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The Research to Practice Gap in the Identification and Instruction of Students at Risk for Reading Disabilities: Teachers' Perspectives

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A thesis submitted in partial fulfillment of the requirements for the Doctor of Philosophy degree in Education

THE RESEARCH TO PRACTICE GAP IN THE IDENTIFICATION AND INSTRUCTION OF STUDENTS AT RISK FOR READING DISABILITIES: TEACHERS' PERSPECTIVES

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Abstract

This study investigated teachers' uses of research on the identification and instruction of students at risk for reading disabilities (RD). It identified obstacles to teachers' uses of RD research and methods to bridge RD research and teachers' practices. Two theoretical frameworks underpinned the study. The knowledge utilization framework consisted of eight stages of knowledge use (reception, search/find, cognition, reference, effort, adoption, implementation, and impact), and three categories of obstacles to knowledge use (supply, demand, and context). A critical perspective also informed the study's methods, analyses, and implications. A mixed methodology was employed by way of: (a) a pre-pilot study which tested the efficacy of the knowledge utilization framework; (b) a narrative synthesis of RD research; (c) a pilot study of an online questionnaire; (d) an online teacher questionnaire; and (e) focus groups. Ten Ontario elementary school teachers participated in the pre-pilot and pilot studies; 204 elementary school teachers completed the questionnaire and eight teachers took part in focus groups. Results revealed underutilization of RD research across the eight stages of knowledge use. Variables within the three categories of obstacles contributed to the underuse of RD research. Research/researcher and user variables correlated most strongly with research uses; user variables were most predictive. Specialized teachers reported greater research use than intermediate grade teachers. Methods to bridge RD research and practice related to research, researcher, dissemination and context factors. Insights which may lead to improved evidence-based reading instruction for those at risk for RD were achieved. Further study of research use across the curriculum and disciplines is proposed.

Keywords: reading disabilities, research use, knowledge use, research to practice gap

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CHAPTER I

Introduction

The research that is reported in this dissertation was conducted to understand the extent to which there is a divide between available research on reading disabilities and teachers' practices, reasons for such a divide, and means to bridge a divide. Ontario elementary school educators completed a questionnaire and participated in focus groups in which they relayed their views regarding the gap between reading disabilities research and their practices. The conceptual frameworks which underpinned the methods, analyses, and implications of this study were comprised of Knott and Wildavsky's (1980) and Stone's (2002) theories of knowledge utilization, as well as critical theoretical perspectives (Giroux, 1988; Kincheloe, 1993; Tripp, 1992).

The utilization of education research has provoked concern dating back to 1867 (Coulson, 1983) and it continues to garner international attention (Levin, 2004). In fact, "observations concerning the gap between research and practice in education have become a mainstay of contemporary literature" (Gersten, Chard, & Baker, 2000, p. 453). Research-based instruction is not only considered to be central to the reflective practice of school teachers (Williams & Coles, 2007), but evidence of effectiveness also constitutes the criterion for ethically responsible teaching (Herie & Martin, 2002). Levin (2004) proposed that the impetus for evidence-based instruction stems from various circumstances: (a) the present day population is more highly educated than in the past and it therefore strives to comprehend current complex problems; (b) currently, research is considered to be scientific and objective; (c) there is an increased emphasis on accountability for public spending; (d) the media increasingly publicizes research reports;

and (e) historically, education has been less research-based than other professions. Undeniably, the drive for evidence-based educational practices persists and is thriving.

Various international measures reflect this drive for research-based education. For example, in the United Kingdom, efforts to elevate the profile of educational research have included the establishment of the Evidence-Informed Policy and Practice Centre, the National Education Research Forum, the Teacher Research Panel, and the Teaching and Learning Program (Levin, 2004) in addition to the General Teaching Council for England and the National College for School Leadership's Networked Learning Communities program (Williams & Coles, 2007).

A standards-based educational reform movement has also begun in the United States (Foorman & Nixon, 2006), and high quality training which is based in scientific research has been mandated for teachers (PL 107-110 No Child Left Behind Act, 2001). The United States Department of Education with the Campbell Collaboration has established a 'clearinghouse' of 'what works' to screen and assemble reports of rigorous and scientific educational research (Levin, 2004).

In addition, the Ontario government's increased concern for the application of educational research spurred the formation of "a strategy to increase the role of research and evidence in Ontario education… focused on improving student outcomes through evidence-informed policy and practice" (Gitterman & Young, 2007, p. 2). In order to facilitate the research agenda, the Ontario Ministry of Education established a Researcher in Residence position in 2005, created an Assistant Deputy Minister's Research Steering Committee, and employed a Chief Research Officer in 2006. A thirteen member Ontario Education Research Panel was also formed in 2006 and annual Ontario Education

Research Symposia focusing on “closing the loop between research and practice” (Ontario Ministry of Education, 2007, p. 7) have been hosted by the Ontario Ministry of Education. Growing concern for evidence-based educational practice in Ontario has been further demonstrated by the Council of Directors of Education projects which may be found at http://www.ontariodirectors.ca/, the Evidence-Based Education and Services Team (E-BEST), the Canadian Centre for Knowledge Mobilization (http://www.cckm.ca), and the 2010 creation of a Knowledge Network of Applied Education Research.

Furthermore, the value of evidence-based reading instruction has been particularly highlighted. For example, the PL 107-110 No Child Left Behind legislation (2001) in the United States guaranteed funding solely to scientifically-proven instructional reading programs in an attempt to raise the reading performance of all children. Underpinning this legislation was the premise that the most effective reading instruction for all individuals is based on research findings (Council of Ministers of Education (CMEC), 2009; McCardle & Chhabra, 2004; International Reading Association, 2010).

Further to this belief, are claims that decades of reading research have culminated in a consensus of what is necessary to prevent or remediate reading disabilities (National Reading Panel, 2000; Shaywitz, 2005; Snow, Burns, & Griffin, 1998). Evidence has demonstrated that early identification and appropriate instruction can prevent or alleviate 70% (Barnes, 2007) to 95% (Greenwood & Abbott, 2001) of potential reading disabilities; "at-risk readers can become both accurate and fluent readers" (Alexander & Slinger-Constant, 2004, p. 244).

The urgent need for research-based reading instruction has been further

underscored by accounts that 80% of all students with learning disabilities (which is defined in the next paragraph) experience reading disabilities (Snow et al., 1998). This 80% incidence amounts to approximately 3.5% of the school population or more than 2 million children in the United States (Shaywitz, 2005). In Canada, Winzer (2007) reported a prevalence of reading disabilities ranging from 5% to 30% of the entire population. In addition, Sweet (2004) reported that 1/3 to 2/3 of minority students in the United States were unable to read with fluency and clarity. Another consideration is that most students with learning disabilities spend a minimum of 50% of their instructional days in regular classrooms (Ontario Ministry of Education, 2005) and up to 100% in fully inclusive schools, where students with or without disabilities are instructed in the same classrooms. Therefore, classroom teachers as well as special education specialists should be cognizant of and employ current, evidence-based identification and instructional strategies with students who may be at risk for or who experience reading disabilities. Unfortunately, a consistent definition of a reading disability to draw on for the identification and instruction of students is lacking. For example, I present here three definitions of reading disabilities and I explain my choice of definition for this dissertation.

Among the definitions which may be familiar to Canadian educators is the Learning Disabilities Association of Canada (2002) official definition of a learning disability which states that learning disabilities affect individuals who have at least average abilities and who evidence unexpected academic underachievement as well as possible impairments in language (which includes reading), processing, executive functions, and social skill development.

The Ontario Ministry of Education (2001) definition of a learning disability also includes dyslexia among the numerous possible features of a learning disability by stating that a learning impairment may be associated with one or more conditions diagnosed as: a perceptual handicap, a brain injury, minimal brain dysfunction, dyslexia, or developmental aphasia.

In my opinion, neither of the above definitions provides sufficient detail to identify individuals with a reading disability, also known as dyslexia (Snow et al., 1998). Therefore, for this dissertation, I have adopted the following definition which was developed by G. Reid Lyon and a group from the International Dyslexia Association in 2002:

> Dyslexia is a specific learning disability that is neurobiological in origin. It is characterized by difficulties with accurate and/or fluent word recognition and by poor spelling and decoding abilities. These difficulties typically result from a deficit in the phonological component of language that is often unexpected in relation to other abilities and the provision of effective classroom instruction. Secondary consequences may include problems in reading comprehension and reduced reading experience that can impede growth of vocabulary and background knowledge (Shaywitz, 2005, p. 132).

Regardless of the definition, evidence from research underscores the value of early identification and interventions for students at risk for reading disabilities.

However, concurrent with the emphasis on research-based instruction is the widespread and perpetual concern that research findings are simply disconnected from educational practices (McLeskey & Billingsley, 2008); namely, there is a research to practice gap in education. This gap has attracted a great deal of attention over the years (Cochran-Smith & Lytle, 1990; Dagenais, Janosz, Abrami, Bernard, & Lysenko, 2008; McIntyre, 2005; McLeskey & Billingsley, 2008; Walberg & Genova, 1982; Weinert,

Schrader, & Helmke, 1990; Williams & Coles, 2007), and the interest continues today.

For example, Cooper, Levin, and Campbell (2009) reported finding more than 20 million hits with a Google search using the terms 'research practice schools'. The divide between education research and practice demands attention because, as Carnine (1997) stressed, the "underutilization [of research] must be addressed comprehensively and concurrently if improvements in practice are to be realized", especially for diverse learners (p. 514). Furthermore, the longer a gap between research and practice persists, the longer individuals wait for evidence-based instruction (Greenwood & Abbott, 2001). Therefore, the gap between research and practice in special and general education should be a matter of national concern (Greenwood, 2001).

Statement of the Problem

Given that the most effective reading instruction is based on research (McCardle & Chhabra, 2004), the first issue with the underutilization of education research is that teachers may not be employing optimal reading instruction with students who are at risk for reading disabilities. As a result, a significant number of individuals may be denied the benefit of evidence-based education that could prevent them from experiencing reading disabilities and that may allow them to achieve to their potential. The ability to read is considered to be "essential to success in our society": it is "important for social and economic advancement" (Snow et al., 1998, p. 1). Therefore, ineffective instruction for students at risk for reading disabilities may also perpetuate "economic disparities" in our society (Snow et al., 1998, p. 18).

However, studies to date have not specifically investigated the extent to which a gap exists between reading disabilities research and teachers' practices, reasons for such a

gap, and means to bridge a gap between reading disabilities research and instructional practices in order to address this first issue.

Secondly, researchers, scholars, and education administrators have forwarded evidence and rationales for the existence of a divide between education research and practice. For example, the difficulty in bridging research and practice has been attributed to high costs (Sindelar & Brownell, 2001), a paucity of research-based interventions, a lack of professional development for teachers (Greenwood & Abbott, 2001), inaccessible research (Greenwood, 2001), and to the belief that practitioners are resistant to empirically defined notions of quality programs (Greenwood, 2001; Foorman & Nixon, 2006).

However, the propensity to omit teachers from the discourse concerning education research use is problematic; more diverse viewpoints of the issue are needed (Broekkamp & van Hout-Wolters, 2007). Broekkamp and van Hout-Wolters (2007), Dagenais et al. (2008), Everton, Galton, and Pell (2000), Ratcliffe et al. (2005), Scribner (2005), Williams and Coles (2007), and Young (2006) have enlisted teachers' perspectives on research use; still, their approaches and goals varied widely and they did not investigate the use of reading disabilities research which is the mission of the current study.

In addition, a Canadian perspective on the underutilization of reading disabilities research is lacking. Only Dagenais et al. (2008) explored and published research use by Canadian teachers and school administrators in recent years and they did not examine reading disabilities research use or approach the investigation with a knowledge utilization framework. In fact, a specific knowledge utilization framework, such as the

one underpinning the current study, has not yet been employed to explore the extent of a gap between education research and teachers' practices.

Research Questions

In order to address the problems identified above, I examined the extent to which there is a divide between research on reading disabilities and teachers' practices, reasons for a divide, and means to bridge a divide. Specifically, I explored teachers' uses of research according to a theoretical framework of knowledge utilization which classified knowledge use into eight stages, seven of which had been theorized by Knott and Wildavsky (1980): reception, cognition (reading and understanding), referencing, effort, adoption, implementation, and impact. To this model, I added a stage of "search and find" in recognition of educators' capacity to actively seek and retrieve information as well as receive it passively. In addition, I explored the obstacles to research use which may be responsible for a gap between available reading disabilities research and teachers' knowledge and practices according to Stone's (2002) theory of routes to knowledge utilization: supply, demand, and context categories. Critical theory offered another lens through which I analyzed the issues. These theories were enlisted to answer the following questions:

1. To what extent is there a gap between research on the identification and instruction of students at risk for reading disabilities and teachers' practices?
2. Why is there a gap between research on the identification and instruction of students at risk for reading disabilities and teachers' practices?
3. How might a gap between research on the identification and instruction of students at risk for reading disabilities and teachers' practices be bridged?

To answer the questions, I conducted a survey of Ontario elementary school educators in 15 school boards and I carried out two focus groups of teachers as a means of member-checking of the survey responses. The questionnaire respondent group of 204 educators provided demographic, quantitative, and qualitative data. I analyzed the data using descriptive statistics, correlation analyses, regression analyses, analyses of variance, and thematic analyses in order to determine the extent of reading disabilities research use by teachers, stages of research use which were deficient, obstacles to research use, and means to facilitate research use by educators. Data from the focus groups were analyzed thematically and compared with the questionnaire outcomes.

Definition of Research

Feuer, Towne, and Shavelson (2002) stated: "If a research conjecture or hypothesis can withstand scrutiny by multiple methods, its credibility is enhanced greatly" (p. 8). Therefore, for the purpose of this study, I have defined research as: evidence of approaches to identify and instruct students at risk for reading disabilities that have been shown to be effective by multiple methods and/or studies. Participants in the current study were provided with this definition before they responded to questions regarding reading disabilities research.

Organization of the Study

The issues which underpinned this study, the procedures that I employed to answer the research questions, and the findings are detailed in the following chapters. In Chapter II, I report a review of the literature on the gap between education research and classroom practice. In this review, several issues are highlighted regarding the extent of a gap between education research and practice in general and across the curriculum,

possible causes for a research to practice gap, and potential means to bridge the gap. Some of these means are studies in which researchers attempted to transform educators' practices by introducing them to evidence-based teaching strategies. Following in Chapter III, I discuss the theoretical frameworks which underpin the current study. Theories of knowledge utilization and critical pedagogy inform the study's methods and analyses. Next, in Chapter IV, an overview of mixed methods methodology provides the rationale for the methods I employed in this study. In Chapter V, I explain the rationale, procedure, and results of the pre-pilot study which I conducted to explore the applicability of the knowledge utilization framework. Chapter VI contains a synthesis of the literature on reading disabilities identification and instruction to which I compared teachers' responses to open-ended questions regarding their knowledge of reading disabilities in the pilot study and core study. The report of the questionnaire development and the pilot study which tested the efficacy of the questionnaire follows in Chapter VII. In Chapter VIII, I detail the procedures and results of the first core component of my study, the teacher questionnaire. The second component of my research which was comprised of two focus groups is presented in Chapter IX. In Chapter X, I examine the combined quantitative and qualitative findings from the questionnaire and focus groups, limitations of the study, and implications for theory and practice. I conclude with considerations for future research and some final thoughts.

CHAPTER II

The Research to Practice Gap in Education: A Literature Review

In this chapter, I present a review of literature which represents views and studies on the research to practice gap in education primarily from the past fifteen years. This matter has been analyzed worldwide by researchers and academics who have theorized causes and solutions for the gap, investigated teachers' knowledge in particular domains, elicited teachers' perspectives on research use, and who have explored projects to close the gap. Throughout the literature are areas of convergence and conflict regarding what constitutes research or knowledge. While I fully acknowledge and respect the value of teachers' professional knowledge and their role in knowledge production, research in the literature concerning a gap generally refers to information that has been discovered by researchers who are based outside of schools. This review therefore focuses on findings that relate to my research questions: the extent of a research to practice gap, reasons for a gap, and means for bridging a gap between educational research and teachers' practices, where the research is produced by individuals other than classroom teachers. The review reveals how my study on the gap between research on reading disabilities and teachers' practices complements past inquiries and adds unique information to the field.

The Extent of the Gap between Educational Research and Practice

On the whole, the reported use of educational research across the curriculum confirmed the existence of a disconnect between research and practice. For example, Scribner (2005) explored the nature of teachers' workplace learning in relation to problems of practice. He concluded that teachers used the tools they had available; they

dealt with problems ‘in the moment’ based on knowledge gained from past experiences or acquired on a ‘need-to-know’ basis. Although teachers valued knowledge that was generated externally, Scribner found that they rarely used research; their knowledge was informal, localized, and built on past experiences. Broekkamp and van Hout-Wolters (2007) also explored the use of education research by way of a questionnaire and a symposium with 190 individuals who included teachers as well as researchers, teacher trainers, and policy-makers. These participants agreed that a gap existed between education research and practice, but also that it is possible to improve it. Several causes for the gap were also forwarded by the participants and these are discussed in an upcoming section of this review.

In addition, Williams and Coles (2007) investigated 390 teachers’ ‘information literacy’ in the United Kingdom. They studied teachers’ abilities to find, use, and judge research-related information and their attitudes toward research. With the use of surveys, interviews, and group exercises, Williams and Coles discovered that the educators conveyed a positive attitude toward research; however, the respondents reported minimal research use. Formal research-based sources such as bulletins, journals, and systematic reviews were used regularly by fewer than 10% of the teachers and occasionally used by fewer than 50%. Libraries were utilized for researching information on teaching and learning by only 4.5% on a regular basis and by 31.7% occasionally. Resources for information were more likely to be informal discussions with colleagues, in-service training where the research was 'pre-digested', the internet, and professional magazines or newspapers.

In another study, Dagenais et al. (2008) determined from questionnaires which

were completed by 2,734 Quebec educators (professionals, administrators, and teachers), that the participants possessed neutral attitudes toward research and that they rarely used research-based information. On the other hand, Everton, Galton, and Pell (2000) discovered that of 302 educators in England who completed a questionnaire on teachers' views and value of research, 96% reported that they had "seriously considered research findings" (p. 169) since they became teachers. In addition, nearly 50% of their 178 respondents indicated that research had changed their views for the better, and another 29.3% had reassessed their views because of research. Everton et al. conceded, however, that their sample of educators consisted largely of administrators who were engaged in professional development at the time and whose work experience exceeded 10 years. The views of a sub-sample of younger and less experienced teachers were less positive.

Research utilization in specific subjects has mirrored the trend found in education research use in general. For example, in the assessment domain, Daniel and King (1998) discovered that despite the available research to support practice, teachers were unaware of the uses of testing to improve student learning. The same results were revealed regarding educators' knowledge and reported utilization of interventions for difficult-to-reach students (Wilson, Gutkin, Hagen, & Oats, 1998). On the topic of special education, teachers of students with learning disabilities and emotional/behavioural problems in Boardman, Arguelle, Vaughn, and Klingner's (2005) focus group study responded that they did "what works" (p. 172). Two-thirds of Boardman et al.'s teachers acknowledged that they knew of specific methods to use, but they were not obligated to do so. Similarly, Burns and Ysseldyke's (2009) survey of 174 special education teachers disclosed that these teachers employed evidence-based strategies with their students as frequently as

they used strategies with little empirical evidence. Burns and Ysseldyke concluded somewhat optimistically that research was employed to some extent; however, a research to practice gap was evident. Furthermore, in an investigation of science teachers' uses of research, Costa, Marques, and Kempa (2000) ascertained that more than 50% of the teachers' pedagogical knowledge was based on personal experience, mentors, or tutors; 13% was considered common sense; only 9% was based on research. Sari (2006) similarly elicited elementary teachers' perceptions on scientific research and he determined that 29.7% reported applying research to their practices, 27% benefited from educational research, 46.2% partly used research, and 20% never used research. Sari's teachers relied mostly on newspapers, television, radio, the internet, ministry publications, school announcements, and professional books for information; in-service courses, college lectures, and communication with academics were accessed the least. In an additional study, the influences of math research reports on teachers' practices were explored by Groth and Bergner (2007). Although teachers acknowledged the positive impacts of research, 13 out of 20 teachers reported that they had very little to no experience reading or applying math research; five had some experience; two had read research. Clearly, a gap between research and practice has been evidenced across the curriculum.

With respect to research on reading specifically, considerable progress has been made in the early identification and interventions for learning difficulties. Unfortunately, "the fruits of these scientific labours cannot be realized however, unless teachers understand and are prepared to implement them" (Moats & Foorman, 2003, p. 38). The skills that teachers require to effectively teach reading are known; therefore, it can be

surmised that teachers' lack of these skills points to a research to practice gap.

To investigate this supposition, Bos, Mather, Dickson, Podhajski, and Chard (2001) surveyed pre-service and in-service teachers' perceptions and knowledge about early reading instruction. Findings revealed that both groups displayed a limited familiarity with phonological awareness and the terminology related to language structure and phonics that are needed for effective reading instruction. The teachers also indicated that they felt only somewhat prepared to teach struggling readers.

In addition, McCutchen et al. (2002) investigated whether explicit instruction in phonological awareness and its connection to orthography would change teachers' practices and benefit the students. They discovered that participants modified their teaching and their students improved their learning to a greater extent than the students in the control group. It was apparent that the teachers without the explicit training lacked necessary skills for effective instruction; there was a gap between research on reading and teachers' knowledge of reading instruction.

Furthermore, Moats and Foorman (2003) similarly witnessed that teachers of reading were deficient in their knowledge of sounds, words, sentences, language skills, reading development, and principles of instruction. Spear-Swerling and Brucker (2005) additionally discovered that teachers lacked an understanding of early literacy and word-level reading skills that are important for teaching struggling readers.

In an additional exploration of teachers' knowledge, Cunningham, Perry, Stanovich, and Stanovich (2004) ascertained the same limited awareness of literature, phonemic awareness, and phonics by 122 teachers, and the issue was compounded by the teachers' overestimation of what they knew. This poor calibration of their own

knowledge suggested that the teachers would probably not be inclined seek information either.

In fact, in light of the findings by Joshi et al. (2009), it is not an unexpected revelation that these gaps in teachers' knowledge of current reading instruction existed. Joshi et al. discovered that teacher educators were actually too deficient in their understanding of phonological awareness and synthetic phonics to instruct pre-service teachers to effectively teach reading, let alone assist students at risk for reading disabilities. The research to practice gap existed not only with respect to classroom teachers but also in teacher education programs.

Whether one considers measures of teachers' content knowledge, observations of teachers' practices, or teachers' self-reports of research use, conclusions from the studies to date unanimously confirmed that teachers make minimal use of research knowledge. An extensive gap between education research and practice is evident. In order to comprehend and consider remedies for these circumstances, reasons for the lack of research use have also been explored.

Reasons for the Gap between Educational Research and Practice

Numerous rationales for the research to practice gap in education or for unsustained research use have been theorized by authors such as Carnine (1997), who critiqued the quality of education research and explored how to increase a demand for it; Gersten, Vaughn, Deshler, and Schiller (1997) who discussed the role of researchers with respect to the gap; Gersten et al. (2000), who analyzed conditions that were missing to maintain the use of research; Greenwood and Abbott (2001), who reviewed several factors that impeded the use of research in special education; and Kennedy (1997), who

identified features of research and the school environment that precluded research use. Additional hypotheses regarding causes for the lack of research use in education have been forwarded by other researchers as well (Levin, 2003; Levin, 2004; Lloyd, Weintraub, & Safer, 1997; Malouf & Schiller, 1995; Nuthall, 2004; Sindelar & Brownell, 2001; Stanovich & Stanovich, 1997; Stone, 1998; Tanner & Galis, 1997; Vaughn, Klingner, & Hughes, 2000; Wagner, 1997). The contributions of these authors are reported in a following section.

Scholars have also explored the successful and unsuccessful dynamics of researcher-supported information transmission and of schools that implemented evidence-based practices. Pressley and El-Dinary (1997), for example, observed the fidelity of three groups of educators to the use of research-based comprehension strategies that they had been trained to implement. Baker and Smith (2001) studied factors that facilitated the use of research-based reading programs in two schools; while Calfee, Miller, Norman, Wilson, and Trainer (2006) reported on the conditions that facilitated and that obstructed the translation of literacy research to practice in three projects. An examination of the Texas Reading Initiative by Fletcher, Foorman, Denton, and Vaughn (2006) disclosed that impediments plagued even this relatively successful program. Additionally, teacher and researcher approaches to reading academic articles and differences between the groups were examined by Bartels (2003) to determine whether such differences were responsible for a disconnection between research and instruction.

Investigations that elicited the opinions of teachers regarding their difficulties with using research or innovations have also provided insights into the reasons for a

research to practice gap (Boardman et al., 2005; Broekkamp & van Hout-Wolters, 2007; Dagenais et al., 2008; Everton et al., 2000; Groth & Bergner, 2007; Konings, Brand-Gruwel, & van Merrienboer, 2007; Ratcliffe et al., 2005; Sari, 2006; Scribner, 2005; Williams & Coles, 2007; Young, 2006) and the findings are discussed in succeeding sections of this dissertation. The reported impediments to research use have been identified as faults with the research, the researchers, research dissemination, the intended users such as the teachers, policy-makers, or administrators, as well as with the teachers' working conditions. Consensus on the reasons and the broad categories of obstacles to research use was found in the literature; I will therefore discuss the possible causes for a gap between education research and practice under the classifications of research, researcher, dissemination, user, and context variables.

Research Variables

With respect to problematic features of education research, several authors proposed that educators do not use research because of its quality and design. For example, some proposed that if research is not useful or practical and if it does not make a difference or meet the needs of the school, it is not implemented (Boardman et al., 2005; Broekkamp & van Hout-Wolters, 2007; Carnine, 1997; Calfee et al., 2006; Greenwood & Abbott, 2001; Groth & Bergner, 2007; Hemsley-Brown & Sharp, 2003; Sari, 2006; Stanovich & Stanovich, 1997; Vaughn et al., 2000; Wagner, 1997). Broekkamp and van Hout-Wolters (2007) suggested that education research is not useful because it does not address the right questions and it is often of poor quality. Hemsley-Brown and Sharp (2003) concurred that researchers and teachers often have disparate goals, or that research may not relate to key policy issues. Konings et al. (2007) added

that innovations contain insufficient guidelines, or they are inappropriate and do not benefit enough of the students.

Vaughn et al. (2000) suggested that the benefits of a research-based practice are often simply not immediately visible, or the practices are not applicable to an entire class and they are therefore difficult to implement. In addition, research findings are at times ambiguous and not persuasive (Broekkamp & van Hout-Wolters, 2007; Groth & Bergner, 2007; Stanovich & Stanovich, 1997; Tanner & Galis, 1997) or their validity is questioned as Levin (2003) posited regarding a 20 year phonics versus whole-language controversy. The generalizability of research findings has also been challenged because of the heterogeneity of school contexts (Calfee et al., 2006; Hemsley-Brown & Sharp, 2003) and the changes in school demographics from the time of the research (Tanner & Galis, 1997). In addition, the lack of useful research has been attributed to the absence of teachers' input regarding which research questions are studied and how the outcomes are interpreted (Carnine, 1997; Stone, 1998; Konings et al., 2007; Vaughn et al., 2000; Wagner, 1997); local knowledge is typically not recognized (Calfee et al, 2006.; Gersten et al., 1997), and research is rarely conducted by practitioners (Broekkamp & van Hout-Wolters, 2007).

The inaccessibility of educational research has also been implicated in the gap. Physically, research may be difficult to locate by teachers (Broekkamp & van Hout-Wolters, 2007; Carnine, 1997; Fletcher et al., 2006; Groth & Bergner, 2007; Sindelar & Brownell, 2001; Stanovich & Stanovich, 1997). As well, the language of research may render it inaccessible and alienating if it is too statistical (Bartels, 2003; Hemsley-Brown & Sharp, 2003; Stanovich & Stanovich, 1997; Williams & Coles, 2007). Broekkamp and

van Hout-Wolters (2007) in addition to Vaughn et al. (2000) also suggested that too little information may hinder the use of research, while excessive knowledge may prove to be too overwhelming to be adopted (Lloyd et al., 1997). Clearly, several attributes of the research itself may contribute to its limited use.

Researcher Variables

Researchers may also contribute to underutilization of their findings. For example, they have been accused of embracing a "multiplicity of perspectives" which can be confusing (Levin, 2003, p. 23) because different stances create conflicting findings (Calfee et al., 2006). Case in point are 'research-based' reading programs which can vary a great deal depending on the researchers' particular theoretical inclinations (Baker & Smith, 2001).

Furthermore, it has been argued that researchers rarely consider the needs of the educators. One explanation for this last matter is that universities reward research over teacher education/collaboration (Sindelar & Brownell, 2001); therefore researchers tend to comply with funding councils' or their universities' "set of imperatives" (Brundrett, 2006, p. 100), rather than selecting research topics which may benefit educators. Everton et al. (2000) agreed that the source of the research-teacher divide may be that decisions regarding the funding of research are not based on teachers' needs. In addition, researchers, practitioners and policy-makers rarely cooperate on equal terms with respect to research (Broekkamp & van Hout-Wolters, 2007).

Sari (2006) also suggested that researchers' poor human relations skills impact their communication with intended users before, during, and after research projects. Moreover, it may be that researchers do not take adequate responsibility for translating

their research to practice or for fostering its implementation (Carnine, 1997; Calfee et al., 2006; Konings et al., 2007).

Dissemination Variables

The diffusion of research knowledge has been another long-standing dilemma. Teacher education programs have been accused of poor diffusion of knowledge to some extent (Broekkamp & van Hout-Wolters, 2007; Joshi et al., 2009; Lyon & Weiser, 2009; Moats, 2009; Sindelar & Brownell, 2001). For example, Lyon and Weiser (2009) and Joshi et al. (2009) disclosed that pre-service teachers were ill-prepared to help students become proficient in reading. With respect to in-service programs, Fletcher et al. (2006) admitted that the best means to transfer new knowledge to in-service teachers is unknown. Gersten et al. (2000) claimed that the implementation of innovations is more difficult than telling teachers and others that there is a new knowledge base and they should be using it; instead, organization, skill, and endurance are needed to introduce new classroom practices (Malouf & Schiller, 1995). Others have also forwarded that in addition to inadequate professional development, a lack of collegial time limits teachers' learning about research (Boardman et al., 2005; Greenwood & Abbott, 2001; Sindelar & Brownell, 2001). Also, a deficiency in materials to facilitate the sharing of research with either pre-service or in-service teachers has been linked to poor research dissemination. For instance, Broekkamp and van Hout-Wolters (2007) as well as Stone (1998) protested that new practices are not always in textbooks. Moats (2009) concurred, stating: "there is a dearth of good textbooks and teaching materials for teacher preparations and professional development" (p. 389) and that this is an obstacle to improving the knowledge of teachers.

An additional issue concerning the diffusion of research is the traditional linear flow of information from researchers to teachers (Malouf & Schiller, 1995; Levin, 2003). This linear flow disregards the realities of practice (Malouf & Schiller, 1995); teachers should not be viewed as passive users of research (Levin, 2003). Therefore, inadequate research dissemination also accounts for a gap between education research and practice.

Teacher Variables

Stone (2002) suggested that policy-makers may resist using research if they adopt an attitude of anti-intellectualism. In a similar vein, researchers have proposed that teachers contribute to the gap between research and practice because they are not interested in research or that they are unwilling to learn (Boardman et al., 2005; Konings et al., 2007; Sari, 2006). Scholars have claimed that teachers are not conscious of their behaviours and that they are non-reflective (Konings et al., 2007). It is also possible that teachers and policy-makers have a low opinion of research (Broekkamp & van Hout-Wolters, 2007) and, therefore, reject it despite being aware of it.

Teachers may also reject innovations in preference for familiar methods which they believe are somewhat effective (Vaughn et al., 2000). Teachers are known to rely on knowledge gained from their own experience to a great extent (Malouf & Schiller, 1995; Scribner, 2007) and with the advent of standardized testing, Vaughn et al. (2000) additionally proposed that teachers maintain the methods that they find generate high scores on high stakes tests rather than attempt novel ideas. It is also possible that teachers believe that there are many ways to teach students and that there is no consensus from research (Vaughn et al., 2000). Although teachers recognize that research provides new information, they will more readily adopt research findings if the findings confirm the

teachers' existing beliefs and practices (Ratcliffe et al., 2005). Results from Ratcliffe et al.'s (2005) as well as Williams and Coles' (2007) studies demonstrated that the sources of teachers' information may additionally be problematic, since most reported sources were not academic. In addition, Stone (1998) proposed that some teachers actually "disavow both the responsibility and the knowledge base" (p. 121) for meeting the needs of students with learning disabilities and, therefore, refuse to consider relevant findings.

It has also been forwarded that teachers' competencies to use research vary (Calfee et al., 2006; Konings et al., 2007); they may lack the skills to evaluate and correctly implement new practices despite best intentions (Broekkamp & van Hout-Wolters, 2007; Calfee et al.,2006; Stanovich & Stanovich, 1997; Williams & Coles, 2007). In fact, some researchers claimed that evidence-based methods are undermined when teachers modify the methods over time and according to their own beliefs (Baker & Smith, 2001; Pressley & El-Dinary, 1997). Teachers may also contribute to the gap between research and practice when they misuse innovations or when the wrong innovations, too many innovations, or under-developed innovations are utilized (Malouf & Schiller, 1995). Resultantly, research is used "haphazardly or irresponsibly" (Broekkamp & van Hout-Wolters, 2007, p. 212) and, therefore, a disparity between research findings and practice is created. However, teachers are subject to certain work conditions which may impact their use of research as well.

Context Variables

On reviewing several position papers on barriers to research use, Hemsley-Brown and Sharp (2003) concluded that more emphasis should be on organizations that do not foster a culture of learning. Numerous contextual factors have been forwarded to support

this claim. For example, Broekkamp and van Hout-Wolters (2007) believed that educational policy is simply not based on research. Another perspective has been that systematic change in response to research is hampered by both stability (slowness to change) and instability (adoption of fads) in education (Stanovich & Stanovich, 1997). In addition, when change occurs with difficulty, it may take place too slowly to keep pace with research (Sindelar & Brownell, 2001). On the other hand, frequent changes in programs discourage commitment to any program (Boardman et al., 2005).

School boards and leadership within schools conceivably further block research use. Such leaders may have limited capacity or skills to locate, understand and apply research innovations (Broekkamp & van Hout-Wolters, 2007; Greenwood & Abbott, 2001; Levin, 2003; Sindelar & Brownell, 2001). Decision-makers may rebuff research because of opposing beliefs about teaching or epistemologies (Fletcher et al., 2006; Levin, 2003). In addition, a lack of resources and funding may compound the hardships in instituting new practices (Boardman et al., 2005; Calfee et al., 2006; Fletcher et al., 2006; Sindelar & Brownell, 2001). Schools also confront staff and leadership turn-over, transient and changing students, new policies, and altered curricula that interfere with the consistency of the knowledge used (Calfee et al., 2006; Malouf & Schiller, 1995) and, one could surmise, that interfere with teachers' opportunities to explore novel practices.

Furthermore, the multiple demands on teachers that preclude the exploration of research findings are well-acknowledged. Teachers must deal with too little time, a demanding curriculum, administrative requests, workshops, paperwork, large class sizes, and inadequate texts (Boardman et al., 2005; Broekkamp & van Hout-Wolters, 2007; Konings et al., 2007; Scribner, 2005; Sindelar & Brownell, 2001; Vaughn et al., 1998;

Williams & Coles, 2007). Students' characteristics also impact the teachers' engagement with research. For example, if students appear to lack passion or are unable to benefit from innovations, teachers may well reject new practices (Konings et al., 2007). Students with emotional or behavioural problems require time and effort that could also impede teachers from accessing and exploring new concepts (Boardman et al., 2005). In addition, the students' parents may potentially oppose research-based initiatives (Boardman et al., 2005). Lastly, the fact that there are few incentives for teachers to use research has been recognized as a basis for teachers' evasion of research knowledge (Moats, 2009; Sindelar & Brownell, 2001).

Clearly, several factors may account for an inadequate use of research in education. The research itself might be of poor quality, impractical, inappropriate, ineffective, unconvincing, vague or too specific, inaccessible, incomprehensible, or irrelevant to the users who are often not consulted about the questions that are asked or about the validity of the findings. Researchers might be more focused on their own interests or the interests of their sponsors instead of the needs of schools; they might not work with the users collaboratively in their studies or in translating research to practice. Dissemination of research via the researchers, pre-service programs, teacher professional development, or textbooks is lacking. Teachers might not have the interest, skills or confidence to search for or experiment with new knowledge, or they adopt or modify programs according to their prior beliefs. Lastly, the intended contexts are not always conducive to research use; school leaders may lack the capacity to search for and maintain pace with innovations, or they indiscriminately enforce programs that are not appropriate for all schools. Resistance by personnel and parents can deter change;

students' needs might differ from what research provides and teachers can be too consumed with everyday work demands. Resources and support may be absent or inconsistent. Inarguably, a multitude of explanations for a gap between educational research and teachers' practices exists. As efforts to understand the barriers have been made, attempts to intervene in order to bridge the gap between education research and practice have also been undertaken. A review of such attempts follows.

Means to Bridge the Gap

Eliminating the preceding impediments would seemingly remedy the research to practice gap in education. Indeed, researchers have theorized and explored means to overcome many of the obstacles by way of improving the research, by enhancing the researchers' roles, by improving the dissemination of research, and by creating school contexts that are more conducive to research use. Theoretically, all these variables would interact for maximum effectiveness in research implementation.

Research Variables

First, scholars have recommended that quality research should be a priority; research must be trustworthy, which means replicated, well-designed, and well-executed (Billows, 1997; Carnine, 1997; Ratcliffe et al., 2005). Ideally, research would be practice-oriented and basic (Broekkamp & van Hout-Wolters, 2007). Hemsley-Brown and Sharp (2003) emphasized that "effective programs for change should be utilitarian, inspirational, provide immediate pay-offs and meet local needs" (p. 461). Useful research should answer problems that are forwarded by the consumers (Gersten et al., 1997; Lloyd et al., 1997) and it should be customized by drawing on local school knowledge and expertise (Scribner, 2005; Ratcliffe et al., 2005), adjusting programs to local needs, and

by revising the programs as necessary (Broekkamp & van Hout-Wolters, 2007; Calfee et al., 2006, Stone, 1998). Researchers therefore need to be more informed about school contexts (Hemsley-Brown & Sharp, 2003).

Recommended instructional strategies should also have demonstrated that they produce improved learning by all students (Gersten et al., 1997; Pressley & El-Dinary, 1997). The consumer of a new practice needs to be satisfied (Vaughn et al., 2000). To achieve such satisfaction, Gersten et al. (1997) and Nuthall (2004) suggested that changes in instruction should be linked to measures of student performance in order for teachers to witness the effects of the instruction immediately. On the other hand, Ratcliffe et al. (2005) recommended that convincing findings are those that are "generalizable to different contexts" (p. 183), while Stone (1998) suggested that findings need to be packaged in multiple ways for multiple audiences.

Improved accessibility to research has also been identified as a requisite for its use. Teachers require reliable sources of teacher-friendly reports of research-based practices and examples of how to implement them (Bartels, 2003; Billups, 1997; Sindelar & Brownell, 2001). Williams and Coles (2007) found that in-school access facilitated research use.

Researcher Variables

Researchers also have the potential to improve research use. For example, Lloyd et al. (1997) found that when teachers understood the concepts underlying the research, they were more inclined to implement innovations as they were intended. Therefore, research accessibility and teachers' skills to employ research could be enhanced if researchers would translate their research into practical classroom applications, and if

researchers were available to support teachers in understanding and implementing new information (Pressley & El-Dinary, 1997; Ratcliffe et al., 2005).

Research accessibility, dissemination, and teachers' skills to use research may also be improved if research were a "shared responsibility" between the researchers and the practitioners (Gersten et al., 1997, p. 472). Research projects should be collaborative endeavours (Everton et al., 2001; Hemsley-Brown & Sharp, 2003; Malouf & Schiller, 1995; Ratcliffe et al., 2005 ; Simons, Kushner, Jones, & James, 2003; Sindelar & Brownell; Vaughn et al., 2000; Wagner, 1997), where the knowledge of both the researcher and teacher is considered to be complementary and equal (Broekkamp & van Hout-Wolters, 2007). Teacher participants in a study by Ratcliffe et al. (2005) for example, reported that their involvement in research projects influenced them to adopt innovative ideas and change their practices.

Fuchs and Fuchs (1998) also effectively collaborated with teachers in a Peer-Assisted Learning Strategies (PALS) project. Teachers and researchers developed curriculum-based measurement and peer tutoring strategies in math (and later in literacy) and researchers supported accommodations to programming that were required for the students. The students' performance, the teachers' involvement, and the researcher assistance changed most teachers' practices. Fuchs and Fuchs (2000) additionally succeeded with another project in which researchers and teachers partnered to identify goals, develop methods, and to evaluate the innovations. With respect to bridging the gap between education research and practice, these researchers learned that within a school there should be: one key interested person; discretionary spending for staff and resources; accountability for student outcomes; ongoing participation of teachers in the development

of the innovation; practice and time with new methods; and recognition of teachers' accomplishments.

Boudah, Logan, and Greenwood (2001) similarly reported four collaborative projects that centered on research-validated practices to improve the educational outcomes of children with and without disabilities. Significant elements of the programs were: teachers identified the problems to solve; researchers contributed their knowledge of effective practices; and the programs were developed and evaluated cooperatively.

Collaboration between researchers and practitioners in designing experiments was additionally advanced by Jitendra (2005) who conceded that while the efforts were challenging to maintain, they succeeded in engaging teachers in the research with resultant changes in teachers' practices. These successful collaborative projects veered from the traditional, problematic "unidirectional script" (Bauer & Fischer, 2007, p. 225) of transferring knowledge from researcher to practitioner; instead, research was a cyclical process with research impacting practice and vice versa.

Dissemination Variables

An additional route for improving accessibility, dissemination of research, and teachers' skills has been by way of sustained professional development and focused feedback for practising teachers who attempted innovations (Gersten et al., 1997). Vaughn et al. (1998) tested the benefit of such professional development. They instructed educators on teaching reading and writing to students with learning disabilities in the regular classroom. Of the seven teachers who participated, five continued the program completely or partially after nine weeks; four maintained the program for a year and three continued the program into the following year. Although it was a small sample,

indications were that very intensive training and support potentially produce satisfactory changes in teachers' practices. McCutcheon and Berninger (1999) also succeeded with an in-service training model that was comprised of a summer institute, follow-up, and on-going observations and consultation. Similarly, Podhajski, Mather, Nathan, and Sammons (2009) reported that teacher knowledge of reading instruction can be improved with in-service training. According to Vaughn et al. (1998), well-administered professional development is considered to provide an ideal influence on teachers' practices.

With respect to professional development, Walberg and Genova (1982) concluded that in-service workshops for teachers were effective when the topics were selected by the participants or when they were suggested by consultants, when the workshops were clearly explained in advance, and when the sessions contained interesting instruction, subject matter that was relevant to the job, and practical skills. Teachers who had received recent instruction and teachers who came from informal, clear, warm, interesting, challenging, and manageable schools benefitted most from the workshops. Teacher participation, school climate, and workshop features all impacted the effectiveness of the professional development.

The diffusion of information can also be aided by teachers who employ new practices and record their successes; they may potentially inspire their colleagues to emulate the new methods (Gersten et al., 1997). In order for this to succeed, teachers should recognize their own roles as knowledge producers which they presently do not appear to do (Ratcliffe et al., 2005).

Levin (2003), on the other hand, advocated for a third party to link the producers and users of research. The effectiveness of such a linking agent was studied by Gersten

and Dimino (2001). In two projects, a leader facilitated the translation of research into classroom practice. Success of this form of linking depended on: ongoing technical support; a truly knowledgeable leader who was accessible and helpful with problems; and the leader's specific feedback on implementation issues. These authors also suggested that collegial networks, informal discussions with the leader or change agent, and linking student performance to the changes in practice changed teachers' beliefs and resulted in sustained use of innovations.

Boudah et al. (2001) additionally described a linking project in which a full-time, on-site Research Lead Teacher connected research to practice within a school. This Research Lead Teacher responded to teachers' concerns about specific learning and behaviour problems and trained teachers to use research-based strategies. After four years, student outcomes improved, teachers were more willing to teach students with disabilities, and the Research Lead Teacher model was augmented. Moats (2009) supported the concept of highly-trained specialist teachers "whose advanced knowledge and skills elevate them to the higher ranks of a profession" (p. 390). Moats also suggested "interdisciplinary credentialing" (p. 389) which, in an area such as reading, may include combining qualifications for speech and language pathologists, reading specialists, and special education teachers to produce highly skilled teachers who would assist others to bridge research and practice.

Yet another novel approach to promote research information was forwarded by Olivero, John, and Sutherland (2004). These researchers suggested that 'videopapers' could replace the conventional written research reports. Videopapers combine texts, videos, hyperlinks, and slides in one document, so that research can be presented

in a multimedia format for better communication.

Additional suggestions for promoting research use may be found in Fletcher et al.'s (2006) Texas Reading Initiative to expand school reading programs according to research evidence. They stressed that leadership initiatives from the state government, business, and the state education agency, combined with universities and other interested groups, successfully introduced new reading ideas to educators. The educational needs were identified by stakeholders who advocated for children, and legislation to provide services and statewide accountability followed. Fletcher et al. found that research use was fostered when there were connections with universities, when teacher development was encouraged, and when train-the-trainer models were implemented. This program was yet another example of the effort and persistence that is possible to connect research with practice.

An alternate route to transfer knowledge would be for researchers to collaborate with teacher-educators who could introduce new concepts through teacher education programs (Sindelar & Brownell, 2001). Greenwood and Abbott (2001) agreed that teacher educators could teach pre-service teachers the skills to find, evaluate, and use research. Moats (2009) added that teacher educators also require support and incentives to stay current in order to impart the most effectual knowledge of reading instruction to the pre-service teachers.

Context Variables

Finally, conditions within teachers' work contexts have been identified as instrumental in producing a culture of research acceptance and use. Knowledgeable and visionary school leaders have the capability to stimulate and maintain progressive schools

(Sindelar & Brownell, 2001) and to encourage and support teachers to seek and use new ideas (Hemsley-Brown & Sharp, 2003; Williams & Coles, 2007). Moats (2009) suggested that research-based practices in reading could be facilitated if school and school board leaders had access to the most current, effective approaches and if they were rewarded for continuing their own professional development and for being innovative. Teachers also need time to learn about new innovations, opportunities to interweave their own knowledge with the research (Vaughn et al., 2000), chances to discuss their learning about new interventions and student achievements with colleagues (Gersten et al., 1997), and recognition for their efforts to undertake progressive practices or research of their own (Broekkamp & van Hout-Wolters, 2007). Hemsley-Brown and Sharp (2003) proposed that legislation is the optimal way to impact educational practice; but new initiatives will not be adopted if they are not funded (Everton et al., 2000; Hemsley-Brown & Sharp, 2003). Funding for resources, training, and personnel would potentially facilitate research use.

Many of the theorized proposals for bridging the gap have been successfully tested, albeit in seemingly isolated projects except for the Texas Reading Initiative which is state-wide. Several lessons that were learned from the Research Lead Teacher project and from collaborative projects were detailed by Boudah et al. (2001, see pp. 294-295) and a comprehensive list of sustainability factors and issues has been compiled by Gersten et al. (2000). Remedying many of the blocks to research use would seemingly produce a positive influence on practitioners' attitudes, skills, and opportunities for knowledge access and implementation. However, systematic study of teachers' adoption of instructional practices and of the conditions that enhance long-term use continues to be

needed (Calfee et al., 2006; Vaughn et al., 2000).

Summary

This review of the literature on the gap between educational research and classroom practice has illuminated several significant issues; yet, it has also evidenced shortcomings. Overall, there appeared to be agreement that research is valuable for effective instruction of all students. Sufficient research reportedly exists to inform education practices and especially early reading instruction; however, that research is not being utilized to the degree it should be. Obstacles to research use in schools have been identified and, if surmounted, could potentially solve the research to practice gap.

However, the extent of the research to practice gap has not been thoroughly demonstrated. The degree to which there is in fact useful research in reading and in other domains such as math, science, and special education, needs to be investigated, followed with more study of the extent to which the research is used.

In addition, the meaning of 'use' was rarely clarified; use might imply that information is read, assimilated into practice, or that it is applied and changes practice. With the exception of Dagenais et al. (2008) who considered user, supplier, and context variables, and Williams and Coles (2007) who used an information literacy framework, no particular theoretical or conceptual framework has been used to understand how research is used and the extent of research use by teachers.

A number of additional shortcomings in the literature indicated areas that deserve further examination. The voices of teachers were missing. Only a small number of studies between 1995 and 2010 have included teachers' views on education research use (Boardman et al., 2005; Broekkamp & van Hout-Wolters, 2007; Burns & Ysseldyke,

2009; Dagenais et al., 2008; Everton et al., 2000; Groth & Bergner, 2007; Konings et al., 2007; Ratcliffe et al., 2005; Sari, 2006; Scribner, 2005; Williams & Coles, 2007; Young, 2006).

Additionally, although teachers' knowledge of literacy skills has been studied to a degree, teachers' knowledge and use of information on identifying and instructing students at risk for reading disabilities specifically were not. Lastly, only one Canadian study (Dagenais et al., 2008) was among the reports on the research to practice gap in education.

The current study of teachers' perspectives on the research to practice gap in the identification and instruction of students at risk for reading disabilities addressed several of the deficits found in the literature. Teachers' voices were elicited regarding their uses of research and their views on the obstacles to research use. The focus was on knowledge about the identification and instruction of students at risk for reading disabilities specifically. The extent of a gap was analyzed from a knowledge utilization framework with stages of use which help to identify where the utilization of research actually breaks down and why, as well as through a critical lens. These theoretical frameworks are presented in the following chapter.

CHAPTER III

Theoretical Framework

Two theoretical frameworks guided this investigation of the gap between reading disabilities research and teachers' practices. First, the concept of knowledge utilization significantly informed the methods, analyses, and implications of the study. Knowledge itself is a controversial subject which I discuss in this chapter. Also, several models have been proposed to dissect the term "use" and to explain impediments to knowledge use. I selected a model which merged Knott and Wildavsky's (1980) stages of knowledge use and Stone's (2002) routes to knowledge use to examine the issues concerning education research.

Secondly, the review of the literature on teachers' utilization of research revealed a paucity of teachers' participation in exploring the matter. As I discussed in Chapter II, twelve studies, published between 1995 and 2010, were found to have investigated education research use by eliciting teachers' input; however, these studies did not recruit educators' perspectives on a rationale for a research to practice gap or for means to bridge a gap. Frequently, teachers have been objects of discussions concerning research implementation. This positioning of educators prompted me to adopt a critical perspective on the topic, which resultantly underpinned my research methods. Specifically, critical theoretical views, as informed by the work of Giroux (1988), McLaren (2007), and Kincheloe (2000) among others, were useful in informing my conceptualization of teachers and their pedagogical practices as contextually specific and enmeshed in relations of power. Critical theorists dispute traditionalist beliefs that knowledge is rational, objective, and unmediated, and they apply this knowledge to

thinking about teachers as ‘transformative intellectuals' rather than as technicians who merely impart knowledge to their students. Critical theory therefore informed my approach to studying the use of education research; however, it particularly provided insights into the systemic implications of this issue. In the following sections, I discuss knowledge utilization and critical theories in general and specifically with reference to their roles in the current study.

Theories of Knowledge Utilization

Before embarking on a discussion of knowledge utilization theories, the concept of "knowledge" warrants attention. From both a critical theory and cognitive perspective, knowledge has embodied various connotations. For example, from a cognitivist viewpoint, Paisley and Butler (1983) reported that knowledge is awareness, skill, or change that can be made by individuals or by organizations and that it is produced by anyone from nursery school to graduate school. Concepts of "technical" versus "practical" knowledge have also been forwarded, where technical knowledge "is capable of written codification" and practical knowledge is acquired through experience and is not necessarily amenable to written description (Eraut, 1985, p. 119). Knott and Wildavsky (1980) suggested that knowledge specifies the relationship between variables and consequences in contrast to information, which relates variables to effects in a hypothetical relationship. However, “scholars differ on how much distinction should be made between 'information' and 'knowledge'; knowledge is usually inferred to be more refined and to have some pretested 'value'” (Backer, 1991, p. 227). Backer (1991) additionally stated that knowledge may be the "manifestation of the human urge to solve problems, to master the environment around us" (p. 225).

Karmon (2007) pointed out that schools inculcate the curricular subject, which is produced by others and is located in textbooks, as real knowledge. On the other hand, Hood (2002) equated "information" with "knowledge"; however, similar to Eraut (1985), Hood challenged the view that knowledge consists of "objective" facts that are easily communicated and understood, and transferred as if "filling an 'empty vessel'" (p. 3). Hood claimed that "new views of knowledge …stress its implicit and social nature" (p. 3); from the more current constructivist viewpoint, "knowledge is developmental, internally constructed and socially and culturally mediated" (p. 6). Hood also referred to "craft knowledge" (p. 5) which is "local" (p. 4) and evolves from individual learning and "communities of learners" within organizations (p. 3) and which usually prevails over scientific knowledge in its use. In considering knowledge use, Hood contended that we must reconcile that scientific and craft knowledge are melded in users' contexts.

Despite Hood's (2002) arguments, literature concerning the research to practice gap often refers to knowledge as the published output of a planned piece of research (Williams & Coles, 2007). While the meaning of "research" itself might also be "contested" (Levin, 2004, p. 2), research in the context of evidence-based practice and the research to practice gap has customarily implied knowledge produced by researchers external to schools (Levin, 2004; Ontario Ministry of Education, 2007; Sari, 2006; Scribner, 2005; Shultz, 2007; Thompson, Estabrooks, & Degner, 2006; Williams & Coles, 2007; Wise, 2007). Teachers in my pre-pilot study, which is reported in Chapter V, appeared to share this connotation of research. Readers are reminded, however, that the definition of research for my study is: evidence of methods to identify and instruct students at risk for reading disabilities that have been shown to be effective by multiple

methods and/or studies. Reliable and useful knowledge may well be "local" or from "outside" (Louis, 2005, p. 55). I have not indicated a preference for one particular mode of knowledge production or research despite the fact that the literature may.

With respect to the utilization of knowledge, interest in this phenomenon reportedly extends back to the ancient Greeks (Landry, Amara, & Lamari, 2001). In America, the topic has been studied in "three waves (1920-1960, 1960-1980 and the present)" (Backer, 1991, p. 225) and it continues to garner extensive interest across disciplines such as business, health, human services, and education.

As early as the 1920s, a dissemination paradigm dominated the study of research use (Coulson, 1983; Craig, 2006; Herie & Martin, 2002; Hood, 2002; Thompson et al., 2006). Concern centered on the distribution of knowledge that was produced external to the intended user, sometimes physically and culturally distant (Hood, 2002). Hood (2002) illustrated the past dynamics of research dissemination as in Figure 1. Research was produced outside the realm of the intended users; it was then dispersed to users who were to implement the findings. Hood also suggested that the steps may have been bi-directional with a "two-way exchange" (Hood, 2002, p. 3) as in Figure 2.

Attention to research dissemination was first motivated by interest in transmitting agricultural advances to farmers and innovative teaching strategies to educators (Backer, 1991). The initial attempts to develop explicit policies to make science more accessible to society in the United States began in 1929. With the information explosion after 1945, the concentration on promoting knowledge use flourished (Backer, 1991). The second wave (1960-1980) emphasized the study of both knowledge dissemination and utilization, and these facets of knowledge use continue to draw interest today (Backer,

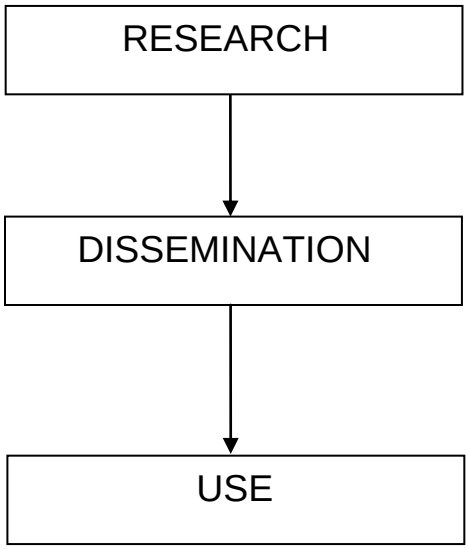


Figure 1. Past dynamics of research dissemination.

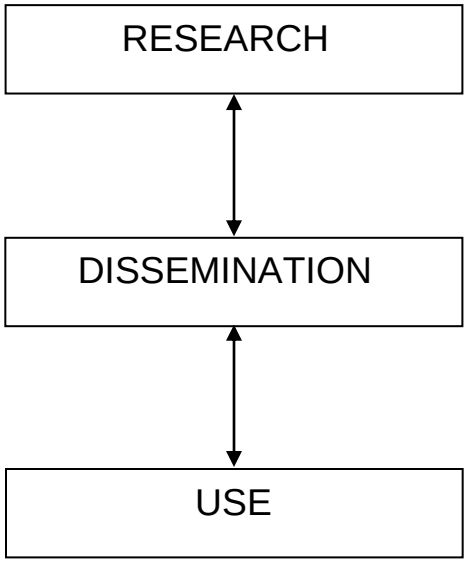


Figure 2. A bi-directional dissemination of research.

1991). Since passive diffusion of research has been ineffective in promoting use (Thompson et al., 2006), researchers are exploring avenues for improved promotion of innovations (Cooper, 2010; Thompson et al., 2006; Qui & Levin, 2010); however, Larsen (1980) contended that the utilization process itself needed to be understood before knowledge would translate into action. Landry et al. (2001) additionally concluded that "factors such as dissemination and linkage mechanisms …are less important than factors such as the receptive capacity of users when one climbs from the stage of transmission to the higher stages in the ladder of knowledge utilization" (p. 416). How then is knowledge utilization explained? What are the stages?

Several theories of knowledge utilization have been forwarded. For example, concepts of "instrumental" and "conceptual" utilization have been proposed; in other words, knowledge use could be expressed in action or it might just influence thinking without observable activity (Landry et al., 2001; Larsen, 1980). Additionally, symbolic use involves the employment of research to justify or sustain certain actions (Beyer & Trice, 1982; Landry et al., 2001). On one hand, Backer (1991) simply stated that "knowledge utilization represents an evolutionary step involving strategies designed to put knowledge to use effectively in a larger number of settings" (p. 225). On the other hand, others have presented theories of knowledge use to explain possible strategies or stages in the utilization process.

For example, Ashford and LeCroy (1991) concluded that basically three models of knowledge use exist:

1. The research and development model: research leads to practical application.
2. The problem-solving model: research is applied toward solving a particular problem.

3. The interactive model: knowledge producers and users work collaboratively through on-going communication.

Weiss (1979) however detailed seven models of knowledge use beginning with the "Knowledge-Driven Model" (p. 427) which is demonstrated in Figure 3. In this process of knowledge use, basic research findings suggest that there are opportunities for policy to benefit from the research; more specific study is then undertaken to test the applicability of the basic research to policy; next, findings of the applied research lead to creating technologies which facilitate use of the applied research. Weiss (1979) explained that this model originated in the natural sciences and is less relevant to the social sciences.

A second model of knowledge use is the "Problem-Solving Model" (Weiss, 1979, p. 427) which is illustrated in Figure 4. In this model, research has been undertaken before decision makers discerned the existence of a problem. A problem is subsequently discovered by the decision makers, and they search for, stumble upon, or are informed of research that may solve the presenting problem. The decision makers then make a judgment based on the research, and use of the research ensues. However, this scenario may result in the use of inappropriate findings because the research would have been conducted prior to identification of the presenting problem.

A second problem-solving model begins with a dilemma which stimulates research to resolve the issue, and the decision and application stages follow as illustrated in Figure 5. Although more appropriate for the social sciences, the second problem-solving model assumes that decision-makers and researchers concur on the problem and on the ideal outcomes.

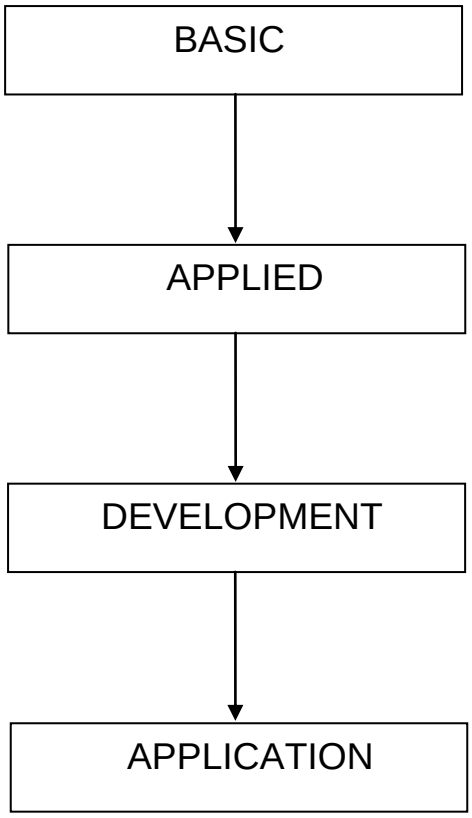


Figure 3. The knowledge-driven model of knowledge use.

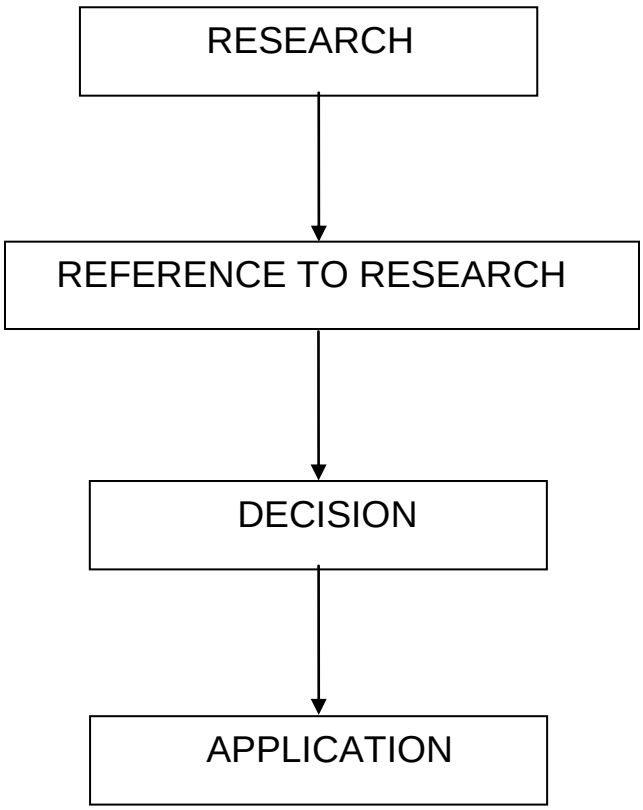


Figure 4. A problem-solving model of knowledge use.

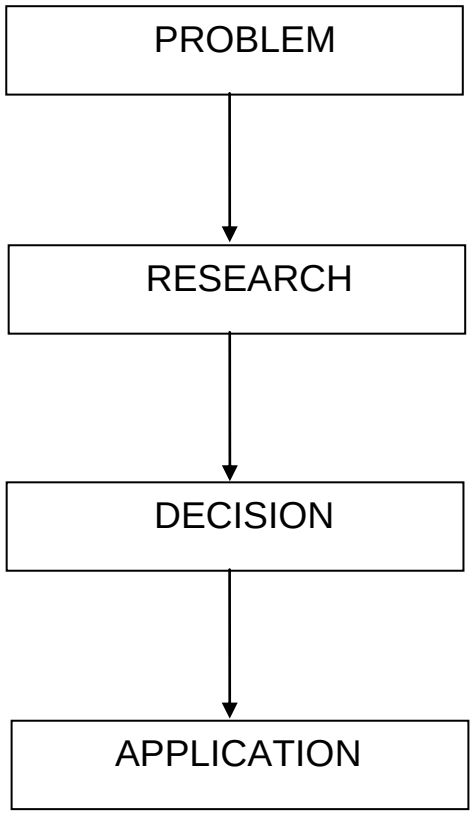


Figure 5. Second problem-solving model of knowledge use.

A third model of knowledge use presented by Weiss (1979) was the "Interactive Model" which Weiss described as "a disorderly set of interconnections and back-and-forthness" (p. 428) between policy makers and social scientists, administrators, politicians, practitioners, planners, aides, friends, journalists, and clients. This model does not result in a set of decisions and research use; rather, consultations among the diverse individuals gradually approach decisions which are partly research-based. Weiss's "Political Model" (p. 429) reflects occasions when policy makers have established views that research will not impact; alternatively, they use research to confirm their views. Weiss stated that misrepresentation of the research would be illegitimate; however, if all individuals concerned with decisions have access to the research, then this is a credible model of research use. The model may be demonstrated as follows in Figure 6.

In a fifth model of research use, Weiss (1979) described how, in "bureaucratic politics" (p. 429), agencies take advantage of the fact that research is being conducted regardless of the research findings. According to this "Tactical Model" (p. 429), agencies may use the existence of on-going research to argue that they are responding to issues; they may use the need to wait for research findings as excuses for the agencies' delayed responses; agencies may attribute the responsibility of unfavourable decisions to research; and they might support research in order to attract allies who are drawn to agency because of the research.

Weiss's (1979) sixth model of research use, the "Enlightenment Model", explains how research "generalizations and orientations" spread "circuitously through …professional journals, mass media, conversations with colleagues" to influence how policy makers think about the world (p. 429). By way of this "indirect diffusion" (p. 430),

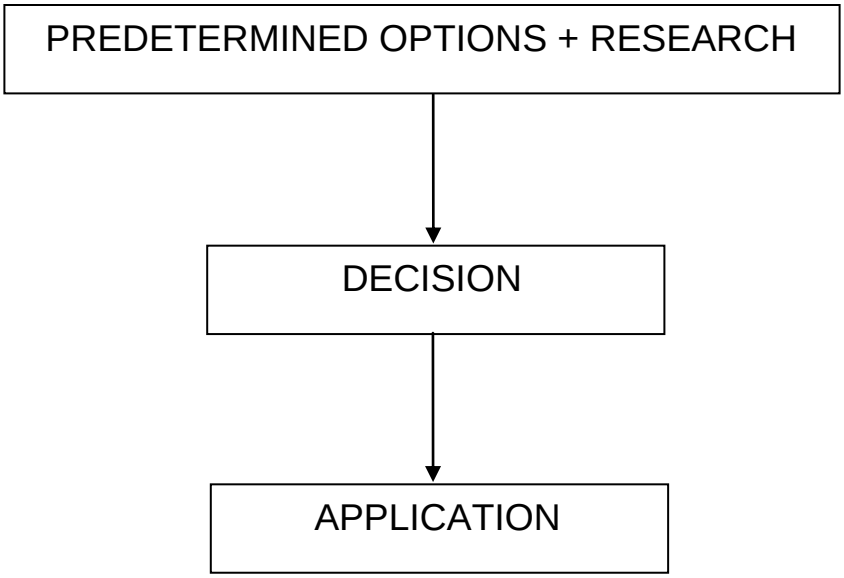


Figure 6. The interactive model of knowledge use.

policy-makers become aware of issues in general; however, there are risks that the information they learn may be oversimplified, inaccurate, and/or contradictory because they do not learn from specific studies or findings. Lastly, Weiss discussed research use as an "Intellectual Enterprise of Society", wherein social science researchers and policy makers interact in responding to societal concerns, making research a three-way "interconnected intellectual enterprise" (p. 430).

While any of these models may represent a form of social science research use, including instrumental, conceptual, and symbolic uses, no single model explains knowledge/research utilization conclusively. In addition, the term utilization in the previous models and traditionally meant that knowledge was implemented in a program, or that it influenced a decision or action. Larsen (1980) intuited that these were limited views. Instead, she produced a model of knowledge use that exemplified stages that occur at the user end of the process:

1. Knowledge enters awareness.
2. Knowledge is considered.
3. Knowledge is implemented tentatively.
4. Knowledge enters practice or policy and becomes integrated into a program.

Larsen (1980) also suggested that non-utilization is an intentional act and may arguably be a step in the process of knowledge use, and that the timing of the knowledge, the context of expected knowledge use, and the kind of knowledge being promoted deserved consideration when examining how knowledge is utilized.

Beyer and Trice (1982) additionally postulated stages of implementation at the user end. Their utilization process entailed four components of behaviour by the user:

"cognitions, feelings, choices, and actions" (p. 595). Cognitions referred to awareness of conditions which people considered to be relevant. Feelings reflected individuals' evaluation of the options. Choices were made when individuals integrated their cognitions and feelings to select from options. Actions were the outward expressions of their choices.

Theories of knowledge production, transference and utilization continue to evolve as the third wave of knowledge utilization research proceeds. For example, Hood (2002) forwarded a spiral concept of knowledge transference and use which was conceived by theorist Nonaka and others (as cited in Hood, 2002). In this model, tacit knowledge (personal and context specific intuitions and mental images) is initially transferred to others during socialization; individuals participate in joint activities by which tacit knowledge is implicitly shared. Next, the tacit knowledge becomes externalized and expressed in explicit statements or other concrete forms. Then, the resultant explicit knowledge is transformed during a "combination" stage (Hood, 2002, p. 9) into conventional books and journal articles. Through the implementation of the explicit knowledge that users acquire through reading the books etc., they internalize it, convert it to tacit knowledge, and the spiral continues. Hood (2002) explained that this "spiral of knowledge" elevates our understanding of knowledge production beyond a linear procession; the forms of knowledge are "deliberately pursued and reflected against each other" (p. 9), and knowledge flows from the individual to a group via socialization and eventually by explicit publication.

An additional concept of stages of knowledge use was proposed by Arts, Gijselars, and Boshuizen (2006) who examined problem-solving skills and knowledge

use by business managers with three levels of expertise. Results supported the Model of Domain Learning which hypothesized that new graduates acquire a large quantity of domain-specific knowledge; however, transference to a work-place is fraught with confusion about its application. This first stage is characterized by the acquisition and reproduction of knowledge. A second stage consists of understanding knowledge and the development of some application skills. Finally, the third stage is one of expertise, when knowledge is used effectively to problem-solve with deeper understanding of inferences and processing strategies.

The stages of knowledge utilization to which Landry et al. (2001) referred above were developed by Knott and Wildavsky (1980). Landry et al. reported that most other models of knowledge utilization "place too much emphasis on instrumental use, are too focused on particular uses (i.e., evaluation), or place too much emphasis on perceptions at the expense of observable behaviour" (p. 398); however, Knott and Wildavsky's stages do not have these shortcomings. Knott and Wildavsky agreed that utilization was not simply an “immediate and direct impact” (p. 542); instead, they developed the following seven standards of utilization:

1. Reception: Utilization takes place when policy-makers or advisors receive relevant information such as data.
2. Cognition: Utilization occurs when the policy-maker reads, digests, and understands the information or studies.
3. Reference: Utilization takes place when the information changes the views, the preferences, or the policy-maker’s understanding of the magnitude or probabilities of the impact.

4. Effort: Utilization of information influences the actions of the policy-maker; effort is made to adopt the study's recommendations.

5. Adoption: The measure of utilization is the whether the information is put into policy and whether it influences policy outcomes.

6. Implementation: Utilization of information affects action if the information is implemented.

7. Impact: Utilization at this stage means that the policy is implemented and it yields the desired effects.

Knott and Wildavsky (1980) additionally suggested three potential impediments to knowledge use:

1. Knowledge does not exist.

2. Decision-makers do not know that the knowledge exists.

3. Decision-makers know about the knowledge but refuse to use it.

Knowledge use may also be impacted if decision-makers do not know how to find the information, if dissemination is faulty (poorly conducted or incorrect knowledge is shared), if the information is too complex to be interpreted or if it is misinterpreted, if there is too much information to digest and implement, or if the necessary resources to use the knowledge are lacking (Knott & Wildavsky, 1980). Knott and Wildavsky (1980) also believed that the rejection of information can be a deliberate and informed decision. They submitted that these stages and potential difficulties can be used to identify and rectify the problems with knowledge dissemination and use. Landry et al. (2001) successfully adapted Knott and Wildavsky's stages to explore whether the model could assist researchers to climb the scale from transmission of their work to application.

However, as Beyer and Trice (1982) exclaimed, "If we want to achieve greater utilization of organizational research, merely thinking about utilization cannot take us very far" (p. 591). Beyer and Trice recommended systematic observation to test theories of use. I suggest that we must also explicitly examine variables that either facilitate or block the use of information at the various steps.

With respect to such variables, Stone (2002) supplemented the aforementioned theories of knowledge use with the conception of three routes to knowledge use: the supply side, the demand side, and the policy currents or the context side. Stone's examples of each route are:

1. Supply side: research is not relevant to users; research is too esoteric and/or theoretical; research is not generalizable; researchers have unrealistic expectations of users; the flow of the information is faulty; there is insufficient information; access to the information is lacking or inequitable; researchers do not understand what is needed; researchers are ineffective communicators; research is difficult to understand.
2. Demand side: the audience is unreceptive to the research; users are unaware of the research; users have limited time and resources; the audience uses information from reliable sources (colleagues) instead; users have a tendency for anti-intellectualism (negative bias against use of research); users are unable to interpret and use research; users modify or implement research selectively to reinforce existing beliefs and practices.
3. Context: a societal disconnection of researchers and users from each other; a "contested validity of knowledges" or "ideology" between the world of researchers and that of the users (p. 291); limiting institutional arrangements; nature of the regime of power; culture of public debate (or research interest) or lack of it.

The supply side refers to the researcher's responsibility in facilitating the use of research; the demand side identifies the user's characteristics and roles that affect research use; the context labels situational features of the researcher's and user's settings that influence research use. These routes to bridging research and policy could also be viewed as categories of possible obstacles to research use. Stone's (2002) concept of routes or obstacles to knowledge use had been previously identified casually by Beyer and Trice (1982), Larsen (1980) and Knott and Wildavsky (1980) as well, and it is well-supported in my literature review on the gap between educational research and practice in Chapter II.

Therefore, to explore and understand the gap between research on reading disabilities and teachers' practices, I integrated Knott and Wildavsky's (1980) stages of knowledge use and Stone's (2002) routes/obstacles to knowledge use into a unified model which is illustrated in Figure 7. This model was used successfully by Shultz (2007) in his study of research use by university administrators in the United States, and it is a feasible theoretical framework for investigating the extent of teachers' uses of reading disabilities research, which factors hinder their use of such research, and how the problem might be remedied. In addition, recognizing that teachers are not only passive recipients of research, I inserted a second step of reception that reflects teachers' active searching for and retrieving information. From a critical standpoint and with the current view of knowledge utilization (Hood, 2002), I also acknowledged that teachers are producers of knowledge. However, addition of a "knowledge production" component to the model was beyond the scope of this study. The usefulness of the resulting knowledge utilization framework was confirmed by a pre-pilot study that I document in Chapter V.

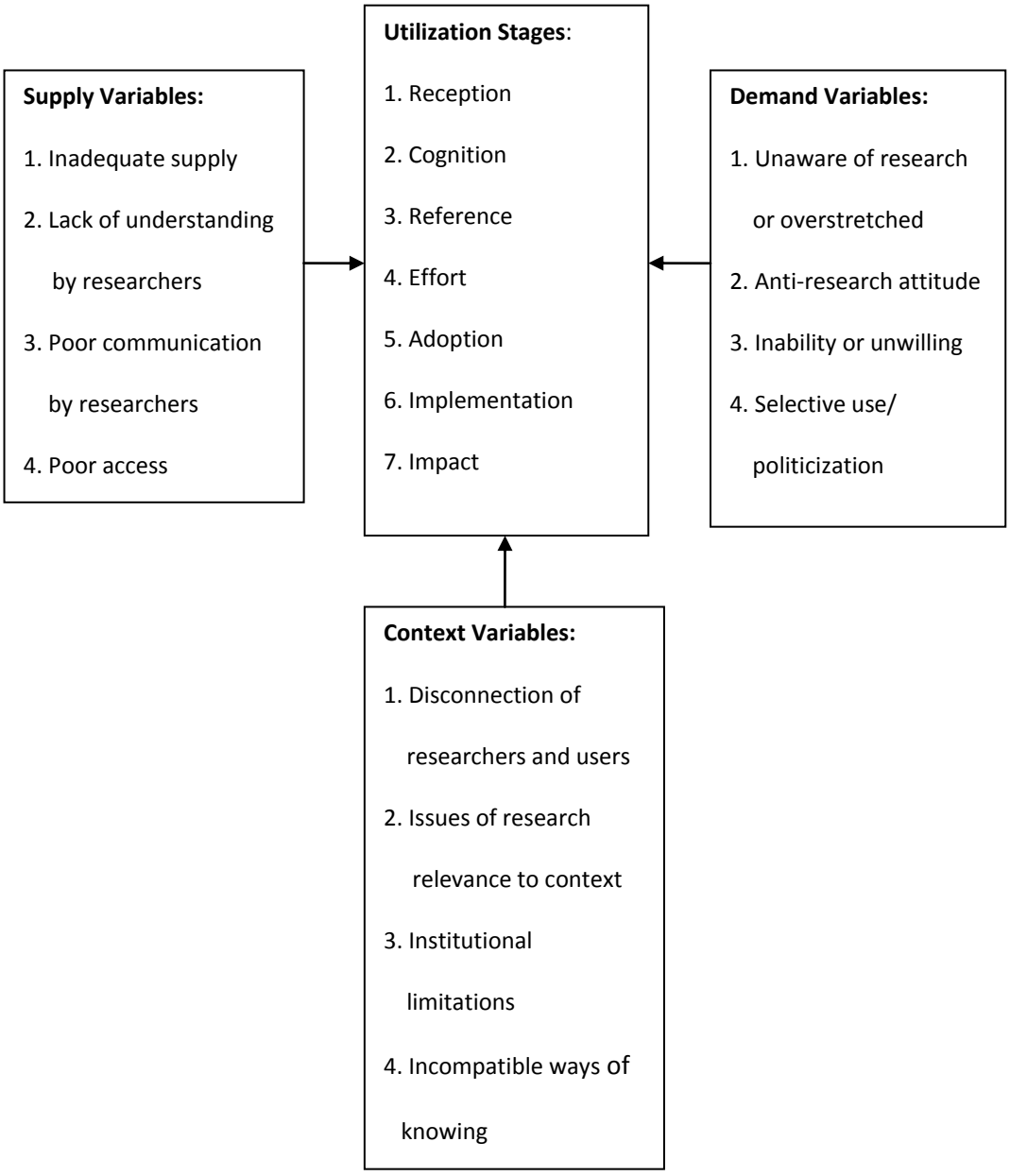


Figure 7. The combined knowledge utilization frameworks of Knott and Wildavsky (1980) and Stone (2002).

Critical Theory

According to Calhoun (1995), critical theory "exists largely to facilitate a constructive engagement with the social world that starts from the presumption that existing arrangements – including currently affirmed identities and differences – do not exhaust the range of possibilities. "It seeks to explain the ways in which our categories of thought reduce our freedom by occluding recognition of what could be" (Calhoun, 1995, p. xiv). From this perspective, critical theorists are dissatisfied with the status quo; they explore the world and adjust their frameworks to understand the way things are (Calhoun, 1995; Phillips, 2000). Furthermore, "how things are is never seen as having occurred by chance and for no particular reason; all social systems and their practices are seen to be as they are in order to serve the interests of a particular group" (Tripp, 1992, p. 7). More specifically, critical theorists are of one mind: the social world consists of oppressed and oppressors and the goal of critical theorists is to make the powerless powerful and to alter social inequalities and injustices (McLaren, 2007). Critical theorists envision "a more just society" in which all people have "cultural, economic, and political control of their lives" (Tripp, 1992, p. 13). Oppression is not necessarily intentional or the "acts of a tyrant" (McLaren, 2007, p. 2); however, the oppressed need to develop a self-conscious critique of their circumstances in order to change them (Freire, 1970/2005; Tripp, 1992). Despite the fact that critical theories vary and are continually changing (Kincheloe & McLaren, 2000), critical theorists concur that a faction of society is always oppressed. Kincheloe and McLaren (2000) added that a "criticalist" (p. 304) participates in social or cultural criticism not only with the beliefs that thought is mediated by power relations, but also that facts are related to values and ideology, that language is central to forming

subjectivity, and that capitalist production and consumption determine relations between concepts and objects.

Regardless of the diversity of critical theory, a consensus also appears to exist regarding knowledge. It is agreed that what knowledge is, how it is produced, and how it is transmitted are contested issues (Kincheloe & McLaren, 2000; Lather, 2004; McLaren, 2007). Critical theorists believe that "knowledge is a social construction deeply rooted in a nexus of power relations" (McLaren, 2007, p. 197) and consequently, issues regarding knowledge, schools, teachers, and research are political and contentious and must be examined critically. Hence critical pedagogy emerged. Critical pedagogy "is fundamentally concerned with understanding the relationship between power and knowledge" as it relates to teachers and their practices/relations with students (McLaren, 2007, p. 209). It is also identified as the "reaction of progressive educators against institutionalized functions that channel individuals into their 'rightful' place in the order of things and train them to be reconciled to that destiny" (Burbules & Berk, 1999, p. 50). Osborne (1990) outlined the following tenets of critical pedagogy:

> 1. Teachers must comprehend the inter-relationships of ideology, power, and culture and curriculum; they need to constantly examine what they are teaching, why, who is benefitting, what is omitted and whether there are alternatives.
> 2. Educators should view schools as arenas of conflict where diverse agendas meet.
> 3. The curriculum recognizes and builds on students' lived experiences; it is not simply imposed.
> 4. The relationships between students and teachers are humane and democratic; students actively participate in their learning.
> 5. Students become "empowered" by becoming "personally reflective and socially conscious" (p. 52).

Within this mindset, critical theorists dispute traditionalist beliefs that knowledge is rational, objective, and just "out there to be found" (Kincheloe, 1993, p. 2). Personal

knowledge must be recognized, knowledge needs to be contextualized, and no particular knowledge is privileged (Barnes, Clouder, Pritchard, Hughes, & Purkis, 2003).

Secondly, critical theorists challenge the positioning of "experts" above the "masses" (Kincheloe, 1993, p. 5). In research for example, there appears to be "a hierarchical non-reciprocal enterprise in which teachers are viewed as needing researchers but researchers do not need teachers (Gore & Gitlin, 2004, p. 35). This relationship risks colonizing teachers (Bartels, 2003). Teachers are disempowered when they are treated like "specialized technicians" (Giroux, 1988, p. 122), when their voices are "marginalized" (Gore & Gitlin, 2004, p. 37) and when their own experiential knowledge is discredited (Gitlin et al., 1992). The scientific management of teaching and a "deskilling" of teachers resulted from this top-down approach to education (Kincheloe, 1993, p. 8) and it is problematic that educators teach only that which is determined independently from them and which is based on the opinions of experts (Karmon, 2007). The United States government's demand for evidence-based practices under the PL 107-110 No Child Left Behind Act (2001) is considered to be a significant offence in this regard (Lather, 2004; McLaren, 2007).

Alternately, from the perspective of critical pedagogy, knowing is a "dialectical movement which goes from action to reflection and from reflection upon action to new action" (Freire, 1970, p. 13). The potential of various epistemologies should be acknowledged (Anderson & Herr, 1999); reflexively aware teachers should be recognized as intellectuals who are capable of contributing to the knowledge base (Giroux, 1988; Kincheloe, 1993).

Thirdly, knowledge dissemination which is "conclusive, formal and highly

controlled "is questioned by critical theorists; traditional models of informing teachers of research, not unlike imposing unfamiliar curriculum on students, should be subverted (Barnes et al., 2003, p. 152). The traditional concept of knowledge transference resembles the "banking" instructional technique which Freire (1970/2005, p. 72) rejected. In banking, knowledge is like "a gift bestowed on those whom they [those who know] consider to know nothing", and projecting ignorance on others in this way is characteristic of the ideology of oppression (Freire, 1970/2005 p. 72). The creation and sharing of knowledge should be collaborative; "a pedagogy must be forged with, not for the oppressed" (Freire, 1970/2005, p. 48). By means of a two-way dialogue, both students and teachers teach and are taught; in other words, researchers and teachers ideally work in "a mode of reciprocity" to determine new knowledge (Freire, 1970/2005, p. xii).

Lastly, knowledge use from a critical stance is tied to the beliefs about what knowledge is and how it is produced and disseminated. If the traditional hierarchical perception of research continues, it only follows that teachers' voices will continue to be alienated – oppression with respect to knowledge production and dissemination will continue. Freire (1970) believed that an individual is "able to look critically at the culture which has shaped him (*sic*) and to move toward reflection and positive action upon his world" (p. 5). Teachers are therefore encouraged to organize and establish a united voice (Giroux, 1988). They should promote their insights and actively and reflexively engage in research which is a logical extension of critical theory (Kincheloe, 1993).

Critical theory and critical pedagogy provide an engaging paradigm with which to analyze research use in education. The frequent situating of teachers as subjects of the research to practice discourse and recipients of decisions others make regarding which

research is disseminated and how it is shared does not need to remain the status quo. Researchers' knowledge should not be privileged over that of teachers. Teachers should be seen as potential collaborators and active participants in examining the use of reading disabilities research, their practices, and solutions for bridging the research to practice gap. Surely, individuals at the front lines of education have the optimal insights regarding research use in their contexts; teachers are valuable sources of knowledge in this respect. Inclusion of educators as partners in the study of the research to practice gap opens the opportunity for them to escape their "rightful" places as recipients of researchers' decisions and it has potential to enrich the knowledge base. Through involvement in studying the use of research, teachers gain the opportunity to reflect on their practices and to become self-conscious critics of the status quo and thereby possibly take actions to remedy the problems they identify.

The methods employed in this study have attempted to include teachers in such a collaborative, reciprocal relationship. Teachers participated in a preliminary study in which their insights helped me to test the appropriateness of the knowledge utilization framework. Teachers completed a questionnaire which elicited their views on the gap between research and practice by way of rating questions and open-ended questions to which they could freely record their opinions. I conducted focus groups of teachers as a means of member-checking to have teachers validate, refute, and/or elaborate on the findings of the questionnaire. The study was reciprocal in that I gained insights from the teachers before, during and after the questionnaire was conducted. On the other hand, the teachers reflected on the research to practice gap in the area of reading disabilities and the focus group participants were additionally informed of the findings from the

questionnaire and from my synthesis of reading disabilities research. Teachers' contributions comprise the core substance of this study.

Summary

In summary, the knowledge utilization framework provided a credible structure for exploring, analyzing and interpreting teachers' views on the research to practice gap. Critical theory and critical pedagogy underpinned the objective of my study to include teachers' voices in the discussion and problem-solving efforts to understand the gap between reading disabilities research practice. The critical perspective also informed the methods, analyses, and implications of this study. The application of these theories is reflected in succeeding chapters, beginning with a discussion of methodological issues.

CHAPTER IV

Methodology

Methodology is defined as the study of methods (Dunleavy, 2003), or the interpretive framework that guides a study (Avramidis & Smith, 1999). It also refers to the grounds or broad approaches that underpin scientific inquiry (Teddlie &Tashakorri, 2009); namely, the ontological and epistemological assumptions of a research project (Booth, 2005, p. 326). O'Donoghue (2007) proposed that methodology links "paradigm-guided questions" with appropriate methods (p. 6). Teddlie and Tashakorri (2009) suggested that methodological approaches reflect the researchers' "worldviews" (p. 339). As a result, methodologies influence research questions, study designs, sampling, data collection and analyses, conclusions, and the criteria for assessing the quality of the research results. Research methods on the other hand, refer to the specific strategies and procedures that are employed in a study; the exact questions, design, sampling, data collection, data analysis and interpretations comprise the methods of a particular investigation (Teddlie & Tashakorri, 2009). In this chapter, I outline and provide justification for using the mixed methods approach in my study. Details of my specific research methods follow in succeeding chapters as I report on the various strands of my research.

One of the critical features of mixed methods research is the combination of qualitative and quantitative approaches to research questions, methods, data collection and analysis, and inferences within one study (Teddlie & Tashakorri, 2009). This union of supposed competing research paradigms in the social and behavioural sciences (Teddlie & Tashakorri, 2009) and specifically in educational research (Lincoln & Guba,

2005) has incited debate and criticism concerning mixed methods. I begin by briefly discussing the issue of paradigms, how mixed methods researchers reconcile the controversy, and how paradigms relate to this study.

Paradigms

Paradigms may be known as "grand" or "big" theories (O'Donoghue, 2007, p. 6), as a "shared understanding of reality" (Morgan, 2007, p. 50), or as shared beliefs within a community of researchers regarding which questions are most meaningful, which procedures are most appropriate, and how findings are interpreted (Avramidis & Smith, 1999). At the core of the paradigm war are the two main opposing paradigms of positivism and anti-positivism/constructivism (Morgan, 2007), although others such as interpretivism and critical paradigms (Avramidis & Smith, 1999), post-positivism and participatory paradigms (Lincoln & Guba, 2005), postmodernism (O'Donoghue, 2007), or realism and idealism (Blaikie, 2007) enter the debate as well. Despite the varied terms, the relative suppositions of these paradigms regarding ontology (the nature of reality), epistemology (the nature of knowledge; relationship between knower and knowledge), generalizability, axiology (the role of values in inquiry), and causal links, remain somewhat constant (Teddlie & Tashakorri, 2009). For example, constructivists reportedly believe that reality is relative, multiple, and constructed, and that knowledge is subjective and inseparable from the knower. Constructivists utilize many qualitative research methods and they accept that generalizability is inconsequential. They believe that all inquiry is value-laden and that causes and effects are indistinguishable from each other. Alternatively, it is believed that positivists assume that there is one reality, that objective knowledge can be gleaned through controlled, experimental methods that produce

generalizable findings, that inquiry is value-free, and that real causes precede effects (Lincoln & Guba, 2005). The incommensurability of the constructivist and positivist paradigms is apparent.

However, pragmatists challenge the incompatibility of the quantitative and qualitative paradigms, arguing that these philosophical stances are neither "mutually exclusive nor interchangeable" (Onwuegbuzie & Leech, 2005a, p. 270). They allow that a "single real world" exists and that unique individualistic interpretations of it are acceptable (Morgan, 2007, p. 72). In other words, according to pragmatism, both objective and subjective orientations toward knowledge are conceivable (Onwuegbuzie & Leech, 2005a). This ontological viewpoint is compatible with the critical stance I described in Chapter III. Biesta and Burbules (2003) also explained that pragmatists recognize that individuals live in their own worlds, but when they work together toward a common goal, they adjust their individual approaches, views, and actions in order to achieve a coordinated response. In this way, individual beliefs are transformed to produce inter-subjective knowledge. Pragmatists adopt such inter-subjectivity as a key research approach which embodies "shared meaning and joint action" with research participants (Morgan, 2007, p. 67). Within this paradigm, researchers also assume a "reflexive orientation" (Morgan, 2007, p. 72), being ever conscious of their impact on the research process. Pragmatists are unconcerned that values are inherent to research; their research topics and methods are openly congruent with their values (Teddlie & Tashakorri, 2009). Generalizability is replaced with concern for transference and external validity, and though they recognize the possibility of causal effects, they consider them to be "transitory" and difficult to identify (Teddlie & Tashakorri, 2009, p. 93). The pragmatic

worldview simultaneously integrates and rejects concepts from both the qualitative and quantitative research perspectives as it underpins mixed methods research.

In addition, the concept of paradigms continues to evolve. For example, Teddlie and Tashakorri (2009) reported the existence of a transformative paradigm. The priority of transformative scholars is social equity for oppressed groups, and they use methods that result in social justice. Transformative researchers also reject the polemic relationship between the paradigms. In fact, Teddlie and Tashakorri suggested that the "incompatibility thesis" (p. 98) which rejects the combination of qualitative and quantitative paradigms, has been largely discredited. They proposed that in reality, "continua of philosophical orientations, rather than the dichotomous distinctions, more accurately represent the positions of most investigators" (p. 94). In other words, several paradigms conceivably exist on continua between the constructivist and positivist extremes. For example, according to the single paradigm thesis, positivism links with quantitative methods, constructivism with qualitative methods, and pragmatism with mixed methods. On the other hand, since all paradigms have strengths, they may complement each other when they are combined. Therefore, Teddlie and Tashakorri proposed a multiple paradigm thesis which links several underlying paradigms to mixed methods research. The proposition of a" multidimensional continuum of research projects" (Teddlie & Tashakorri, 2009, p. 95), which is depicted in Table 1, demonstrates the innumerable paradigmatic prospects for conducting research. The research options are no longer limited to either constructivist/qualitative or positivist/quantitative paradigms; studies may fall on differing locations on the continua with respect to purposes, questions, objectives, processes, and inferences.

Table 1
Multidimensional Continuum of Research Projects

Positivist		Constructivist
Sphere of Concepts: Purposes, Questions, Objectives		
Deductive questions	⟷	Inductive questions
Objective purpose	⟷	Subjective purpose
Value neutral	⟷	Value involved
Confirmation	⟷	Understanding
Explanatory	⟷	Exploratory
Sphere of Concrete Processes		
Numeric data	⟷	Narrative data
Structure/close-ended	⟷	Open-ended
Preplanned design	⟷	Emergent design
Statistical analysis	⟷	Thematic analysis
Probability sample	⟷	Purposive sample
Sphere of Inferences		
Deductive inference	⟷	Inductive inference
"Objective" inference	⟷	"Subjective" inference
Value neutral	⟷	Value rich
Politically noncommittal	⟷	Transformative
Etic representation	⟷	Emic representation
Nomothetic	⟷	Ideographic

Note. Adapted from Teddlie and Tashakorri (2009, p. 95)

Furthermore, qualitative and quantitative paradigms actually share more similarities than they have differences (Onwuegbuzie & Leech, 2005a). Both include research questions, use empirical observations, describe data, reduce the data for interpretation, construct explanatory arguments from data, postulate reasons for the outcomes, and try to minimize bias and lack of validity (Johnson & Onwuegbuzie, 2004; Onwuegbuzie & Leech, 2005a). In addition, all researchers in the behavioural and social sciences aim "to understand human behaviour"; they simply "operationalize[d] their strategies differently for reaching these goals" (Onwuegbuzie & Leech, 2005a, p. 272). Teddlie and Tashakorri's (2009) multiple paradigm thesis aptly reflects the philosophical underpinnings of my mixed methods approach. The varied locations of my study's purpose, questions, strategies, design, data collection, data analysis and inferences on the continua between constructivism and positivism in Table 1, and the benefits of this approach will become evident as I discuss these methodological features.

Research Purpose

The first step in an investigation is to identify a problem to explore (Blaikie, 2007), and, generally, qualitative researchers aim to understand situations often through understanding subjects' perspectives of their experiences, and quantitative researchers tend to search for relationships between variables that may be causal (Teddlie & Tashakorri, 2009). The opposite may also occur. For example, quantitative researchers also conduct exploratory research procedures such as principal components analyses for the purpose of discovering subsets of variables that are independent from each other (Tabachnick & Fidell, 2007, p. 607) and correlational analyses explore relationships that are not causal. However, the goal of pragmatism is not only "the abstract pursuit of

knowledge" but rather "the attempt to gain knowledge in the pursuit of desired ends" (Morgan, 2007, p. 69). Mixed methods researchers accept that exploratory, explanatory, subjective, and objective purposes for research are legitimate; however, action is the preferred outcome.

Thus, the purpose for this study was three-fold: to explore whether there is a gap between reading disabilities research and teachers' practices and to understand it; to discover possible causes that explain a gap; and to discern interventions that might alleviate a gap. These purposes reflect qualitative, quantitative and pragmatic views which are explained in the following sections.

Research Questions and Strategies

Methodology additionally links researchers' paradigms with research questions (O'Donoghue, 2007; Teddlie & Tashakorri, 2009) and with strategies to answer the questions (Blaikie, 2007). For example, consider Blaikie's (2007) three types of research questions: "what" questions that seek descriptions; "why" questions that seek understanding (possibly causes); and "how questions" that are concerned with interventions and solving problems. I propose that these three categories match the previously discussed qualitative, quantitative, and pragmatic purposes respectively. In mixed methods, the research questions address both processes and causes, and they necessarily lead to methods that generate both qualitative and quantitative data (Teddlie & Tashakorri, 2009).

In addition, Blaikie (2007) linked specific strategies to the type of question asked. He categorized the strategies as inductive, deductive, retroductive, and abductive processes. An inductive approach begins with observations which lead to generalizations;

this approach is usually attributed to qualitative researchers and according to Blaikie, is best for solving "what" questions. Conversely, a deductive process begins with a theory which is tested; this process is typically used by quantitative researchers and is recommended by Blaikie for answering "why" questions. Yet, qualitative researchers may also use theory to guide a study and to explain behaviours (Teddlie & Tashakorri, 2009), and quantitative researchers may apply their findings to building theories. On the other hand, pragmatists believe that the movement between theory and data is bidirectional; observations are converted into theories and theories are tested through action and vice versa (Morgan, 2007). Teddlie and Tashakorri (2009) described the process as the" inductive-deductive research cycle" (p. 26).

In the current study, causal relations were not investigated; however, the research questions targeted the qualitative, quantitative, and pragmatic interests of "what", "why" and "how" and therefore a mixture of paradigms; but my approach to theory was bi-directional. Although my process initially appeared to be deductive because I tested a pre-existing theory of knowledge utilization in a pre-pilot study, my approach was flexible and pragmatic with respect to the strategies I used. From the pragmatic perspective, I was receptive to challenges to the theory by results from the pre-pilot study interviews, the questionnaire, and the focus groups. In fact, I added features to the theory to accurately reflect education perspectives following the interviews. The strategies were necessarily exploratory and open to change depending on the findings in order to discover the best explanation. Therefore, a pragmatic approach to the research questions and an inductive-deductive application of theory was optimal.

Research Design

In this section, I discuss the principles and advantages of employing multiple methods and why this mixed methods design was the most appropriate for my study. To begin, a comparison of qualitative and quantitative designs reveals that qualitative research designs vary extensively from ethnographic, to case study, to phenomenology (Teddlie & Tashakorri, 2009); however, they are primarily naturalistic, conducted in "real-world settings" without researcher manipulation of the phenomena (Patton, 2002, p. 9). Quantitative research designs are characteristically experimental, quasi-experimental, or survey research (Cohen, Manion, & Morrison, 2005; Teddlie & Tashakorri, 2009). Quantitative investigators may control the study conditions (Patton, 2002). On the other hand, pragmatists choose designs and methods that best answer their questions; a paradigm does not dictate the methods employed. Pragmatists emphasize" multiple tools of inquiry to gain different perspectives on the problems at hand" (Biesta & Burbules, 2003, p. 108). Recently, a "whatever works" position has been advocated (Bryman, 2006) and “methodological pluralism” is at the forefront (Johnson & Onwuegbuzie, 2004, p. 14). Mixed methods research is a recognized methodology (Johnson, Onwuegbuzie, & Turner, 2007) and an “attractive partner” for pragmatism (Johnson & Onwuegbuzie, 2004, p. 14).

The mixed methods approach is eclectic with many benefits. It “frequently results in superior research”, new epistemological and methodological possibilities, and enhanced collaboration and communication between researchers (Johnson & Onwuegbuzie, 2004, p. 14). Green, Camilli, and Elmore (2006) added that mixed methods are sensible because “it is virtually impossible for any one approach to be used

to address the complex issues being explored through research in education" (p. xvi). No single method can answer all the questions, nor is any method unbiased or flawless (Blaikie, 2007; Brewer & Hunter, 2006; Smith, 2006). Furthermore, mixed methods provide multiple data sets about the same problem; diverse data that allow comparisons; potential to measure more variables; and cross-method comparison to test the validity of measurements, hypotheses, and theories (Brewer & Hunter, 2006). Teddlie and Tashakorri (2009) additionally argued that mixed methods: (a) simultaneously answer confirmatory and exploratory questions; (b) provide stronger inferences (e.g., via triangulation); and (c) generate a greater variety of views. The mixed methods also compensate for each other's weaknesses and they complement each other's strengths (Brewer & Hunter, 2006; Johnson & Onwuegbuzie, 2004). For example, where qualitative methods expose "nuance", or sensitivity to contexts, quantitative methods give precision in comparisons (Howe, 2003, p. 32). Qualitative data can inform the quantitative findings and the quantitative data can add generalizability which qualitative data usually lack (Onwuegbuzie & Leech, 2005b). The number and type of methods selected should be optimal for shedding light on the problem (Brewer & Hunter, 2006; Johnson & Onwuegbuzie, 2004).

The following design options by Creswell and Plano Clark (2007) apply to my study:

a. Triangulation: qualitative and quantitative data on the same phenomenon are compared in order to validate or expand findings.

b. Embedded: data sets are mixed within one method framed by one data set (e.g., open-ended questions within a quantitative survey).

c. Explanatory: one set of data explains or builds on another set of data.

d. Exploratory: one method helps to develop or inform a second method.

The procedures of mixed methods designs may also vary in order and importance. Methods may be implemented concurrently (a parallel design) or sequentially, and the results can be attributed equal or unequal weight (Creswell & Plano Clark, 2007; Teddlie & Tashakorri, 2009). If results from one method are given preference over the other, studies may also be considered mixed but primarily quantitative or qualitative. In addition, mixed methods may follow a "monostrand" design (Teddlie & Tashakorri, 2009, p. 149) in which both qualitative and quantitative methods are used, but the data are converted to either all narrative by "qualitizing" or all numerical by "quantitizing" (Teddlie & Tashakorri, 2009, p. 147). A multistrand design incorporates qualitative and quantitative methods across or within more than one strand of a research project. Teddlie and Tashakorri (2009) also qualified that true mixed methods integrate the findings from the qualitative and quantitative methods in order to answer the same research questions. If the methods used answer autonomous questions, these authors consider the methods to be quasi-mixed methods.

For the current study, a mixed methods design was advantageous to address the five strands of research, each with its respective purpose and research questions. For example, the core component of my study was a questionnaire which I planned to base on the theory of knowledge utilization. In the first strand of my study, I explored the usefulness of the theory in explaining how teachers use research and what impedes research use. I selected semi-structured interviews which generate individuals' opinions, feelings, and knowledge (Patton, 2002) to ascertain teachers' views on their uses of

reading disabilities research. Results from my thematic analysis of the interview transcripts informed the creation of a questionnaire; therefore, this stage was exploratory (Creswell & Plano Clark, 2007). It was also quasi-mixed methods because it comprised an autonomous step in the research process (Teddlie & Tashakorri, 2009). This qualitative component represented the first strand of my overall sequential multistrand mixed methods design. The full report of the pre-pilot study may be found in Chapter V.

A narrative synthesis of research on reading disabilities comprised a second stage in the sequential model. This qualitative component provided information which I employed to analyze responses to four of the open-ended questions. The questions which underpinned this narrative synthesis were also specific to this stage. Therefore, this component of the current study would be considered quasi-mixed methods according to Teddlie and Tashakorri (2009). The synthesis is reported in Chapter VI.

The next strand of my sequential design consisted of a pilot study in which I tested the utility of the questionnaire and the online program which provided access to the questionnaire. The purpose and questions of this pilot study were specific to this stage; therefore, this step also comprised an element of a quasi-mixed methods design (Teddlie & Tashakorri, 2009). However, it additionally represented a parallel and embedded design by virtue of incorporating both rating questions and open-ended questions which generated narrative and numeric data (Creswell & Plano Clark, 2007). A report of this pilot study may be found in Chapter VII.

The following strand of the sequential design entailed a large-scale questionnaire. Once again, the questionnaire comprised a parallel and embedded mixed methods design; qualitative open-ended questions and quantitative rating questions elicited responses that

were integrated to answer the research questions (Creswell & Plano Clark, 2007). Questionnaires are particularly useful for collecting a large number of responses (Cohen et al., 2005) and it is common for closed, fixed-choice questions and open-ended questions to be combined (Patton, 2002). The open-ended and rating questions addressed similar issues; therefore they also contributed to triangulation of some of the results (Creswell & Plano Clark, 2007). The creation of the questionnaire is detailed in Chapter VI and this component of the study may be found in Chapter VII.

Lastly, focus groups comprised an explanatory strand in the sequential mixed methods design. These semi-structured group interviews served to triangulate the questionnaire results as well as provide a means of member-checking for verification, explanation, and elaboration of the quantitative findings from the questionnaire. The report on the focus groups may be found in Chapter IX.

In summary, mixed methods were optimal for conducting the multi-stranded research design that was required to meet my study's disparate purposes and to answer the multiple research questions with rigor and quality. The study in total may be considered quasi-mixed methods because the findings from only the main questionnaire and focus groups were integrated. With reference to Table 1, the design was preplanned; but it consisted of both close-ended (rating questions) and open-ended (individual and group interviews, open-ended questions) components.

Sampling Issues

As a methodological issue, sampling also reflects researchers' paradigms. For example, samples in qualitative research are typically small and nonrandom (Gay & Airasian, 2003; Patton, 2002). Johnson (2001) reported that samples of 6 to 30 interviews

were sufficient for studies, and Cohen et al. (2005) recommended 4 to 12 participants in focus groups. Additionally, sampling in qualitative studies is frequently purposive; participants who are particularly suited to provide rich information are deliberately selected (Patton, 2002; Teddlie & Tashakorri, 2009). On the other hand, quantitative studies often require probability sampling comprised of a large number of participants ideally selected by random selection in order to generalize the findings from the sample to the larger population (Patton, 2002). In random sampling, each individual in the sample is selected by chance and has the same probability of being chosen from the target population. A random sample thereby approximates a representative sample of the target population to which results may be applied. For correlations to be determined a minimum of 30 cases are recommended; for surveys, 100 individuals for a major subgroup and 20-50 in each minor subgroup are recommended (Cohen et al., 2005). Samples of convenience involve willing and accessible participants; consequently, participants are possibly not the most appropriate candidates. However, when attempting to achieve a large and varied sample of research participants to voluntarily respond to a questionnaire within a limited time frame, a sample of the convenience may be the most effective sampling option.

Mixed methods researchers draw on both purposive and probability sampling strategies because they combine qualitative and quantitative research components. In all cases, researchers must consider what type of unit (e.g., participant, material, or other element such as setting or time) is to be selected (Teddlie & Tashakorri, 2009). In addition, basic guidelines also apply to all designs (Teddlie &Tashakorri, 2009). These guidelines are: (a) base the sample on the research questions to be answered; (b) follow

assumptions of probability and purposive sampling; (c) ensure that the sample will generate sufficient data for qualitative or quantitative analyses and inferences; (d) practise ethical sampling procedures; (e) employ strategies that are feasible and efficient; (f) allow for generalizability or transferability; and (g) describe the sampling process so that it may be replicated.

With respect to the current study, my mixed methods design required varied sample sizes which corresponded to each qualitative and quantitative method employed. My sampling procedures are explained within the reports of each design stage in the following chapters; purposive sampling was used for the pre-pilot and pilot studies, and convenience sampling was employed for the questionnaire and focus groups.

Data Collection and Analyses

Data collection and analysis procedures are similarly influenced by researchers' methodologies. Qualitative methods always include observations, interviews, and documents which result in data such as quotations, notes, and excerpts from documents (Patton, 2002). Quantitative methods include elements of tests, questionnaires, and structured interviews (Teddlie & Tashakorri, 2009) which produce primarily numeric data. However, any of these methods may generate qualitative and quantitative data.

Analysis of the data may be conducted by multiple techniques. For example, qualitative researchers analyze their narrative data by generating themes or theories, and data collection and analyses may occur concurrently, one informing the other. Examples of such analytic approaches are displayed in Table 2.

On the other hand, quantitative data analysis typically entails the application of statistical techniques to examine numerical data. Once again, there is a plethora of

Table 2
Three Types of Qualitative Data Analysis

General Type	Examples
Categorical	Content analysis Constant comparative analysis Grounded theory techniques
Contextualizing	Phenomenological analysis Narrative analysis Individual case studies Ethnographic analysis
Data displays	Effects matrices Sociograms Concept or mental maps

Note. Adapted from Teddlie and Tashakorri (2009).

analytical techniques from which to choose depending on the research question. Teddlie and Tashakorri (2009) categorized the numerous approaches as in the following:

(a) Descriptive versus inferential statistics: Descriptive methods summarize data and reveal trends and patterns (e.g., frequencies, means). Inferential statistics are used to confirm or reject hypotheses (e.g., t-tests compare the means of groups, factor analyses search for patterns in quantitative descriptive results).

(b) Univariate versus multivariate statistics: Analyses reveal the degree of relationships between single variables or between sets of two or more variables (e.g., between a predictor and an outcome, or between several predictors and several outcomes).

(c) Parametric and nonparametric statistics: Parametric analyses require data that are independent, normally distributed, and have a homogeneous variance such as interval and ratio scales. Likert scales are considered to comply with the assumptions of parametric measures. Nonparametric analyses are applied to ordinal and nominal scale data and there are no assumptions about the population being studied.

In mixed methods, qualitative and quantitative data analyses may be conducted according to Teddlie and Tashakorri's (2009) typology:

(a) Parallel mixed data analysis: qualitative and quantitative analyses occur separately; but the results may be linked, combined, or integrated.

(b) Conversion mixed data analysis: narrative data are quantitized or numerical data are qualitized; but original data are first analyzed according to qualitative and quantitative techniques before one or the other is converted. Thirdly, researchers may plan from the start of a study to generate both qualitative and quantitative analyses from the same data source.

(c) Sequential mixed data analysis: This type of analysis matches the sequential mixed methods design: qualitative and quantitative analyses follow each other as strands of the research are completed; the analysis from one strand informs the following strand. If there are more than two phases of research in a study, the analyses may also be iterative in a back-and-forth interchange of analyses informing each other (e.g., qualitative to quantitative to qualitative).

(d) Multilevel mixed data analysis: qualitative and quantitative data analyses are used at different levels of a study to answer interrelated questions.

(e) Fully integrated mixed data analysis: qualitative and quantitative analyses take place interactively at all stages of a study, whether iterative, interdependent, or reciprocal.

(f) Applying aspects of analysis from one tradition within another: an example is using matrices, which usually chart numerical data from two dimensions, to record narrative data.

In the current study, narrative data were collected by way of individual and group interviews and open-ended questionnaire items. Thematic analyses were therefore employed. Rating questions produced numeric data which were statistically analyzed. Qualitative and quantitative findings from the questionnaire and the focus groups were integrated to answer the research questions as Teddlie and Tashakorri (2009) recommended for true mixed methods research. In order to integrate the findings, the narrative responses were also "quantified", assigned numeric values such as frequencies, to facilitate comparison and aggregation of the data. Patton (2002) summarized the virtue of mixed data well: "multifaceted understanding…requires both numbers and their stories" (p. 14). Quantitative measures such as the questionnaire facilitate the collection

and comparison of a large number of responses in order to possibly make broad generalizations; whereas qualitative methods generate detailed information which allows for an in-depth study and understanding of issues (Patton, 2002).

Data Quality

Data quality in mixed research is determined by the standards for qualitative and quantitative research; if the qualitative and quantitative data are valid and credible, then the mixed methods study will have high data quality (Teddlie & Tashakorri, 2009).

Validity generally refers to the appropriateness of the interpretations that are made (Gay & Airasian, 2003); whether the data accurately reflect the construct they are supposed to capture (Teddlie & Tashakorri, 2009). Internal and external validity apply to both qualitative and quantitative research (Cohen et al., 2005), where internal validity implies that findings correctly describe what is being researched and external validity indicates the degree to which the findings apply to the wider population or other situations. Other main types of validity are:

1. Content validity: the degree to which an instrument measures an intended content area.
2. Criterion-related validity: the degree to which scores on a test correlate with scores of another test (concurrent); and the degree to which scores can predict future performance on another measure (predictive).
3. Construct validity: the degree to which a measure addresses the abstract construct which is intended (Gay & Airasian, 2003).

With respect to measures, validity depends on an instrument that measures what it is intended to measure and in a standardized manner (Patton, 2002).

On the other hand, qualitative researchers aim to “capture authentically the lived

experiences of people" (Onwuegbuzie & Johnson, 2006, p. 49); validation is considered to be a "social construction of knowledge" (Mishler, 1990, p. 417) such as by member-checking. Qualitative researchers ask whether the findings are credible to the populations they studied and whether they are transferrable to similar populations (Teddlie & Tashakorri, 2009). "The researcher is the instrument" (Patton, 2002, p. 14); therefore, the quality of the findings depends on the researcher's ability and experience.

In mixed methods research, "inference quality" has been suggested to reflect internal validity and trustworthiness of the conclusions, and "inference transferability" is the degree to which the conclusions may be applied to other settings, people, time and so on (Teddlie & Tashakorri, 2009, p. 27). To pragmatists, generalizability is not vital, but aspects of the findings should apply to other actors in other settings.

Another determinant of quality is reliability. This refers to dependability or trustworthiness; it is the degree to which an instrument consistently and accurately measures the constructs being researched (Gay & Airasian, 2003; Teddlie & Tashakorri, 2009). With qualitative or quantitative measures, stable results should be repeatable over time (Teddlie & Tashakorri, 2009). This stability can be calculated by way of test-retest trials, comparing results with an equivalent/parallel form, by comparing results of two halves of a test, and by comparing results from multiple raters. In qualitative research, "reliability can be regarded as a fit between what researchers record as data and what actually occurs in the natural setting that is researched" (Cohen et al., 2005, p. 119). The "trustworthiness" of qualitative data may be determined by way of prolonged engagement, persistent observations, triangulation techniques, member checks, thick descriptions, and reflexive journals (Teddlie & Tashakorri, 2009).

In mixed methods research, triangulation is recommended for assessing the quality of the data overall (Teddlie & Tashakorri, 2009). This technique involves comparing results from a variety of sources such as interviews, observations, surveys, or documents. Teddlie and Tashakorri (2009) cautioned that the comparison of diverse data can be difficult and it may entail having to explain dissonance. Furthermore, the validity and reliability of converted data (i.e., qualitized or quantitized) are questionable because converted data may no longer accurately reflect the original findings.

In the current study, measures of data quality specific to quantitative and qualitative data were conducted. From a quantitative perspective, the questionnaire's content and construct validity are based on the degree to which it asks questions that reflect the knowledge utilization framework. These aspects of validity are demonstrated in the section on the questionnaire development in Chapter VI. Inter-item reliability of the questionnaire's rating questions was examined, and the results are reported in Chapter VIII. Inter-coder agreement of interpretation of the narrative responses to the questionnaire demonstrates the reliability of the qualitative responses. This measure of reliability is reported in Chapter VIII for each question that was interpreted. Internal validity and trustworthiness of the findings overall was examined by way of triangulation and member-checking as I report in Chapters VIII, IX, and X. Further research with a larger sample may be required to generate results that are generalizable; however, results of the current study may be transferrable to other curricular areas in education.

Inferences/Conclusions

The purpose of selecting mixed methods is to generate superior results; both qualitative and quantitative researchers agree "inference" refers to "the last and most

important stage of research" (Teddlie & Tashakorri, 2009, p. 287), which is to actively interpret the results and to reach conclusions. In mixed methods research it is particularly important that results from the qualitative and quantitative components of the study are combined to answer the research questions (Teddlie & Tashakorri, 2009) or to promote new understandings and explanations.

In order to produce quality inferences in mixed methods research, researchers must meet the standards for quality inferences from both qualitative and quantitative standpoints. In addition, the inferences that result from combining the qualitative and quantitative inferences must be credible. The following factors have been connected to quality inferences: appropriate research design; quality and rigorous implementation of the research design; with-in design consistency; analytic adequacy; inferences consistent with findings; inferences consistent with theory; inferences agree with other scholars and participants; most plausible conclusions are made; inferences from strands are convincingly integrated; and inferences correspond to the purpose of the study (Teddlie & Tashakorri, 2009).

However, as stated in the discussion of paradigms, pragmatists (and transformative researchers) in particular conduct research in the pursuit of action/change. Furthermore, Teddlie and Tashakorri (2009) contended that "any type of research should be relevant to someone, somewhere, under some condition" (p. 311). Researchers are therefore encouraged to consider whether their studies will motivate action and whether their inferences transfer to other settings, to other people, to the future, or to other studies (e.g., are they replicable?).

My intention for this study was ultimately to add to the body of knowledge about

the underutilization of education research use which should be relevant to researchers, educators, policy makers, and students. I believe that the rigor with which this study was undertaken and the volume and quality of the findings have produced quality inferences. With respect to the "sphere of inferences" in Table 1, the results of this study were largely deductive because the pre-selected theory did help to explain teachers' uses of research and obstacles to research use. However, the knowledge acquired was primarily the subjective views of teachers as I had intended, and by giving voice to teachers, the study also approached the transformative end of the continuum. I believe the study results are also "value rich", and my position as the researcher was more as an insider because I am an elementary school teacher who has been concerned about the availability of reading disabilities research. In addition, the study's inferences complement findings from prior related studies which were reviewed in Chapter II. The inferences also merge findings from the various strands of the study, from the pre-pilot study, to the pilot study, the narrative synthesis, the questionnaire, and the focus groups, and they reflect the theory that guided the study. I believe the conclusions are plausible since they were generated by various means (e.g., rating and open-ended questions and focus groups). The inferences also answer the research questions which underpinned the study, and they have potential to lead to action which may entail improving the use of education research. As a result, I believe that this study has generated quality inferences according to Teddlie and Tashakorri's (2007) standards for mixed methods research.

Summary

Methodological issues in designing an efficient research study are numerous and varied. While methodology is sometimes conflated with methods, the intent of this

chapter was to explicate the view that philosophical underpinnings, which are also known as paradigms, are expressed by a researchers' choice of methodology and, thus, paradigms necessarily influence the researcher's purpose, objectives, research questions, data collection and analysis. My intent was also to give due consideration to issues such as sampling, validity, reliability, inferences and limitations. In this chapter, I have discussed the manifestations of a methodology which is underpinned by a pragmatic paradigm and how it is expressed in the current study in general. The following chapters demonstrate specific application of this methodology.

CHAPTER V

Pre-pilot Study

The preceding discussion of theories of knowledge utilization in Chapter III concluded with the theoretical framework of Knott and Wildavsky's (1980) seven stages of knowledge use (reception (receiving research), cognition (reading research with understanding), reference (discussing research and having it change one's views), effort (attempts made to use research), adoption (research becomes part of policy), implementation (research is fully used), impact (research is fully used with desired results) and with Stone's (2002) three routes to knowledge use (research/researcher, user, context). Knott and Wildavsky posited that to remedy knowledge underutilization, one needs to understand whether and in what regard knowledge is underused. Their seven stages may therefore guide the exploration of how knowledge is or is not employed. Stone similarly suggested that an understanding of the dynamics of research use leads to methods for advancing knowledge utilization. Stone's three categories of routes to knowledge use, which are comprised of twelve factors (see Figure 7 in Chapter III), may also be applied to investigate whether certain variables are interfering with knowledge use.

Purpose

Knott and Wildavsky's (1980) as well as Stone's (2002) theories were developed in the context of policy makers. I conducted this pre-pilot study to explore whether these frameworks would be appropriate to study teachers' perspectives on the research to practice gap in the identification and instruction of students who are at risk for reading disabilities. The questions for this pre-pilot study were:

1. Can teachers' uses of reading disabilities research be categorized according to Knott and Wildavsky's (1980) seven stages of knowledge utilization?

2. Will this categorization reveal whether there is research underutilization, the degree of underutilization, and which stage of research use is problematic?

3. Will teachers identify obstacles to research use that can be classified according to Stone's (2002) three categories and twelve factors?

4. Will additional themes regarding research use and routes to use arise from teachers' responses?

The findings were used to construct a questionnaire for teachers regarding their uses of research on the identification and instruction of students who are at risk for reading disabilities.

Method

Participants

Ten elementary school teachers who were known to the researcher were contacted by telephone or in person. This comprised a sample of convenience. The researcher attempted purposely to achieve representation from a variety of teaching positions. The participants included one principal, one vice-principal/learning support teacher (special education), two full-time learning support teachers, one literacy teacher, two kindergarten teachers (one in English and one in French immersion), one Grade 1 French immersion teacher, one Grade 2 teacher, and one Grade 4 teacher. All the teachers worked in the public school system. One teacher was a male and nine were females. Five (50%) had Bachelor's degrees and five (50%) had Master's degrees. Years of teaching experience ranged from 7 to 24 years. Their ages ranged from 31 to 58 years.

I did not ask the ages and years of experience of all the participants.

Measure

Open-ended interview questions that were based on the study's research questions and on the theoretical framework were designed to elicit participants' views on teachers' uses of research on reading disabilities and the obstacles to teachers' uses of research. The questions were:

1. In your opinion, how do teachers use research about reading disabilities? (e.g., Do they receive it to read or use it? Do they try it? Do they change their practices?)
2. From where do teachers obtain research information?
3. To what extent do teachers use research? (e.g., all the time, sometimes, or not at all?)
4. What helps or hinders teachers' use of research?
5. Is there anything you would like to add regarding teachers' uses of research about reading disabilities?

Some elaboration of answers was also requested. (e.g., Can you tell me more? Can you tell me what you do?)

Procedure

Prior to beginning this study, ethics approval was obtained from the University of Western Ontario Faculty of Education Sub-Research Ethics Board in May 20, 2008 (see Appendix A) and from the school board which employed all the teachers in the sample on June 6, 2008. Each participant received a letter of information (see Appendix B) and each signed an informed consent form (see Appendix C). Individual, semi-structured interviews were conducted at locations convenient to the teachers. Seven of the interviews took place in schools, two in homes, and one by way of email. All but

the one interview completed by email were tape-recorded and transcribed.

Data analysis

I coded the interview comments according to Knott and Wildavsky's (1980) seven uses of research and Stone's (2002) three categories of routes to knowledge utilization. Sources of research knowledge were coded as an autonomous theme because a question addressed this topic specifically. The sources were categorized as (a) academic journals; (b) university contact/courses; (c) professional development (via school board, ministry of education, teachers' federation, professional meetings, conferences); (d) internet; (e) professional journals, ministry documents, books; (f) within school (e.g., specialized teachers, other teachers, staff meetings, administration); (g) other disciplines or consultants (e.g., speech and language pathologist, psychologist, school board consultants); (h) other schools or school boards; and (i) media (e.g., television). Thirty-three percent of the comments from each category were rated by a second rater. Inter-rater reliability in coding ranged from 62.5% agreement on the knowledge use comments, 70% on the sources comments, to 80% agreement on the obstacles comments. On a second attempt at establishing inter-rater reliability with an added sample of seven comments and with clarification of the categories, agreement on obstacles rose to above 80%. Discrepancies in coding knowledge use by the two raters appeared to result from difficulty in discriminating 'use' from 'try', which demonstrated that a more explicit meaning of 'use' needs to be given when studying this issue. Also, an additional theme emerged as a result of the interview question which asked about factors that help or hinder teachers' uses of reading disabilities research. This theme concerned ways to facilitate research use by teachers. I coded these items without inter-coder agreement

since they were not directly related to the purpose of this pre-pilot; they were only items of interest at this juncture.

Findings

Knowledge Utilization

Teachers' views on whether research knowledge about the identification and instruction of students at risk for reading disabilities is used and in what ways were elicited by questions one (i.e., In your opinion, how do teachers use research about reading disabilities?), three (i.e., To what extent do teachers use research information?), and five (i.e., Is there anything you would like to add regarding teachers' uses of research about reading disabilities?). The teachers' responses to these open-ended questions were classified according to Knott and Wildavsky's (1980) seven stages of knowledge use. The findings are summarized in Table 3. Although the respondents reported that some teachers might use research on reading disabilities sometimes, an overriding message that research on reading disabilities is not used to any significant extent resulted. All levels of use were found to be problematic except for 'adoption' which was not directly mentioned by the respondents.

Stage one: reception. The stage of reception appeared to be the most problematic. For example, one respondent relayed: "I can't say that that has been an area - with all the professional development, there has not been a general in-servicing for learning disabilities at all. I would say that has not been touched on." Others replied: "I would say that they [teachers] don't receive a lot of it. I would say we receive a little"; "Not necessarily about reading disabilities, but mainly about reading techniques used in a classroom in order to improve"; "I don't recall anything specifically on like learning

disability in terms of reading"; and, "As far as disabilities, um, I'm not sure we do a great job of addressing reading disabilities." The teachers acknowledged that some information about teaching reading in general had been shared with them; but most reported that research on identifying and instructing students who are at risk for reading disabilities had not been provided. The special education teachers viewed the reception of reading disabilities research more positively than the others.

However, the acquisition of information is not necessarily passive; teachers may also obtain research on reading disabilities by actively seeking it. Reception of this kind reportedly occurs sometimes and mostly on a "need to know basis", as the following comments illustrated: "When they have a child in the class that's struggling, that's when they seek out the information"; and, "It's in response to specific needs that they have." In addition, participants reported that teachers might not routinely be looking for research on reading disabilities as these statements reflected: "I don't think they actively find it" and "I think they would like to go looking for it, but they don't." If the reception of information is considered to be a stage of research use, these comments indicated that research on reading disabilities is underutilized, and that this stage represents one significant obstruction.

Stage two: cognition. With respect to the second stage of utilization, cognition, interviewees responded that if research on reading disabilities is received, it is read sometimes, and it is read by some teachers but not by others. For example, participants stated: "I see some teachers who really get it and read the information and use it, and I see others who don't…I would hope that they do professional reading on their own, but I have my doubts" and "Any time I have presented an article to staff, it's like anything else,

Table 3
Teachers' Responses According to Knott and Wildavsky's (1980) Stages of Knowledge Use

Stages of Knowledge Use	Teachers' Responses
Reception: research on reading disabilities is received	Five teachers replied that no research on reading disabilities is received by educators; two replied that teachers receive a little; one stated that some teachers receive research, but as a special education teacher she/he receives a lot; one stated that teachers receive some but mainly it was seen in university; one stated that teachers definitely do receive research on reading disabilities. Two stated that teachers do not actively search for research information; two stated that teachers seek research when they need it for their students.
Cognition: research on reading disabilities is read and understood	One teacher read research; five replied that some teachers read research that is provided and some do not; one replied that 30 to 40% will read research; one teacher stated that teachers do read research.
Reference: research on reading disabilities changes teachers' views and preferences; reference is made to it during discussions	Four teachers referred to teachers discussing research in general in groups during staff meetings or collegial times.
Effort: effort is made to try research on reading disabilities	Four replied that teachers use research sometimes; some would try it if they had it; some don't try it.
Adoption: research on reading disabilities is adopted as policy but it does not necessarily change actions	One comment related somewhat to this stage.
Implementation: research on reading disabilities is implemented but it is not necessarily effective	Research is used sometimes or by some teachers or when it is useful and resources are available, or if the research is available according to six teachers; one stated that teachers really cannot use research and one stated that teachers do not use research on reading disabilities at all.
Impact: research on reading disabilities is implemented with desired results	Three teachers reported that research on reading has been used effectively; two cases were regarding the use of technology and one was regarding phonological programming.

some of them jump right on it and say this is what I need and some put it away and find it a little later, and so on and so on, and some just say, "Oh, I haven't got time for that"."

On the other hand, one teacher affirmed that teachers do read research that is given to them. In any case, teachers' responses supported the proposition that the cognition stage is conceivably an additional area of concern with respect to the use of reading disabilities research.

Stage three: reference. Reference to research is the third stage of utilization. Three teachers alluded to the value of regular collegial time for teachers to share and discuss new information and strategies that they have tried. Two teachers mentioned that a learning community exists within their school, and that research on reading disabilities might be distributed and deliberated during division meetings. As a result of the meetings, some teachers try the new ideas and report back to the group. These actions could influence the frames of reference of teachers. However, another teacher in the same school reported:

> I wouldn't say that …it's not a big concern to talk about; they talk about the overwhelming needs in the classroom …they talk about that, but not necessarily that learning disabilities, and um, with reading disabilities, how can I help that child.

These comments indicated that Knott and Wildavsky's (1980) third stage of knowledge utilization is indeed another category of research use that may be explored to reveal the extent to which and how research on reading disabilities is employed by teachers.

Stage four: effort. Regarding this fourth stage, respondents concurred that given that research on reading disabilities is available, some teachers would try it and some would not. According to a few participants, specific conditions dictated whether research

would be used. For example, comments were:"Whatever they are doing, it's not making a difference, so they are looking to try to, um, try to change their practices just to meet what it is that is blocking this child" and "Teachers will try strategies found in research if it applies and/or works for specific students in their current classroom." Another added, "Some people, they just don't feel comfortable doing it, where other teachers would just move in and go, "Well, okay, I'll give this a try"." One teacher reported actual teacher behaviours in response to the presentation of research during collegial time:

> You have some people that didn't do a thing, like they didn't look at anything, they didn't read any articles, nothing, and then you have people that you know, the same people all the time, that had always looked at the stuff and tried it out, and that, so I would say some of the time [research is used].

This fourth stage of knowledge utilization, effort to try new ideas, emerged from the comments made by the teachers, and the findings demonstrated that effort is also a level of knowledge underutilization.

Stage five: adoption. No reference was made to the adoption of research on reading disabilities into school policy or programming specifically. One teacher did comment on the conditions that make the adoption of new concepts about teaching feasible:

> It's about alignment…somebody had been to a workshop and knew that this was a really good piece of work (Six Traits of Writing). That person had the initiative at the school level; the professionals and learning community was already in place. They gather together and then it's go, go, go. So it's taking the time and it's fostering that – getting all systems aligned.

This statement implied that the adoption stage is potentially another level of research use by educators.

Stage six: implementation. For the most part, this stage appeared to be

synonymous with the term 'use'. All of the participants referred to the use of research on reading disabilities with the implication that research either did or did not inform teachers' teaching practices or those research-based strategies either were or were not employed. One teacher stated that teachers do not use reading disabilities research at all, and a second contended that even if research is available, teachers just cannot use it in the classroom. Most of the teachers believed that research would be implemented by some teachers sometimes, given certain conditions. For example, some remarks were: "Even with students which you have identified learning disabilities… you write up your IEPs (Individual Education Plans), you get everything. Then is it being practised is my big concern – quite often it is not." Yet another stated:"I think teachers will change their practices if it benefits their students. They will also keep strategies in mind, and when it's the right time and the right students, they will then implement those 'new' practices." Lastly however, does implementation bring about intended outcomes?

Stage seven: impact. Spontaneously, three teachers commented on the positive impact of the research-informed practices in which they had been engaged or which they observed. For example, with respect to computer programs for students with learning disabilities, comments were:

> …we have it, on our new active directory, Write Aloud and Co-writer, and I have had amazing results with the kids that I've used it with that have learning disabilities… their reading has improved, their spelling has improved, their grammar has improved, just by having that half an hour a day to write using Co-writer and Write Aloud.

A second teacher corroborated the impact that these programs had on student learning:

> …the programming is a result of the research. The one thing that I think has made a huge difference is assistive technology and, you know, the Co-writer and the Write Aloud, all of those, and they have made an amazing difference for most children with reading disabilities…they become independent and can use it

> themselves, a big plus. Then I would say that is one aspect of modern research that teachers use.

Additionally, with respect to early years programming, a teacher reported:

> I know that they are not expected to be reading by the end of grade SK, but they are certainly expected to have a lot of print awareness and phonemic awareness….so, that's changed a lot over the years…the kids definitely, I think, have a lot more solid language base than they did because we have been trained in terms of what specifically we're supposed to teach them now… [the Grade one teachers] have come back to me and said that they have seen a big difference over the last couple of years too in terms of implementing the things that have come down.

Inarguably, when research has been used by teachers, desirable outcomes have been witnessed. These comments supported Knott and Wildavsky's (1980) seventh stage of knowledge use as a level that may be useful for analyzing the extent and type of research use by teachers.

Summary. The interview responses to the questions on knowledge use were successfully classified according to Knott and Wildavsky's (1980) seven stages of knowledge utilization. The information gained from these classifications also revealed that according to these interviews, there is underutilization of research on reading disabilities and that the first stage, that of reception of research on reading disabilities, is the primary cause for underutilization. The teachers reported that very little if any information about reading disabilities is given to them and that some teachers tend to search for information on reading disabilities sometimes and on an 'as needed' basis. If and when research on reading disabilities is obtained, some teachers will read it, discuss it with others, try it, implement it, and actually use it with the desired impact on student learning. Whether research is adopted as policy was not explicitly mentioned. Therefore, the uses of research that the teachers described were easily categorized by, at minimum,

six of Knott and Wildavsky's stages, and the stages pinpointed where knowledge use breaks down and to what extent.

Obstacles to Knowledge Use

The fourth interview question, "What helps or hinders teachers' uses of research on reading disabilities?" was asked to determine whether teachers' responses would verify that Stone's (2002) three groupings of routes and twelve factors within these routes to knowledge use adequately categorize the reported obstacles to teachers' uses of research on reading disabilities. The findings are summarized in Table 4. The three categories of routes (e.g., supply, demand, and context) all revealed potential obstacles to research use.

Supply side. The lack of a supply of research on reading disabilities was definitely an obstacle to its use. Teachers did not suggest that an inadequate supply of research exists, but rather that the research is not accessible primarily due to limited diffusion, factor two. This factor overlaps with Knott and Wildavsky's (1980) stage of reception which was previously demonstrated to be problematic.

In addition to the comments already reported, one teacher stated: "When teachers are in teacher's college, they are required to read and respond to many different journals related to students and learning, etc. That's the only time I can remember getting research info." Another teacher confirmed that access was an issue; she stated: "Getting it, yeah, it's connecting with the right information I think to get the right strategies in place for those kids." Several of the respondents concurred that minimal information about reading disabilities is made known to them. However, despite the provision of a great deal of professional development, one teacher speculated:"…a lot of stuff was, we touched on, was not on learning disabilities and I don't know if they save up for the LST (Learning

Table 4
Stone's (2002) Routes to Knowledge Use and Verification by Teachers' Responses

Stone's Routes	Teacher Verification
Supply side:	
1.Inaequate supply of relevant research	No
2. Lack of access to research knowledge, data, and analysis	Yes
3. Supply of research is flawed due to poor understanding of researchers about what research is relevant and needed	Partially; references were made to research needing to be useful and meaningful
4. Researchers are ineffective communicators; researchers do not provide the answers needed or the presentation of the research is a problem	Yes; research findings need to be 'user friendly'. Some comments referred to how research is disseminated, but not necessarily only by researchers.
Demand side:	
5. Users do not know about the research, they are over-stretched, they do not have time or resources, in-house information from trusted sources is used	Yes
6. There is a tendency for anti-intellectualism; there is resistance to new ideas and change	Yes
7. Policy-makers, leaders (intended users) are incapable of absorbing and using research	Yes
8. Research is politicized; research is used selectively, it is decontextualized, it may be modified to justify existing practices	Partially
Context side:	
9. There is a societal disconnection between researchers and intended users	Partially
10. Domains of research relevance do not impact intended users	Partially
11. Contested validity of knowledge; ideologies of researchers and users conflict; institutional arrangements, the culture of public debate, and the regime of power determine research uptake	Yes
12. There are different ways of knowing	No

Support Teacher) and they want to keep it a secret for them." The implication was that research on reading disabilities is not easy to access and that it is possibly selectively disseminated to teachers.

With respect to variable three (i.e., researchers' awareness of teachers' needs), the participants stressed that research must meet teachers' requirements and it must make a difference with the students in order for it to be used. For example, they stated that teachers must recognize:" …it's a valid strategy and it has to be a connection right away [about] which teachers say, "I can use that and I can make it work"." One teacher pointed out that, "standards/expectations etc. - that differ from Ontario" may be problematic.

In addition, researchers' inability to communicate research effectively, factor four, was verified as a potential block to teachers' implementation of research as this comment revealed:

> …some research is maybe not as – maybe as user friendly or as clear, or as useable in a classroom as others, um, I refer to it as airy fairy, that's my comment, my word for it. It sounds good on paper, but it's not classroom friendly, it's not useable information that can be taken from a piece of paper and used in a classroom without a lot of clarification maybe…

This teacher added that if research requires clarification, further investigation of the content of the research in order to understand it, and then re-designing of an existing program in order to implement it, then the research will probably not be used or not used completely. Communication of the research is undeniably an important variable that determines whether it is used. This factor also refers to the manner in which research is 'sold' to potential users. Researchers may assume this role; however, other individuals are also valuable in linking research and users. If teachers are given the strategies and tools that empower them to feel confident in what they are supposed to do, teachers will buy

into the new ideas one teacher argued. However, if individuals from outside attempt to transmit new ideas, this teacher identified the following problem:

> …it's tricky because they have got these people who have knowledge, but there's no relationship, there is no connection, and so these strangers are going to the schools, they have so much knowledge to share and all this stuff, there's that ego personality barrier …

The previous comment continued, referring to the resistance of teachers to this form of knowledge diffusion which rendered the knowledge underused. Effective communication of research to teachers would be easier, stated a teacher, "If you had a leader working with them and if the research was written in a more accessible way." Several others added that the information needs to be ready to use and supported with the necessary materials. Stone's (2002) fourth variable, communication of the research, was therefore verified as an obstacle to research use by teachers. No additional supply factors arose from the interviews.

The second interview question also addressed the issue of the accessibility of research more explicitly; it solicited the routes by which teachers access reading disabilities research. The findings are reported in Table 5. A wide range of sources for information on reading disabilities was reported, although reliance on the school board for professional development and consultation dominated. In-school dissemination of information on reading disabilities also secured a prominent role as a source; it was largely credited to the principal, the Learning Support (Special Education) Teacher, and to the Literacy Teacher. Less apparent here was the fact that much of the information that is shared within schools originates from school board training of specialty teachers, therefore bolstering the school board's role as the major source. The internet and published works were suggested as potential sources; however, respondents were wary of

Table 5
Teachers' Reported Sources of Research on Reading Disabilities

Source	Reported Frequency /10	Source	Reported Frequency /10
Within School:		School Board:	
a. Principal	3	a. Meetings/workshops/ PD days	9
b. Learning Support Teacher	5	b. Professional learning projects	2
c. Literacy Teacher/Key Literacy Teacher	6	c. website	1
d. Librarian	1	d. Consultants (Language consultants/ Speech and Language Pathologist/ Research and Assessment Officer)	8
e. Other teachers	3		
f. School professional development/ staff meetings	4		
Published materials:		Internet:	
a. Professional reading in general, articles, journals or magazines	5	"Online" or "Google"	7
b. Books	3	Other Professional Development:	
c. Ministry documents	3	a. Federation workshops	1
d. Other school boards, schools, or just "networking	4	b. Conferences	2
University :		Media:	
a. Contact	1	(e.g., Television Documentary)	2
b. Course	1		

the degree to which they are in fact used. Although several available sources of research were reported, teachers appeared to rely on only one or two of them. Responses to this question supported Stone's (2002) notion that research accessibility and diffusion may be an obstacle to research use.

Demand side. Furthermore, on the demand side, an unreceptive audience understandably precludes the implementation of new ideas. Stone's (2002) factors implicating the intended users of research as obstacles to utilization were also strongly supported in the interviews. For example, one teacher commented regarding research use:" That is so individual; it depends on the teacher." More specifically, variable five points to users' lack of knowledge about research as an obstruction to research use. Most of the teachers definitively stated that they receive minimal knowledge about reading disabilities; therefore, they are in fact unaware of the research that is available. The pre-service education of teachers was blamed by some of the respondents for teachers being uninformed about research on reading disabilities. Most agreed, however, that teachers would like to be more knowledgeable. The greatest obstacle to seeking and using research appeared to be time. All of the respondents concurred that teachers are over-stretched; in fact, many might be over-whelmed. Several factors that limit teachers' time were identified in the interviews: ministry and board demands, curriculum expectations, class compositions, lack of help, years of teaching experience, and family obligations. For example, the near exasperation with the demands on teachers was expressed by one teacher in the following comments:

> I think teachers would like to know more and, but I think they are so overwhelmed, that it's just one more thing. But, oh gosh, like they almost get to the point where they shut down when they go to PD sessions. They are so overwhelmed, oh my god, what are they going to make us do now? What's the

> new thing?...I think individual teachers wish they knew more, but it's um, they are just doing the best they can.

and

> It is just the overall time demands of the teachers; there's just so much coming down from the top, and there's a lot of pressure, and they're really dealing [um], you know, they are just trying to survive and keep their heads above the water.

Another teacher explained how the curriculum demands impact on teachers' time:

> Oh, I think it's the amount of curriculum that they have to go through that they just are not able, because they have so much curriculum that they have to cover…I don't think that they have the time to really sit down and plan a lesson and plan for differentiated instruction.

This issue was of particular concern for a junior grade teacher who argued that in the junior grades particularly, the heavy demands of subjects other than reading preclude teachers from investigating and trying new ideas to help students who experience difficulties with reading. This teacher reported:

> Once they are in Grade 4, I find it hard because the primary grades is where they are doing a lot of their learning to read, and by Grade 4 there is not as much time to do all of that. They are expected to be able to read...and when you are looking at your social studies stuff, you are covering science stuff, math stuff…there's not as much time to focus on all of that.

Overloaded classes beyond the primary grades and split grades that result from adherence to a primary class size cap as well as the integration of students on individual education plans additionally burden junior and intermediate teachers' schedules. Regarding students with special needs, this teacher also added: "to try to plan for all those different needs in the classroom, it's hard."

Another respondent highlighted the challenges of keeping pace with the curriculum when a teacher is assigned to a different grade every year, or if one is the only teacher of a particular grade in a school. Regardless of grade level, addressing students'

needs reportedly consumes much of teachers' time as these statements reveal:"…the job is getting harder and harder and the kids are getting more and more challenging and (they) are getting less and less support." Another opined:

> I jokingly say that we have one room school houses, we just happen to have eight of them, but we have them in any given room in this building. We have children who are working far, far below grade level, and anything in between. And some of the children in some of the classes, um, are struggling even [with] some of the modifications that are being made. That's how low some of them are.

The amount of time that teachers' have for exploring the use of new knowledge is also impacted by the stage of their career. A few respondents intimated that experienced teachers would more likely avail themselves of innovations. For example, one teacher stated:

> I think it depends a lot on where that teacher is in their development. Like if you are a first year teacher, you are so overwhelmed with all the other stuff that you are not going to have enough time to research one specific thing. Whereas I think it would be the more experienced teachers that are still searching for those questions.

Participants also proposed that family obligations compete for newer teachers' time as in this quotation:"A lot of them have young families too, you know, so they've got to put on another hat when they walk out that door." Stone's (2002) explanation for poor research uptake because of users being over-stretched was inarguably supported in the interviews.

Another of Stone's (2002) user characteristics that blocked research use was users' reliance on 'in-house' sources of information. The interviews revealed that, to a large extent, the learning support teacher, the literacy teacher, other teachers in the school, and the principal were sources of new knowledge. This finding supported Stone's contention that limited sources of knowledge could be an obstacle to research use.

Stone's (2002) sixth barrier to research use, which implicated the user, was a

tendency for anti-intellectualism or a resistance to new ideas by intended users. No indications were given by the respondents that they withhold their needs from the researchers. The interview results did however support the suggestion that some teachers are simply not motivated to find new ideas. With respect to being interested, one respondent offered:"I know myself, I am. And I know a few others who are. So, I would say it is probably 50:50, I would say." Another participant suggested that on one hand teachers are open to new research and to trying new ideas, yet on the other hand, "What gets monitored, gets done." The need for teachers to be accountable for implementing new ideas was voiced by a few teachers, and this implied that intrinsic motivation to learn about research might be a problem. A recent deterioration in teachers' attitudes toward new knowledge and continued learning was attributed by some respondents to the present generation of teachers and to the effects of collective agreements. A tendency for anti-intellectualism by teachers was expressed in the following explanation for the underutilization of educational research as well:

> I would say comfort level and a comfort level that comes from confidence with almost what they see as academia. That if, um, it becomes too much of a mental exercise, or too much academic reading, then I don't think that the majority of teachers I'm looking at across the system, are going to be as comfortable with that. It needs to be much more practical.

Respondents also mentioned that change takes a long time, and resistance to change might result from existing comfort with established practices as stated here: "Yeah, they get set in their ways….they do the same thing they have done because they have always done it." For example, a few decried the inclination of many teachers to reject differentiated instruction which current researchers promote, as this account reflects: "I think we still are at the point where we present a concept to the middle, to the

class majority, and then we step back a little bit and try and pick up some of the pieces." Teachers may also resist new ideas because of the manner in which the information is presented. For example, if transmitters of knowledge come from outside the school, one teacher reported:"There's that ego personality barrier that I don't want to admit that I don't know what I'm doing or I don't want her to come into my classroom or see. There is that stumbling block." One can safely say that variable six, anti-intellectualism, was reflected in the teachers' responses.

Variable seven refers to the inability of intended users of research to absorb and use new knowledge. This concept also arose from the discussions. Some of the participants speculated that teachers do not receive adequate training in how or where to search for needed information and that they do not feel confident reading research or exploring new practices. For example, one teacher commented:"I think…they don't just feel very comfortable doing it, where other teachers would just move in and go, "Well, okay, I'll give this a try." I think some need that extra little push." As Stone (2002) suggested, teachers are possibly lacking the training to become "intelligent consumers" (p. 290).

Variable eight, which referred to the politicization or misuse of research, was only partially alluded to in the interviews. A few teachers referred to the preference of classroom teachers to have students with special needs pulled from the class in order to receive their individualized programming. In one respect, this is a misuse of knowledge because teachers appear cognizant of alternative strategies to teach some students, but they relegate the teaching to someone else. This behaviour might also be interpreted as a resistance to using the knowledge. Another teacher also reported that innovations

will be used if there is "a connection right away" and if teachers think, "I can use that" or "I can make that work." These statements could be implying that ideas are used if they are compatible with a program or if they legitimize existing practices, but not necessarily because they are evidence-based. Variable eight refers to this as selective use or underuse of knowledge.

Clearly, routes to research use on Stone's (2002) demand side were employed to successfully group the interview responses that implicated teachers' characteristics and actions in research underutilization. With respect to teachers however, the barriers to research use appeared to be more heavily associated with teachers being over-stretched than Stone had possibly anticipated for policy-makers. No additional factors related to the demand side of obstacles were elicited; however, several causes for a shortage of time stemmed predominantly from the teachers' work context.

Context side. Stone (2002) forwarded additional context variables that may be routes or obstacles to research use. She posited that the worlds of the researchers and of the intended users of the research, as well as the relationship between these two contexts, are thought to determine the extent to which research is utilized. Teachers' responses to questions about the barriers to their use of research partially related to these variables associated with their work contexts. For example, factor nine refers to a disconnection between researchers and users. One respondent explicitly confirmed the existence of this problem in the statement that follows:

> I mentioned the school-based learning projects, that's what we try to do, but we don't have – again, I think it's that link between research at a university or college level and the school board. So, there is a huge gap there, there is a huge emptiness where there need to be more links and more connections.

This teacher also emphasized the lack of a connection between teachers and researchers

in the following:

> I don't think it's a real understanding of the channels that it needs to go through, that your classroom teacher is your better link between the child and the information, the research. And, um, I think it's valuing that pathway.

Another teacher implied that there is not necessarily a disconnection; but, that the top-down dissemination of research is possibly problematic: "I think a lot of it gets passed on before we have a chance to voice our opinions about anything." Overall, the teachers' were positive and respectful of external research; they partially confirmed that the relationship between researchers and teachers is faulty.

Stone's (2002) tenth variable addressed the relevance of research to the contexts of the user as an avenue or obstacle to research use. In education, this might overlap with the issue of the usefulness and meaningfulness of research which was discussed with respect to the supply side variables. While the participants did often affirm that research should address teachers' and students' needs, teachers did not attribute research underutilization to the realms of research content to any great extent, except for the message in the following statement: "It has to fit the group of people you have, and it has to fit the direction you are going."

The interview comments were also explored with respect to variable eleven, the social and political conditions within schools that may influence the uptake of new knowledge. Among the context features, this variable garnered the most comments. Aspects of institutional arrangements, the culture of public debate, and the nature of the regime of power within schools or school boards were implicated by the teachers as variables that influence research use in schools. For example, educational institutions might lack the money and resources to support the use of innovations as the following

comments convey:

> Many parents who have children with reading disabilities do not know how to help them. Of course, they can ask their child's teacher, and the teacher can give them many strategies,but then the parents and the teachers don't have the resources to give them.

Additionally, teachers relayed that they are limited in their practices and in recruiting support for students by resistance or delays on the part of the school board to test students in the early primary grades in order to determine what students need. In addition, support services that would facilitate the implementation of novel strategies are being reduced. The culture or attitude within a school or board to learn about new practices was also mentioned as an important factor for example: "I think the teachers should be really encouraged to do professional reading, or, if you get the chance to go to conferences. You don't very often get the chance to go to conferences." Several teachers corroborated that their attendance at conferences during the school year in particular was not supported and probably because of the cost. The culture of the institutions was also implicated when a teacher spoke about the use of technology to assist students:

> I have had amazing results with the kids that I've used it with that have learning disabilities, but I still have resentment from other staff members for me using the lab space with these kids…..that has to be acknowledged board-wide by people [that computer use is beneficial].

In addition, another interviewee suggested: "As far as getting people excited about the research, that starts with conversations, that starts with giving them the time to do that." A culture of learning was additionally promoted by the teachers who applauded the availability of informed literacy or learning support teachers, collegial time to share new ideas, mentoring practices, more professional development, and of self-directed professional development.

Some respondents also referred to school leadership as a determinant of teachers' uses of research as follows: "They (principals) should be encouraging teachers to go to conferences, to get professional magazines, professional reading materials, could be encouraging them. It could be part of your evaluation," and

> It still very much depends on the leadership in the school, and it's not the administration, but the leadership in the school – how effective the school is… is it a comfortable place to be? Is it a productive place to be? Do I want to be there?

The school environment and the school administration undeniably were considered to be influential in teachers' implementation of research.

The philosophical variable number twelve, ways of knowing, was not alluded to as an obstacle to knowledge use, and no additional categories of contextual features were mentioned as obstacles.

Summary. With respect to the reported obstacles to research use by teachers, Stone's (2002) categories of supply side, demand side, and context side and the twelve variables within these categories aptly grouped the responses to the interview questions. In addition, Stone's categories could also be viewed as helpful descriptors of the obstacles that the teachers identified. In conclusion, it was found that Stone's routes to knowledge use are appropriate for studying the reasons for a research to practice gap in the identification and instruction of students who are at risk for reading disabilities.

Facilitation of Research Use

Question four additionally asked, "What helps teachers' uses of research on reading disabilities?." While the primary purpose of this study was to test the amalgamated theoretical frameworks of Knott and Wildavsky (1980) and Stone (2002), the teachers also volunteered several means by which research use may be facilitated.

The main points have also been categorized according to the categories of supply, context, and demand to complement the analysis of obstacles.

Supply side. Regarding the supply side, the participants reported that research needs to be accessible, meaningful, applicable, and useable. Research must reach the teachers and teachers need to know who to contact. The value of the research for helping students must be demonstrated and the provision of specific classroom strategies and materials would facilitate its use. Ideally, the dissemination of information should take place within the school by trusted and knowledgeable colleagues, not "from the top". Teachers should be able to observe, try, and discuss new strategies among themselves over time. This last point overlaps with contextual features that could promote research use.

Context side. Within the work context, several participants emphasized the value of collegial time, networking, and a team approach within their school to support their learning and exploration of new information. Time to learn and explore new strategies during school hours was stressed. In addition, the teachers applauded the provision of support and modeling by knowledgeable colleagues within or from outside the school. A supportive school environment and leadership, mentorship, and university connections were additional factors which participants identified.

Demand side. On the demand side, the respondents generally agreed that reduced work requirements would aid the use of new ideas by teachers. Some suggested that when in-service training is provided, the teachers should be held accountable for demonstrating that they are attempting to implement the new knowledge. Concomitantly, if teachers develop a sense of efficacy through training, they will be "empowered" and

they will "buy into" research ideas. Respondents also recommended additional special education or reading courses for all educators, whether pre-service or in-service, added professional reading and conferences (with funding), and more self-directed professional development.

The interviewees offered several suggestions that could facilitate teachers' uses of research. According to the participants, features of research, dissemination tactics, school environments, and of educators should be considered when remedies are sought for the underutilization of reading disabilities research.

Summary

This phase of my research was conducted to determine the appropriateness of Knott and Wildavsky's (1980) and Stone's (2002) theories to study teachers' perspectives on the research to practice gap in the identification and instruction of students who are at risk for reading disabilities. The open-ended interview questions succeeded in eliciting responses about teachers' uses of reading disabilities research that were categorized according to Knott and Wildavsky's seven stages of knowledge utilization: reception, cognition, reference, effort, adoption, implementation, and impact. The stage of adoption into policy or practice was least supported. This classification of teachers' uses of research indicated that there is predominantly research underutilization at the level of reception. Knott and Wildavsky's model of knowledge utilization stages has potential for identifying the extent of reading disabilities research use and the stages that are problematic. Findings suggest that explicit questions about each stage would be useful for developing a survey questionnaire to investigate the gap between reading disabilities research and practice.

The teachers also identified obstacles to research use that were successfully classified according to Stone's (2002) three routes of supply, demand, and context. Within these three groupings, several of Stone's variables were also confirmed, but to differing degrees from the policy makers for whom Stone developed this model. Regarding the supply of research, the teachers were satisfied with the amount of reading disabilities research; however, poor accessibility and dissemination were considered to be problematic. The desire for useful research was also expressed. The additional inquiry regarding sources of information illuminated the extent of and reason for access as an obstacle. With respect to the user-side, responses indicated that educators may be resistant and unable to use research and that they might alter it to meet their needs or beliefs; however, being over-stretched was the most prevalent variable. Numerous factors that place a strain on teachers' time were advanced. This finding suggested that a questionnaire for teachers should target the many factors that draw on their time, some of them related to context. Within the category of the context, problems with a divide between researchers and educational facilities and the relevance of research were only partially alluded to, while concern with different ways of knowing was absent. Institutional features were the main concerns.

These findings suggested that Stone's (2002) routes and variables are useful in classifying the obstacles to teachers' uses of reading disabilities research and that they, along with specific educational context features, should be considered in a questionnaire. Additional themes regarding research use and barriers to use did not arise from teachers' responses. The respondents' recommendations for the facilitation of research use were found to be beneficial and further exploration of teachers' views on this issue was

indicated. Following these findings, I created a questionnaire for teachers regarding their knowledge and uses of research on the identification and instruction of students who are at risk for reading disabilities.

To assist in analyzing both the pilot study and final questionnaire, I also prepared a narrative synthesis of the research on reading disabilities to which I compared teachers' responses to open-ended questions which elicited their knowledge of reading disabilities. The narrative synthesis follows in Chapter VI, succeeded by reports of the pilot study and final preparation of the questionnaire in Chapter VII.

CHAPTER VI

A Narrative Synthesis of the Research on the Identification and Instruction of Students at Risk for Reading Disabilities

Research on reading disabilities has generated an abundance of evidence that, if applied, could significantly reduce the incidence of this disability (Ehri, Nunes, Stahl, & Willows, 2001; Mathes & Denton, 2002; Shaywitz, Morris, & Shaywitz, 2008). However, if a gap exists between reading disabilities research and practice, teachers may be unaware of the abundant evidence from research. The rationale for this synthesis is therefore to integrate current and concurring information on reading disabilities in order to compare the findings with teachers' responses to the questionnaire items that elicit their knowledge of reading disabilities. This synthesis is beneficial for helping to determine the extent to which there is a gap between reading disabilities research and practice.

Although the influence of sociocultural factors on literacy development warrants serious consideration (Purcell-Gates & Tierney, 2009), the research selected for this synthesis pertains primarily to cognitive perspectives of reading disabilities. It will be noticed, however, that sociocultural variables are necessarily included in the discourse of children's reading development.

Questions

The following questions underpin this synthesis: (a) What are the main characteristics of students who are at risk for or who have reading disabilities?; (b) At what age should students be identified for being at risk for reading disabilities?; (c) What assessments are used to identify students who are at risk for reading disabilities?; and (d) What instructional methods should be employed to teach reading to students who are at

risk for or who have reading disabilities? These same questions were posed to teachers in the questionnaire which was the core component of my study of teachers' uses of reading disabilities research.

Method

Educational researchers often employ primary and secondary sources of information for literature reviews. However, primary sources are preferred because these reports of studies are authored by the researchers involved; whereas secondary sources are compilations, possibly abstracted or incomplete versions of original reports (Gay & Airasian, 2003). In addition, qualitative analysis for the synthesis of research is charged with having "technical challenges such as inter-rater reliability in abstracting qualitative data from individual studies" (Oliver et al., 2005, p. 443). Therefore, a qualitative analysis of secondary sources of information may lack an exact methodology, accuracy and reliability.

On the other hand, a synthesis of research by way of meta-analysis is known by some as "an empirical and systematic form of epistemology [that] imparts the clarity, explicitness, and openness necessary to make research findings believable" (Kavale, 1984, p. 70). However, meta-analysis is not without its critics. For example, Eysenck (1984) considered meta-analysis to be "an abuse of research integration" (p. 41), describing its scoring systems as "useless", "counterproductive" (p. 41) and lacking the researchers' insights. Additionally, Guskin (1984) contended that meta-analyses may result in misinterpretation due to the lack of attention to the "complex detail of individual studies" (p. 79) and to the underlying questions. Kavale (1984) concluded that "no method of research synthesis is right or wrong, but only convenient and valid to the

extent that it proves useful in comprehending complexities" (p. 70).

After considering the preceding issues regarding syntheses, I selected to compile a narrative synthesis of reading disabilities research. A narrative synthesis is "the stage of a review when the evidence extracted from individual sources is brought together in some way" and this may include "extracting common themes across sources" (Mays, Pope, & Popay, 2005, p. 3). Such a synthesis, opposed to a statistical one, uses description to combine findings to generate new insights (Mays et al., 2005). Studies with varying methodologies can be compared, and it is an appropriate approach for producing a "rudimentary synthesis of findings" (Mays et al., 2005, p. 15) when only that is required. Since this synthesis is only tangential to my core research questions and it is used for analyzing merely four out of approximately 60 responses from teachers, I considered a narrative synthesis to be useful and convenient.

In addition, although primary sources are preferred for reviews of literature, when an abundance of literature exits on a topic, Mays et al. (2005) recommended that a "review of reviews" (p. 6) might be the optimal. With respect to my topic, 1,253 articles were located by way of a search of peer-reviewed journals written in English, from 2000 to 2010, using PsycINFO and the key words "reading disability", "reading disabilities", and "dyslexia", concerning children up to 12 years of age. Considering the plethora of studies on reading disabilities, therefore, secondary sources were convenient and useful for extracting main concepts about reading disabilities to answer the four questions.

The most recent and descriptive definition of dyslexia and an explanation of the components of the definition by Lyon, Shaywitz and Shaywitz (2003) served as a foundation for beginning the synthesis. Secondly, the report of the Committee on the

Prevention of Reading Disabilities in Young Children of the National Research Council (NRC), which examined evidence on the prevention of reading disabilities for the United States Department of Education and the United States Department of Health and Human Services (Snow et al., 1998), provided foundational evidence for this synthesis. The NRC reviewed findings from "many research traditions" (Snow et al., 1998, p. 2) on normal reading development, on risk factors for reading failure, and on methods for prevention, intervention and instruction that ensure reading success. The National Reading Panel (NRP; 2000) regarded the NRC report to be "a consensus document based on the best judgments of a diverse group of experts in reading research and reading instruction" (p. 1).

Thirdly, the report of the NRP (2000) was drawn on to address the questions underlying this synthesis. The NRP was created in 1997 in response to a request from the United States congress to the National Institute of Child Health and Human Development and the Secretary of Education for a study of research-based knowledge on effective reading instruction. A committee of fourteen individuals including "leading scientists in reading research, representatives of colleges of education, reading teachers, educational administrators, and parents" (NRP, 2000, p. 1) resulted. The committee built on the work of the NRC and it held public hearings to determine the reading topics that it would investigate. The report summarized the NRP's analysis of experimental and quasi-experimental studies of selected topics: alphabetics (phonemic awareness and phonics), fluency, comprehension, teacher education and reading instruction and computer technology and reading instruction.

Canadian perspectives on effective literacy practices were garnered from the

National Strategy for Early Literacy Report and Recommendations which was prepared by the Canadian Language and Literacy Network (CLLRNet, 2009b) and from *Key Factors to Support Literacy Success in School-Age Populations* (CMEC, 2009).

In addition to these significant publications, meta-analyses, summaries, and reviews of reading disabilities research published in peer-reviewed journals since 2000 and in books authored since 2000 by esteemed researchers in reading, were examined. Searches were conducted by way of the databases PsycINFO, PubMed, and ERIC, using the keywords: reading disability, reading disabilities, reading difficulty, dyslexia, identification, testing, assessment, diagnosis, instruction, teaching, treatment, reviews, and meta-analysis. Citations from reports provided additional sources of information.

Furthermore, the narrative synthesis was subjected to an "external audit" (Creswell, 2007, p. 209) by an experienced literacy researcher who validated my coverage of the topic. This researcher recommended additional sources of information which I subsequently included in the synthesis.

Lastly, approximately 400 articles from 2007 to 2010 were screened for new insights into the characteristics, identification, and instruction of students with reading disabilities. Research continues in all these areas with finely nuanced findings that would augment but are beyond the scope of this synthesis. Current primary studies were included which added new information to areas less developed in the secondary sources (e.g., rapid naming, writing).

Despite this relatively comprehensive search of the literature, I acknowledge that a complete and thorough discussion of the identification and instruction of students at risk for reading disabilities would extend beyond the limitations of this synthesis. I hope

to have addressed significant findings that answer the questions I have posed.

Findings

Definition

As I discussed in Chapter I, there is not a single definition of reading disabilities. Neither the Ontario Ministry of Education (2001) nor the Learning Disabilities Association of Ontario provides a detailed definition of a reading disability, which is also known as dyslexia (Snow et al., 1998). I therefore adopted the International Dyslexia Association definition of dyslexia which may be found in Chapter I.

Characteristics of Dyslexia

The aforementioned definition of dyslexia is foundational in addressing the initial question of this synthesis: What main characteristics are exhibited by students who are at risk for or who have reading disabilities? Firstly, dyslexia is considered to be a "specific learning disability" (Shaywitz, 2005, p. 132) in contrast to "learning disabilities" in general, which encompass difficulties in listening comprehension (receptive language), speaking (expressive language), written expression, mathematics (calculations and reasoning), as well as in reading (Fletcher, Lyon, Fuchs, & Barnes, 2007; Lyon et al., 2003). Despite a high incidence of co-morbidity among these disabilities, the cognitive characteristics of dyslexia are sufficiently distinctive to regard it as a separate and autonomous disorder. Regarding the high co-existence of reading and attention problems in particular, Shaywitz et al. (2008) explained that struggling readers lack automaticity in reading and this places "a tremendous drain on their attentional resources" (p. 461), resulting in clinical appearances of attentional difficulties while the primary problem is in reading. On the other hand, Shaywitz et al. also conceded that "a high co-morbidity does

exist between dyslexia and attention deficit/ hyperactivity disorder, ranging from 15% to 50%" (p. 461). This co-morbidity may explain why there are confusions about dyslexia being an autonomous disability. In addition, the term 'learning disability' is often substituted for reading disability because 80-90% of students with learning disabilities exhibit reading difficulties (Fletcher et al., 2007); therefore much of the literature on learning disabilities deals with reading. However, while the terms reading disability and learning disability are often confounded, there is agreement that the features of reading disabilities are distinguishable from other disorders.

Secondly, the definition affirms the "neurobiological" origin of reading disabilities (Shaywitz, 2005, p. 132). This assertion reflects converging evidence from neurological investigations conducted internationally, as well as across languages and cultures (Lyon et al., 2003). Functional brain imaging research has convincingly demonstrated the presence of anomalies in left hemispheric neural circuits of impaired readers compared with those of non-impaired readers (Paré-Blagoev, 2007). The affected regions are responsible for language transmission and the reception and production of speech (Snowling, 2004). In addition, compensatory activations in left and right hemispheres of the brain are exhibited characteristically by struggling readers (Shaywitz, 2005). The anomalies in neurobiological functioning are evidenced comparably by both adults and children with reading disabilities, which indicates that the neural functions are not attributable to prolonged reading failure (Fletcher et al., 2007; Lyon et al., 2003; Shaywitz, 2005). In fact, current studies have identified abnormal neural clusters (ectopias) on the cerebral cortex of reading disabled individuals, and it is postulated that this neuronal disorder is responsible for changing neural activity and that it is traceable to

fetal life (Rosen, Wang, Fiondella, & LoTurco, 2009; Sherman & Cowan, 2009). The utility of this knowledge has been investigated with respect to early identification and instruction of reading disabilities. For example, Maurer et al. (2009) reported that brain-based measures of automatic phonemic processing and tone deviance processing in preschool successfully predicted reading success in Grade 5. Additionally, although the relationships between specific interventions and neural changes require continued study; an extensive body of research supports the hypothesis that intensive reading interventions may normalize neurobiological activity of disabled readers as they concurrently improve reading performance (Shaywitz et al., 2008; Simos et al., 2007). This research highlights the potential significance of neurobiological factors of dyslexia.

Furthermore, regarding cognitive signs, the definition states that dyslexia is "characterized by difficulties with accurate and/or fluent word recognition and by poor spelling and decoding abilities" (Shaywitz, 2005, p. 132). In this context, word recognition refers to accurate reading of real words, and decoding ability connotes the pronunciation of pseudowords (Lyon et al., 2003). Real, small, function words such as "in" or "and", as well as unfamiliar words, are particularly problematic for struggling readers (Fletcher et al., 2007; Shaywitz et al., 2008). Shaywitz (2005) explained that the difficulty with small function words stems from the dyslexic readers' reliance on context; these words are therefore not committed to memory.

The reading of pseudowords on the other hand, refers to decoding words that "can be pronounced but have no meaning" (NRP, 2000, p. 5); "snig" or "paft" are examples. Decoding, or sounding-out of both real words and pseudowords demands the application of letter-sound knowledge to make sense of print. Thus, the absence of the knowledge of

letter sounds precludes accurate decoding.

Letter sounds and the orthographic representations of the sounds are also requisite for encoding or writing words with correct spelling, and this is an additional challenge for individuals with a reading disability (NRP, 2000; Shaywitz et al., 2008). Berninger, Nielsen, Abbott, Wijsman, and Raskind (2008) added findings that spelling is correlated with written composition; therefore the writing problem evidenced by students with dyslexia has spelling problems at its core rather than poor grapho-motor skills.

Dysfluency in reading is yet another significant cognitive feature of dyslexia. Fluency refers to quick and accurate reading with good understanding (Lyon et al., 2003). Fluency also entails the use of correct expression (NRP, 2000) and reading "automatically" versus "manually" (Shaywitz et al., 2008, p. 461). Automaticity is lacking in the reading by individuals with dyslexia. In addition, fluent reading is considered to be a prerequisite for making meaning from print (Fletcher et al., 2007); poor comprehension is therefore also an identifier which is discussed in a later section.

Most noteworthy is that "these difficulties typically result from a deficit in the phonological component of language" (Shaywitz, 2005. p. 132). Phonological awareness is "a metacognitive understanding that the words we hear and read have internal structures based on sounds" (Fletcher et al., 2007, p. 87). A deficit in phonological processing has the most robust correlation with dyslexia in adults and children (Catts & Hogan, 2003; Goswami, 2002; Herrmann, Matyas, & Pratt, 2006; Lovett et al., 2005; Lyon et al., 2003; McCardle & Chhabra, 2004; Muter, 2003; Naples, Chang, Katz, & Grigorenko, 2009; Sawyer, 2006; Shapiro, 2001; Snowling, 2004; Vellutino, Fletcher, Snowling, & Scanlon, 2004). Shaywitz (2005) claimed that "the presence of a phonologic

deficit in the context of relatively intact overall language abilities is the "*sine qua non* of dyslexia" (p. 137). Yet, this phonological deficit theory is not accepted as "a universal phenomenon"; rather, some researchers contend that it is specific to "irregular" or "opaque" (Snowling, 2004, p. 80) languages such as English. Share (2008) actually labeled English an "outlier orthography" (p. 584) that has dominated reading research and mistakenly attributed all reading problems to a phonological disturbance. Conversely, Caravoles (2005) reported increasing evidence that points to a common phonological deficit, to varying degrees, in reading disabilities across languages. Regardless of the ongoing controversy, I am focusing on reading disabilities of English speaking students; therefore the phonological deficit underlying dyslexia remains relevant.

Indicators of a phonological deficit include inadequate recognition and production of rhyme, the inability to hear syllables, and lacking awareness that all words can be segmented into phonemes, "the smallest unit of speech that distinguishes one word from another" (Shaywitz, 2005, p. 41). The latter skill is known as phonemic awareness. Shaywitz (2005) explained: "Before words can be identified, stored in memory, or retrieved from it, they must be broken down into phonemes by the neural machinery of the brain" (p. 42). In individuals with dyslexia, the phonemes are less well developed (Shaywitz, 2005), and phonological representations of words may be poorly perceived (Bowey, 2005), poorly encoded in memory (Vellutino et al., 2004), and resultantly poorly produced (Bowey, 2005). Such a phonological deficit may in fact be manifested early in children's speech before reading difficulties arise. For example, a child may evidence delayed speech (first words are expected by age 1 year and phrases by 18 months to 2 years), an inability to hear rhyme (usually demonstrated by 3 to 4 years of age), difficulty

learning nursery rhymes (accomplished usually by 4 years of age), frequently mispronounced words (by 5 years of age most words are said correctly), continued baby talk, and dysfluent speech (Shaywitz, 2005). Sustained difficulty in retrieving the correct words and correctly pronouncing words, as well as delayed oral responses, poor rote memory, the substitution of words, talking around words (circumlocution), and in the overuse of nonspecific words (such as 'thing', 'what's his name'), reflect poor phonological retrieval which relates strongly to reading disabilities (Catts & Hogan, 2003; Shaywitz, 2005).

At the onset of reading, inefficient phonological processing impairs learning letters of the alphabet and their associated sounds; names of letters should be known by early kindergarten and sounds of letters by the end of kindergarten (Schatschneider & Torgesen, 2004; Shaywitz, 2005). Understanding the alphabetic principle enables would-be readers to "decipher the reading code" (Lyon et al., 2003, p. 7) to decode and spell words. For example, when one pronounces the word "sit", three phonemes are uttered: /s/ and /i/ and /t/. A reader must hear the phonemes (a phonemic skill) and match the sounds to the correct alphabetic code (a phonetic skill) in order to decode and spell "sit." In this way, phonological sensitivity and letter knowledge are "inextricably linked" (Bowey, 2005, p. 168) and are "co-determinants" (p. 168) of early word reading. Readers must know the sounds of the 43-44 phonemes in the English language, store them in memory, associate them with their orthographic representations, and then convert the letters or letter combinations of written words into sounds in the sequence that they appear in the words in order to decode print (Shaywitz, 2005). Phonological skills also facilitate the recognition of words. Word recognition occurs as the reader stores sounds in memory

that are associated with letters, followed with sounds of groups of letters, and with increasingly larger chunks of words to entire words. Rapid recognition of chunks of words assists readers to decode unfamiliar words quickly. Also, the more frequently a word is read, the stronger the connection of the printed word to the model of the word stored in memory becomes. However, as Shaywitz (2005) explained, a deficient memory of words arises when a dyslexic reader matches only a few letters in a word to their sounds and consequently, stores an incomplete or inaccurate model of the word in memory. Resultantly, when the reader encounters the printed word again, the printed word cannot readily be matched with the stored version. This deficit precludes the storage of sight words and the automatic recognition or decoding of words (Schatschneider & Torgesen, 2004). According to Torgesen (2005), disabled readers will characteristically "stumble" on many words, "guess at, or attempt to 'sound out' words" (p. 522), and make more errors than average readers. A resulting dysfluency is understandable. Additionally, the inaccurate storage of visual representations of words in memory in addition to poor letter-sound knowledge, interferes with efficient, accurate spelling and writing. An awareness of the phonological structure of language is therefore needed for accurate and fluent speaking, for learning the alphabetic principle of a language such as English, for fluent and accurate reading, for spelling, and for writing.

Although rapid naming and verbal memory are not referenced in the definition, they have been related to phonological processing as well (Bowey, 2005; Schatschneider & Torgesen, 2004; Shaywitz, 2005; Vellutino et al., 2004). For example, Shaywitz (2005) proposed that rapid automatic naming relies on phonologic access; that the production of names of objects, letters or numbers on demand, requires individuals to have correctly

stored the names in memory in order to quickly retrieve them. This same process was previously discussed with respect to accessing letter sounds and words for correct and fluent reading and writing. Shaywitz asserted therefore, that rapid naming similarly relies on accurate phonological skills. In addition, Snow et al. (1998), Catts and Hogan (2003), and Shaywitz claimed that verbal (phonological) memory, the "ability to temporarily store bits of verbal information" (Shaywitz, 2005, p. 145), depends on efficient phonological processing and that verbal memory is related to successful reading. Phonologic memory is required to remember sounds as words are decoded, or to remember the beginning of a sentence while reading in order to comprehend what was read (Shaywitz, 2005). Muter (2004) added that poor quality phonological representations in verbal memory or slow processing of phonological information may explain the relationship between phonological skills and verbal memory as well as a relationship with rapid naming. On the other hand, Naples et al. (2009) reported that the relationship between rapid naming and reading depends on the language under study (e.g., English versus Finnish), and that its correspondence with phonological awareness may be less direct than others posit. In any case, there is an undeniable consensus that a phonological processing deficit underpins reading disabilities.

Furthermore, the definition of dyslexia highlights that the exhibited difficulties are "often unexpected in relation to other cognitive abilities and the provision of effective classroom instruction" (Shaywitz, 2005, p. 132). Fletcher et al. (2007) concurred that unexpected underachievement is a "historically central construct" of learning disabilities in general (p. vii). However, Lyon et al. (2003) stressed that this does not necessarily support the "typical discrepancy formula" (p. 8) which is customarily determined by

comparing reading achievement scores and intelligence quotients (IQ). In fact, considerable challenges to the use of IQ in the identification process have been forwarded (Foorman & Al Otaiba, 2009; Jimenez, Siegel, O'Shanahan, & Ford, 2009; Snow et al., 1998; Stuebing et al., 2002). (Elaboration of this debate occurs in the assessment section.) Instead, researchers suggest that the unexpectedness of a reading difficulty should be determined in relation to other observable cognitive skills such as thinking, reasoning, vocabulary, listening comprehension and performance in other subjects such as mathematics (Shaywitz, et al., 2008). "The uneven peaks and valleys of both cognitive and academic functioning contribute to the clinical picture of dyslexia; a weakness in phonologically based skills in the context of often stronger cognitive and academic skills in nonreading -related areas" are evidenced by individuals with reading disabilities (Shaywitz, et al., 2008, p. 462).

In addition, students must have experienced effective classroom instruction (see section on instruction regarding quality) to which they have responded inadequately in order to be classified as having a reading disability. It is known that the absence of effective reading instruction and a paucity of opportunities to practise reading can disrupt reading development (Snow et al., 1998). Therefore, before a reading disability is attributed to an individual, environmental factors, such as the quality of early learning opportunities, need to be considered. This attitude is currently reflected by practices in the United States where there must be evidence of appropriate instruction and documentation of the student's response to the intervention at repeated intervals before a learning disability is diagnosed. Both the unexpected underachievement and the provision of effective instruction relate to the identification of students with a reading disability

which will be discussed in following sections.

Lastly, the definition identifies outcomes of a reading disability in declaring that "secondary consequences may include problems in reading comprehension and reduced reading experience that can impede growth of vocabulary and background knowledge" (Shaywitz, 2005, p. 132). Underscored here is the implication that phonological problems ultimately may lead to deficits in vocabulary, background knowledge, and reading comprehension. When readers labour to decode words, few cognitive processes remain for higher level functions such as text integration and comprehension (Bowey, 2005; Fletcher et al., 2007). In addition, dyslexic individuals are potentially deprived of reading texts that could enrich their vocabulary and general knowledge, both of which are instrumental in accurate reading and understanding of text. Long term memory difficulties may additionally impede vocabulary development (Snowling, 2004). It is also noteworthy that as children with reading difficulties mature, they may in fact develop relatively accurate but dysfluent reading; this is important to recognize when identifying older students. Accurate word reading or decoding might mask an underlying disability that is evidenced by poor fluency and poor comprehension. Reading comprehension difficulties may exist without apparent word recognition problems (Fletcher et al., 2007).

On the other hand, Shaywitz et al. (2008) also pointed out that children with strengths in other cognitive processes may in fact demonstrate reading comprehension incommensurate with their poor fluency and word accuracy. Therefore, a poor understanding of what is read is not always readily identified in cognitively strong students.

Additional features of dyslexia that are absent from the definition yet are worthy

of mention are biological and environmental factors, excluding instructional situations. For example, reading disabilities are known to be highly heritable (Sawyer, 2006; Shapiro, 2001; Snowling, 2004); parents with reading disabilities have a 31% to 62% chance that their children will have reading disabilities compared with 5% to 10% in the population at large (Snow et al., 1998). Where one child is dyslexic, almost 50% of the siblings have a strong likelihood of being reading disabled (Shaywitz, 2005). In addition, children with the most persistent reading disabilities are those with a family background of dyslexia (Lyytinen & Erskine, 2006).

With respect to the environment, the heritability of dyslexia may result in generations of exposure to behaviours and habits that obstruct the development children's pre-reading skills (Shaywitz, 2005). It is also known that low socioeconomic and/or minority status are related to weaknesses in pre-reading skills, thereby positioning children from these groups to be at risk for reading disabilities. Broad oral language knowledge that is needed for comprehension and phonological and print-related knowledge that are necessary for learning the alphabetic principle and to read words are often deficient in these children (McCardle & Chhabra, 2004; Snow et al., 1998). This same population is often also deprived with regards to the quality of their educational opportunities, the significance of which has already been identified.

In summary, the primary characteristics that may be exhibited by a student who is at risk for or who has a specific reading disability are:

- inaccurate or dysfluent reading; difficulty with basic word identification; poor spelling; poor decoding (real and pseudoword); difficulty learning the alphabetic principle; poor reading comprehension;

- neurobiological evidence of brain activation that differs from skilled readers (identifiable by brain imaging);
- an underlying deficit in phonological awareness which may be evidenced by a delay in speaking, difficulties in pronunciation, inability to hear rhyme, difficulty retrieving a word, difficulty producing a word on command, difficulty in understanding the phonemic structure of words (i.e., blending phonemes into words, segmenting words into syllables and phonemes, substituting and deleting phonemes), difficulty learning letter-sound relationships, deficient phonological access (rapid naming), and poor phonological (verbal) memory;
- intact higher level cognitive abilities such as thinking, reasoning, vocabulary, and listening comprehension, and higher performance in other subjects such as mathematics compared with reading performance;
- previous opportunity to benefit from effective reading instruction;
- secondary difficulties in comprehension and in reduced reading experience which may impede development of vocabulary and background knowledge;
- and a genetic predisposition to a reading disability.

In analyzing the questionnaire responses to the question on characteristics of students at risk for reading disabilities, I therefore expect the teachers to make references to the above features.

Age of Identification

The second question addressed in this synthesis is: At what age should students be identified as being at risk for reading disabilities? In response, Snow et al. (1998) argued that most reading difficulties result from problems that could have been avoided

in the primary grades. The need for early identification is confirmed by Fletcher et al. (2007) who reported that when students are identified with reading disabilities in Grade 3, greater than 70% maintain this status through Grade 12. Reading remediation studies have also demonstrated that it is difficult to bring students up to grade level if interventions for word level reading disabilities begin after Grade 2 (Fletcher et al., 2007). In fact, Snow et al. concluded that students who are substantially behind their peers at the end of first grade remain behind. These findings suggest that before the end of Grade 1, students at risk for future reading disabilities should be identified.

In fact, Muter (2003) reported success with kindergarten – level screening batteries which had the potential to predict later reading skills with almost 90% accuracy. (The batteries are discussed in the section on assessment.) Difficulties in phonological awareness are apparent in at-risk children in kindergarten; however, as previously discussed, identifiable risks for reading disabilities actually exist prior to children attending school. The absence of necessary linguistic, cognitive, and early literacy skills can in fact be determined at the pre-school level (Catts & Hogan, 2003; Shaywitz, 2005; Snow et al., 1998; Snowling, 2004; Torgesen, 2004). One could justifiably argue that a familial background of dyslexia places a child at risk for a reading disability at birth. Snow et al. (1998) cautioned, however, that although risk factors for reading difficulties can be detected very early, not all children who exhibit these risk indicators will develop reading disabilities, and one risk factor alone cannot accurately predict reading difficulties. The presence of risk factors at a pre-school age should however lead to careful monitoring and interventions if necessary. It appears therefore, "because of what is known about early reading and risk factors for reading failure, it is clear that the pre-

school period is important in preparing children to enter kindergarten ready to learn to read" (McCardle & Chhabra, 2004, p. 466). Students who are at risk for reading disabilities should be identified "as early as possible", "at the cusp of school entry" (Shaywitz, 2005, p.119). Muter and Snowling (2009) concurred that screening children for the risk of a reading disability is possible at 5 years of age. Even younger ages for screening of language development are recommended for children with a family history of a reading disability; Snow et al. suggested one to two years before the start of school. An accurate questionnaire response to the question on the age of identifying students at risk for reading disabilities is therefore from preschool to 5 years of age.

Assessment

How are these risk factors assessed? Although the third question asked in this synthesis is, "What assessments are used to identify students at risk for reading disabilities?", not all features that are predictive of reading disabilities are necessarily testable; they can, however, be appraised in some fashion. The following discussion highlights the information that constitutes a thorough assessment.

Background information. In screening for potential reading problems or before assessing an individual for dyslexia, there should be a "thoughtful synthesis of information – from the child (or adult's) personal and family history; from observations of her speaking and reading; and from tests of reading and language - the history is the most critical component and is afforded the most respect" (Shaywitz, 2005, p. 132). Muter (2003) agreed that background information must be explored, recommending that school experience (consistency and type), family history of learning or educational problems, developmental history (especially speech development), medical history

(illnesses, sensory problems such as vision and hearing), family factors (stress, anxieties, moves), personal and behavioural characteristics (temperament, attention) should be investigated. Alexander and Slinger-Constant (2004) similarly emphasized that the "linguistic and social emotional environments at home and school must be evaluated and addressed with treatment if necessary" (p. 756). One needs to be cognizant of students' family environments, neighbourhoods, schools, communities, as well as home languages which might place students at a higher risk for reading difficulties (Muter, 2003; Snow et al., 1998). In addition, Phillips and Lonigan (2005) proposed that socioeconomic status, which is a multi-faceted condition comprised of factors such as income, education, occupation, values, beliefs, cultural norms, and sometimes ethnic views of reading might affect a child's academic achievement and, therefore, should also be considered in an assessment. For example, some cultures or ethnicities might not value standard book reading. However, Snow et al. (1998) reported that low socioeconomic status of a school district is even more highly correlated with students' school achievement than individual families' socioeconomic status. The latter factor may be more prevalent in the United States where school board funding is more reliant on the surrounding community than in Canada. In any event, the influence of all the above variables on children's learning need to be considered before one determines that a reading problem is intrinsic to the child. Muter stressed that background information is particularly important because not all children who present with reading problems are necessarily dyslexic; they may not have a phonologically-based disorder. Instead, some children may experience generalized learning problems, broader language difficulties, inconsistent or poor schooling experiences, emotional upsets, or they may have had very low birth weights that have

interfered with their development and learning. These potential explanations for a reading delay should also be explored.

In addition, one of the most important factors in identifying students at risk for a reading disability is a family history of reading problems (Shaywitz & Shaywitz, 2004). Consequently, investigation of children's family histories is additionally recommended as an effective screening measure (Lyytinen & Erskine, 2006; Muter & Snowling, 2009). Children with family histories of reading difficulties particularly require close monitoring of pre-school language and literacy skills development (Snow et al., 1998; Shaywitz, 2005); speech processing and perception in infancy and delayed expressive language and some delayed receptive language in toddlerhood can differentiate children who develop reading problems from those who do not among children with familial histories of dyslexia (Lyytinen & Erskine, 2006).

Regardless of family history, the student's record of early speech and language development, particularly vocabulary growth and expressive language, is significant (Muter & Snowling, 2009). The Children's Communication Checklist 2 (CCC2; Bishop, 2003a) may also assist in this area (Muter & Snowling, 2009) and language assessments which Speech and Language Pathologists administer help to determine impairments. A history of speech and language difficulties should alert educators to the possibility of future reading difficulties and the students' literacy progress should be monitored closely (Muter & Snowling, 2009).

With respect to a child's temperament or attention, Snow et al. (1998) emphasized that motivation to learn literacy needs to have been instilled, and that the degree of a child's interest in learning reflects the quality of a child’s pre-school experiences. It is

also conceivable that an aversion to literacy activities reflects a difficulty with pre-reading or reading skills. Muter (2003) and Muter and Snowling (2009) suggested a measure such as The Strengths and Difficulties Questionnaire (Goodman, 1997) to elicit information about children's temperament and attentional abilities. This brief behavioural screening tool assesses a propensity for conduct problems, hyperactivity, emotional symptoms, peer problems, as well as pro-social behaviour which would add valuable information to the assessment process.

Furthermore, while revealing the quality of the student's instructional experience, students' academic records may additionally provide insights into the students' strengths. Evidence of an aptitude for higher- level thinking skills such as conceptualization, reasoning, imagination, and abstraction; a sophisticated listening vocabulary; an ability to understand at a high level what is read to him; and excellence in subjects that are not dependent on reading, could support the unexpectedness of a reading disability (Shaywitz, 2005). Therefore, as a first step in assessing whether a child is at risk for or has a reading disability, many avenues may be pursued in completing a thorough investigation of a child's background.

Educational assessments. Following the collection of background information, it is "appropriate to embark on an assessment protocol to evaluate the child's learning and educational skills" (Muter, 2003, p. 144). Measures for children aged 5 to 7 years might be called screening tools while more detailed assessments are conducted for older children, and the reliability, validity, and standardization of assessments should always be considered (Muter, 2003). Several measures may assess more than one attribute or skill; they may therefore be listed more than once in this synthesis.

With respect to screening tools, several skills warrant surveillance before or during kindergarten and Grade 1. For example, observations of children's language skills, vocabulary and grammar may be telling (Bowey, 2005; Muter & Snowling, 2009). General verbal skills and the ability to attend to the sounds of language are closely correlated with future reading; 40% to 75% of pre-schoolers with early language impairment develop later reading problems (Catts & Hogan, 2003; Snow et al., 1998). This compares with approximately 8.6% of students who do not experience language problems (Catts & Hogan, 2003). The early identification of language problems can therefore pinpoint children at risk for reading problems in order to provide preventative interventions.

The ability to repeat sentences or to recall a brief story just read to them (Snow et al., 1998), rapid automatic naming (Fletcher et al., 2007; Shaywitz, 2005), and the understanding of concepts about print such as directionality, punctuation, concepts of words (Shaywitz, 2005; Snow et al., 1998) may also reveal language or memory difficulties, as well as a deficient knowledge of books. Schatschneider and Torgesen (2004) recommended that the growth of short term memory, rapid automatic naming, in addition to letter knowledge and phonemic awareness should be monitored several times during kindergarten and Grade 1 since the predictive accuracy of these skills improves with students' ages. Naples et al. (2009) cautioned however, that debates persist regarding the predictive validity of rapid naming, and that its predictive merit is greater in consistent orthographies unlike English (e.g., Finnish, Spanish, and German). Shaywitz (2005) also recommended an early screening of phonological awareness in the second semester of kindergarten; phonological awareness is a consistent predictor of reading

from prekindergarten onwards (Smith, Scott, Roberts, & Locke, 2008). In fact, the United States National Early Literacy Panel confirmed that the early literacy skills of alphabet knowledge, phonological awareness, rapid automatized naming of letters / digits / numbers / colours, writing letters and one's name, and phonological memory of preschoolers and kindergarteners were highly predictive of later reading (Shanahan & Lonigan, 2010). Concepts about print, print knowledge, reading readiness, oral language and visual processing were moderately predictive (Shanahan & Lonigan, 2010).

While teachers' classroom observations may suffice to alert them to certain children, assessments of the aforementioned skills are also available. Shaywitz (2005) recommended measures such as the Peabody Picture Vocabulary test (Dunn & Dunn, 2007) to explore a student's familiarity with a range of word meanings as well as overall language skills, and the testing of word retrieval via measures such as the Boston Naming Test (Goodglass, Kaplan, & Barresi, 2000).

An individual's understanding of grammatical constructs may also be assessed using a measure such as the Test for Reception of Grammar-Version 2 (TROG-2; Bishop, 2003b). Additionally, the following measure phonological memory: the Comprehensive Test of Phonological Processing (CTOPP; Wagner, Torgesen, & Rashotte, 1999), which requires repeating of number strings and pseudowords, and the Illinois Test of Psycholinguistic Abilities -3 (ITPA; Hammill, Mather, & Roberts, 2001), which requires nonsensical sentence repetition. Rapid naming may be assessed with measures such as the Rapid Automatic Naming Test (RAN; Denckla & Rudel, 1974). Letter knowledge may be readily assessed with tests such as the Woodcock Reading Mastery Test – Revised (Woodcock, 1998) (Catts & Hogan, 2003; Shaywitz, 2005) or Marie Clay's

Letter Identification Test in the Observation Survey (Clay, 2005), which also contains the Concepts About Print Test.

Lastly, Shaywitz (2005) recommended several measures of phonological skills: the Lindamood Auditory Conceptualization Test-Revised (LAC; Lindamood & Lindamood, 1979); the Rosner Test of Auditory Analysis (Rosner, 1979); the Test of Phonological Awareness (TOPA; Torgesen & Bryant, 1994) and ; the Yopp-Singer Test of Phoneme Segmentation (Yopp, 1995). These tests have been proven as highly predictive of future reading (Rathvon, 2004; Salvia & Ysseldyke, 2004).

Yet another screening tool that incorporates letter knowledge, phoneme completion, and beginning and end phoneme deletion tasks is the Phonological Abilities Test (PAT; Muter, Hulme, & Snowling, 1997), which Muter (2003) reported to have proven reliability and validity and predictive ability of future reading with greater than 80% accuracy (Muter & Snowling, 2009).

Noteworthy here is that users and authors of assessments share the responsibility for the valid use of assessment procedures (Salvia & Ysseldyke, 2004). Authors must demonstrate that their assessments are reliable and valid; that they are consistent and measure what they profess to measure. Users must also be critical consumers, assuring that the assessments they intend to employ have adequate norms and lack of bias as well. In considering the predictiveness of assessments, as I have discussed above, users must also examine the reliability and validity of the criterion measures (e.g., reading tools) that were used to determine an assessment's ability to predict future reading (Salvia & Ysseldyke, 2004).

Once children embark on learning to read and difficulties are suspected, Shaywitz

(2005) recommended three steps in the assessment process: (a) collect evidence that the apparent difficulty in reading is unexpected according to other capacities and/or educational or professional achievement; (b) establish a reading problem according to age and education; and (c) demonstrate evidence of a phonological weakness in contrast to other higher-level language functions.

With respect to the first step, incongruity of a child's reading skills with other cognitive abilities or educational achievements has traditionally been established by way of intelligence tests and achievement tests. In fact, a long-standing definition of a learning disability has required that a significant discrepancy (usually 1-2 standard deviations) between one's intelligence quotient (IQ) and reading achievement must be verified before a diagnosis of a reading disability is assigned (Ontario Ministry of Education, 2001). However, extensive controversy exists regarding this use of IQ tests (Fletcher et al., 2007; Jimenez et al., 2009; Mathes & Denton, 2002; Muter, 2003; Rack, 2004; Sawyer, 2006; Snow et al., 1998; Stuebing et al., 2002).

For example, the original evidence base for using the IQ-achievement discrepancy model of identifying learning disabilities in general was and remains to be weak (Fletcher et al., 2007; Stuebing et al., 2002). Debate continues regarding which IQ and achievement tests should be used, and the claim that IQ tests measure aptitude for learning is widely challenged (Fletcher et al., 2007). Others proposed that measurement error and arbitrary cut-off points for identification purposes render the use of conventional tests meaningless (Fletcher et al., 2002).

In addition, the relationship between reading and IQ is not straightforward. Also, when a discrepancy definition is instituted, the identification and resultant instruction are

often postponed until students' achievement and IQ scores are sufficiently discrepant to justify the designation of a disability. Students' reading must fall further and further behind their peers and often years of failure must be experienced by a student before an IQ-achievement discrepancy results. Frequently, the testing and interventions do not occur until Grade 3, and it is well known that remediation for reading difficulties is very difficult after this grade (Fletcher et al., 2007). Snow et al. (1998) argued that such a deferral of interventions until 3rd or 4th grade "should be avoided at all costs" (p. 326). Meanwhile, students who do not meet the criteria of the IQ-achievement discrepancy often exhibit the same poor reading and are at risk for the same negative educational and occupational outcomes, yet they are deprived of a designation and appropriate interventions (Snow et al., 1998).

It is therefore additionally disputed that the discrepancy model does not identify a unique group of underachievers (Fletcher et al., 2002; Fletcher et al., 2007). Moreover, researchers contend that those with the most severe problems are in reality punished by using IQ tests; poor readers' verbal IQ may decline over time, and a limited exposure to books, a poor verbal memory, and deficient word retrieval ability can negatively influence IQ test performance (Snowling, 2004). Jimenez et al. (2009) discovered in fact that IQ tests do not measure distinctly unique attributes from those required for reading; it is therefore difficult to demonstrate a discrepancy when students have severe reading problems. Shapiro (2001) additionally argued that children with multiple disabilities may not demonstrate a large enough discrepancy while some children with a reading disability might develop compensatory strategies or receive instruction that "blunts" a discrepancy (p. 13). Application of the IQ – achievement discrepancy approach to identification also

fails to guide instruction and remediation (Vellutino et al., 2004); while concomitantly researchers are emphasizing that assessment should enhance programming (Fletcher et al., 2007).

On the other hand, Muter (2003) listed several benefits to using IQ tests as part of an assessment battery. Ability tests help to determine whether a reading delay is part of a global learning problem; they can identify co-occurring difficulties (e.g., motor or spatial); they might indicate whether there are speech or language problems; they provide information on which teachers and parents may base their expectations of a child; they can identify cognitive strengths. Muter (2003) argued that intelligence tests may identify a student's strengths, which may be used to demonstrate that reading underachievement is unexpected. However, the strong opposition to the use of the IQ-achievement discrepancy means of identifying a learning disability such as dyslexia is apparent.

Alternatives to the discrepancy model of identification include observation of students' non-reading achievements and higher level thinking skills. In addition, reading assessments and the response to intervention approach with its tiered instruction are increasingly in the forefront. In fact, the United States' Individuals for Disabilities Education Act (IDEA) of 2004 now permits the education system to explore new methods to identify and teach students with learning disabilities under the rubric of response to intervention (Fletcher et al., 2007). These authors explained that response to intervention is partly based on a mass screening of all students, with repeated assessments of core areas of learning. In addition, response to intervention methods identify students at risk for a learning problem by recognizing the ones who respond inadequately to high quality instruction that is successful with the majority of students. Instruction is generally

provided in three tiers beginning with an entire class to increasingly more intense instruction in smaller groups for students who do not benefit adequately from previous tuition. Instruction is continually guided by assessments that are valid, reliable, and sensitive to teaching. Vellutino et al. (2004) concluded that "assessment that would eventuate in educational and remedial activities tailored to the child's individual needs" is ideal. Response to intervention provides this sort of assessment.

Advantages of response to intervention include early identification and interventions for students at risk for learning problems, ongoing progress monitoring, and increasingly more intensive research-based instruction, with the possible benefit of preventing reading disabilities instead of waiting for students to fail (Wanzek & Vaughn, 2007). Response to intervention may also prevent deterioration of students' motivation to learn, which Snow et al. (1998) identified as a significant factor in preventing reading disabilities.

It may also be worthwhile to administer assessments of non-reading skills as Muter (2003) suggested in order to determine students' strengths, weaknesses, or "co-occurring difficulties which may affect the child's educational progress and development" (p. 160). Recent research by Menghini et al. (2010) confirmed that dyslexia may in fact have a "multifactorial neurocognitive aetiology" (p. 870). Therefore, tests of attention, executive functions, language, mathematics, visual-motor skills, and of visual-spatial skills, in addition to tests of cognitive aptitude may be useful in determining individuals' specific needs (Muter, 2003; Muter & Snowling, 2009).

According to Shaywitz (2005), a second step in the assessment process is to establish a reading problem relative to a child's age and education. The response to

intervention approach to identification would facilitate the collection of such observations early in a student's school career.

Additionally, beyond kindergarten, Vellutino et al. (2004) and Fletcher et al. (2002) forwarded that word recognition skills in early and less-skilled readers (Grades 1 and 2) are even better predictors of future reading than phonemic awareness or letter identification. Both the reading of real words in isolation and the decoding of nonsense words, which require the mapping of sounds to letters, should be tested (Muter & Snowling, 2009). In fact, Compton et al. (2010), Muter (2003), Shaywitz (2005), and Sawyer (2006) concurred that the ability to read nonwords is the clearest indicator of decoding ability.

Muter (2003) suggested these decoding tests: The Graded Nonword Reading Test (Snowling, Stothard, & MacLean, 1996) and the non-word reading test of the Phonological Assessment Battery (PhAB; Frederickson, Frith, & Reason, 1997). Whereas Compton et al. found The Test of Word Reading Efficiency: Phonemic Decoding Efficiency (Torgesen et al., 1997) to be highly effective in identifying students at risk for reading problems. A reading prose test such as the Neale Analysis of Reading Ability II (NARA II; Neale, 1997) also assesses decoding, in addition to the student's use of context cues in text reading and speed of reading, (Muter, 2003). Another measure which is frequently used may be administered by teachers is the Woodcock-Johnson III Tests of Achievement (Woodcock, McGraw, & Mather, 2007).

As a child matures, fluency becomes a more significant indicator of difficulty; "a child who reads accurately but not fluently is dyslexic" (Shaywitz, 2005, p. 133). Both accuracy and fluency are observable by way of oral reading tasks; word omissions or

substitutions, lack of expression and cadence, in addition to decoding problems may be witnessed as a struggling reader reads aloud. The Tests of Word Reading Efficiency (Torgesen et al., 1997), as well as the Gray Oral Reading Tests (Wiederholt & Bryant, 2001) and the Woodcock Johnson III tests of Achievement (Woodcock, McGraw, & Mather, 2007) may be used to assess oral reading (Shaywitz, 2005).

Ultimately, comprehension, which is the ability to make meaning from print, is the desired outcome of reading. Measures that may be used include: reading sections of the Woodcock-Johnson III Tests of Achievement (Woodcock et al., 2007), the Woodcock Reading Mastery Test (Woodcock, 1998), and the Gray Oral Reading Tests (Wiederholt & Bryant, 2001) which were suggested by Shaywitz (2005), and the Neale Analysis of Reading Ability II (Neale, 1997), recommended by Muter (2003).

Thirdly in Shaywitz's (2005) steps of identification is assessment of the phonological component of language. This assessment is recommended even beyond the screening stages because the ability to attend to sounds of language is "the predominant core cognitive correlate" with reading (Fletcher et al., 2007, p. 7) in both primary and secondary school. Strong relationships between reading ability and phonological skills persist throughout development and even into adulthood (Lovett et al., 2005; Simos et al., 2007; Snowling, 2004), and they should be assessed if a reading disability is suspected. The assessment of phonemic awareness is therefore advised as students progress through the grades in order to develop a comprehensive profile of students' reading skills and a thorough understanding of underlying difficulties (Muter, 2003). Many of the previously named phonological assessments are appropriately administered into the junior and intermediate years (Muter, 2003). In addition, if students present with phonemic

problems, letter knowledge might also be compromised and should be tested.

Spelling tests may additionally be used as a measure of decoding ability (Muter, 2004) by testing the spelling of words that a student correctly reads aloud. Qualitative, phonological analysis of spelling errors provides another means to identify a student's decoding misunderstandings. Readers with dyslexia make more non-phonetic spelling errors than non-disabled readers and they continue to make such errors for longer (Muter, 2003). Spelling assessments therefore have potential to assist in the diagnosis of a reading disability. Shaywitz (2005) recommended the following spelling measures:

- The Test of Written Spelling-4 (TWS-4; Larsen, Hammill, & Moats, 1999);
- The Wide Range Achievement Test-3 (WRAT-3; Wilkinson, 1994);
- The Wechsler Individual Achievement Test-II (WIAT; Psychological Corporation, 2001);
- The Woodcock-Johnson III Tests of Achievement written language sub-test (WJIII; Woodcock et al., 2007).

In addition, Muter (2003) suggested the single word spelling test from Wechsler Objective Reading Dimensions (WORD; Rust, Golombuck, & Trickey, 1993) which is also amenable to analysis of word attack strategies.

In summary, the assessment of individuals at risk for or with a reading disability may begin with screening tools in the early years and proceed to a more thorough assessment as the individual begins to read. Therefore, in analyzing the teachers' questionnaire responses to the question on means to assess students for potential reading disabilities, I anticipate that they will mention assessment of: (a) the child's background with respect to family history of reading difficulties, school and environmental

experiences, overall development with particular attention given to language skills; (b) the child's reading related skills relative to the child's age and education;(c) the child's reading related skills relative to other cognitive abilities; and (d) the child's phonological skills as recommended in the literature.

Several useful measures have been suggested; however, in this review, they only serve as examples of tools that may be used. Test reliability, validity, and appropriateness should always be considered. Respondents may name other, similar and acceptable measures as well. It may additionally be prudent for educators to remain abreast of the IQ-achievement discrepancy and response to intervention controversy with respect to identification, and to remember that ideally, assessment informs instruction.

Instruction

Students' strengths and difficulties, which are revealed by assessments, should inform interventions (Shaywitz, 2005). Students' strengths, for example, may serve as compensatory mechanisms to aid them in reading, and acknowledgement and use of these strengths may bolster students' self-esteem and motivation to learn. However, instructional strategies tend to chiefly target students' difficulties in hopes of preventing or remediating reading disabilities and numerous commercially packaged, instructional / remedial programs are cited in the literature on reading disabilities. A review of such specific programs is not within the scope of this synthesis. Readers are directed to Shaywitz (2005) or Fletcher et al. (2007) for information regarding programs.

This section focuses on key instructional concepts about which considerable consensus exist. In fact, "35 years of research from around the world have described the knowledge, skills, and supports that students need to have success in reading and how to

deliver them in classrooms" (CMEC, 2009, p. 16). Torgesen (2004) agreed that we have "a very broad scientific consensus about the types of knowledge and skills required to become a good reader" (p. 361). The CMEC (2009) recommended the following four necessary components of effective reading instruction for all students:

1. A comprehensive approach to reading instruction;
2. Articulated standards with data used to monitor progress and inform instruction;
3. The resources and professional capacity to ensure effective delivery;
4. Effective interventions for children experiencing difficulties (pp. 16-17).

According to the CMEC (2009), comprehensive reading instruction includes daily reading and development of students' oral language, fluency, comprehension, and motivation. Regular classroom instruction in reading was urged for all children in kindergarten to Grade 3, with the recognition that the amount of time spent in quality instruction is related to levels of reading achievement in the primary grades. According to the CMEC, fluency instruction included letter-sound knowledge, phonological awareness, and decoding which relate to efficient word reading and eventual fluency.

Details of quality literacy instruction may also be found in *Foundations for Literacy: An Evidence-based Toolkit for the Effective Reading and Writing Teacher* (CLLRNet, 2009a). In this publication, which is only available via the website at the time of writing this report (http:www.cllrnet.ca/), valuable information regarding oral language development and components of literacy development are explicated for teachers. Instructional and assessment strategies are given for print awareness, decoding (letter knowledge, phonological and phonemic awareness, and the alphabetic principle), vocabulary building, reading comprehension, fluency, and writing (spelling, handwriting,

composition). The handbook additionally presents elements of effective instruction: motivation, systematic and explicit delivery, synthetic and analytic instruction, multisensory approaches, scaffolding, meta-cognitive strategies, reciprocal teaching, computer use, parental involvement, and interventions for students with special needs.

Inarguably, such excellent reading instruction is expected for all students; however, students' individual difficulties may dictate select interventions as well. For example, researchers concur that explicit instruction in all facets of reading and writing are particularly necessary for students who are at risk for reading disabilities (CLLRNet, 2009b; Ehri et al., 2001; Hammill, 2004; McCardle & Chhabra, 2004; NRP, 2000; Rack, 2004; Snow et al., 1998; Swanson, 2008). Catts and Hogan (2003) added that a comprehensive approach to reading instruction should also include the teaching of grammatical structures in text, self-monitoring, questioning, mental imagery, and summarizing to facilitate students' reading comprehension. Rack (2004) clarified that not all these skills would necessarily be taught together; rather, decoding may be a focus in the early stages of instruction, and the application of a range of skills would be expected in later stages. However, there should always be a combination of skills, with practice and generalization of the skills during the reading of connected text.

Secondly, the CMEC (2009) reported "when expectations about competency are established, aligned with curriculum and assessment, and supported by standards, educators and parents are able to determine how well the individual child, school, or system is doing in relation to expected competencies" (p. 22). Ongoing, formative assessments, daily or weekly, are recommended in order to avoid overlooking changes in

students' progress (CMEC, 2009). Connor et al. (2009) similarly concluded that instruction is effective when it is: (a) intentionally planned to meet individual students' needs; (b) based on scrupulous assessment of students' skills; and (c) responsive to changes in students' abilities. The same practice applies to students' at risk for or with reading disabilities. Reasonable and attainable benchmarks should be set (Shaywitz, 2005), and careful monitoring of students' progress relative to their individual goals and corresponding program alterations are essential (Denton, Vaughn, & Fletcher, 2003; NRP, 2000; Snow et al., 1998). RTI methods, comprised of quality, tiered instruction based on regular assessments are compatible with this principle and are arguably an optimal means to provide articulated standards and assessment data for students with reading difficulties.

Thirdly, sufficient, quality materials and trained professionals are invaluable to the provision of effective educational programs for all students (CMEC, 2009). Not surprisingly, programs for students at risk for reading disabilities similarly require superior and plentiful reading materials; texts should be meaningful, well-written, predictable, and at the appropriate levels of difficulty for the students, for example, instructional versus frustration level (Snow et al., 1998). Material resources may well include assistive technology and computerized training programs; however, educators are advised to investigate the effectiveness of such programs to ensure that they are research-based and proven (Denton et al., 2003; Shaywitz, 2005).

In addition, these students particularly require well-prepared, knowledgeable, experienced instructors (NRP, 2000; Rack, 2004; Shaywitz, 2005; Snow et al., 1998). Teaching assistants, volunteers, peers, or computers are inadequate substitutes for highly

qualified teachers (Shaywitz, 2005). This means that pre-service teacher education, in-service professional development, and on-going support are necessary for teachers to develop the expertise they need to ensure optimal programming for students at risk.

Snow et al. (1998) additionally recommended that quality education for at-risk students especially relies on schools that are well-organized, have pleasant physical environments, contain excellent libraries and media resources, and that aim for school-wide excellence in teaching. Clearly, quality teaching practices, resources, and environments are requisite for optimal learning by all students; however, effective interventions for students who are experiencing difficulties (or who are at-risk) must also be provided.

Lastly, extensive agreement exists regarding the content and administration of interventions, specifically for students who may experience reading problems. The first considerations are prevention and early intervention. The primary step in the prevention of reading disabilities is to reduce the incidence of children entering school with inadequate linguistic, cognitive, and early literacy knowledge such as concepts about print, phonemic awareness, receptive vocabulary (Alexander & Slinger-Constant, 2004; CLLRNet, 2009b; Shaywitz, 2005; Snow et al., 1998). Preschool and kindergarten screening, as well as high quality, intensive preschool and kindergarten learning experiences and quality family support can alleviate some of the early risk factors for reading disabilities. Snow et al. (1998) recommended increased public understanding of early literacy development and the significance of stimulating early literacy experiences. Preschoolers benefit from shared reading of books with adults and quality verbal interactions that foster language development and concepts about how books work; they

need activities that develop attention to the sound structure of spoken words and the relation between speech and print (Snow et al., 1998).

Early identification and interventions are of paramount importance for preschoolers with language difficulties in particular (Catts & Hogan, 2003; Shanahan & Lonigan, 2010). The language basis for reading implies that strategies to improve children's broad language skills, such as language comprehension and vocabulary (Catts & Hogan, 2003; Muter & Snowling, 2009; Snowling, 2004), word recognition (Catts & Hogan, 2003), processing complex verbal material (Sawyer, 2006), and expressive language (Snowling, 2004) should be addressed when difficulties in these areas are observed. It should be recognized that preschool and kindergarten programs significantly affect children's early literacy skills (Shanahan & Lonigan, 2010).

Undoubtedly the greatest consensus regarding instruction has been with respect to phonological training. Explicit instruction in phonological awareness and specifically in phonemic awareness is necessary for students who lack these skills (Alexander & Slinger-Constant, 2004; Catts & Hogan, 2003; Lovett et al., 2005; Mathes & Denton, 2002; Muter, 2003; Muter, 2004; Muter & Snowling, 2009; Shaywitz, 2005; Snow et al., 1998; Swanson, 2008). Screening and interventions for phonological difficulties could begin with children aged 4 or 5 years (Muter, 2004). Since developmentally young children may be expected to hear and produce rhyme, distinguish words, and hear syllables, as indications of phonological awareness, these may be the first elements of instruction. These skills do reflect and draw attention to the sound structure of words and should therefore not be dismissed. Simos et al. (2007) suggested that difficulty at this level of phonological awareness may in fact be the source for difficulty in developing

phonemic skills. In addition, it is instruction in the manipulation of phonemes, the smallest units of sound in words that is strongly recommended as a core component of interventions for reading disabilities (Denton et al., 2003; NRP, 2000). However, the development of phonological skills alone will not automatically lead to reading (Muter, 2003; Rack, 2004; Schlagal, 2001). Phonological training is most effective if it is combined with instruction in sound-letter correspondences (phonics) (Catts & Hogan, 2003; Muter, 2003; NRP, 2000) and in correspondence with basic reading and writing instruction (Schlagal, 2001) and explicit spelling instruction (Berninger et al., 2008).

Consequently, instruction in the alphabetic principle (phonics) is also highly recommended for students who are at risk for reading difficulties and evidence a weakness in phonics (Ehri et al., 2001; Lovett et al., 2005; McCardle & Chhabra, 2004; NRP, 2000; Snow et al., 1998; Swanson, 2008). Explicit instruction is required for these students to phonetically decode printed words (Catts & Hogan, 2003; Mathes & Denton, 2002; Rack, 2004). Simos et al. (2007) additionally explained that in an inconsistent language as English, students must learn multiple strategies for decoding words; these strategies include whole word and onset-rhyme analogies (word families), as well as grapheme-phoneme relationships. Others forwarded that phonics tuition (with phonological awareness) may be more effective with students in kindergarten or Grade 1 (Ehri et al., 2001); in later grades, a combination of skills take precedence. Roberts, Torgesen, Boardman, and Scammacca (2008) for example, recommended that instruction for older readers (Grades 4-8) should focus more on word study (e.g., morphology, syllable segmentation), fluency, vocabulary, comprehension, and motivation, particularly if quality phonics tuition had previously been provided. Researchers have suggested

therefore that phonics instruction should extend beyond phonics rules alone; for maximal benefit, phonics need to be combined with other components of a balanced reading program, reinforced and practised in the context of reading continuous text (Ehri et al., 2001; Mathes & Denton, 2002; Lovett et al., 2005; Muter, 2004; Rack, 2004; Wanzek & Vaughn, 2007). Therefore, early identification and instruction, phonological awareness and phonics instruction comprise core considerations for educating students who are at risk for or who have reading disabilities. It is noteworthy however, that these skills should be developed within a balanced, comprehensive reading program. In addition to a comprehensive literacy program, Muter and Snowling (2009) recommended that co-occurring difficulties should be addressed possibly by including emotional support, speech and language therapy, occupational therapy, physiotherapy, medication or behavioural programs, and aid in other subjects.

Another vital and distinguishing feature of effectual instruction for these at-risk students is the procedure employed. For example, student-teacher ratios and the clarity, intensity and duration of instruction are significant variables in the delivery of instruction. Manageable class sizes were recommended (NRP, 2000; Snow et al., 1998), with ideally one-to-one or groups of two to five students (Shaywitz, 2005; Swanson, 2008; Torgesen, 2004; Wanzek &Vaughn, 2007). Small groups allow for "more finely calibrated and explicit instruction, responsive to a child's unique needs, actions, and behaviour" (Shaywitz, 2005, p. 258). One-to-one instruction was found superior to small group instruction by Elbaum, Vaughn, Hughes, and Moody (2000). Instruction must also be explicit and systematic; clear goals and organized teaching processes are necessary (Alexander & Slinger-Constant, 2004;Catts & Hogan, 2003; Denton et al., 2003; NRP,

2000; Rack, 2004; Snow et al., 1998; Swanson, 2008; Torgesen, 2004). For example, teachers should model the skills (Denton et al., 2003) and teach precisely how sounds connect with letters, letters with words and words with continuous text (Rack, 2004). In addition, these students require more intensity and time spent in instruction (Denton et al., 2003; Fletcher et al., 2002; Rack, 2004; Shaywitz, 2005; Snow et al., 1998; Torgesen, 2004; Wanzek & Vaughn, 2007). Daily reading and writing and extended time with each are required; students need to read and re-read continuous text with support and independently to practise strategies.

For example, Shaywitz (2005) proposed that 150 to 300 hours of intensive instruction (90 minutes per day) may be needed for one to three years for some students to succeed. Wanzek and Vaughn (2007) considered an extensive intervention to consist of 100 or more sessions. Alexander and Slinger-Constant (2004) suggested that students need intensive (daily, one-on-one and small group) phonologically based treatments to close the gap for those in the low 2nd percentile of word-level reading. Additionally, Torgesen (2005) reported success of intensive interventions, comprised of 67.5 hours of one-to-one sessions in 50-minute intervals twice daily for eight weeks for 60 severely reading disabled students. Two programs were implemented. One focused on articulatory/phonemic awareness and phonemic decoding and writing (85% of the time), sight word recognition (10% of the time), and reading meaningful text (5% of the time). In the second approach, the students practised phonemic awareness and phonemic decoding of single words (20% of the time), learned high frequency words (30% of the time), and read meaningful text with support (50% of the time). After the interventions, half of the students no longer required special education services and all the students

improved significantly in reading accuracy and comprehension and particularly in decoding unknown words. Torgesen admitted that half of the students did not maintain their skill level after two years and that the students' reading fluency was not equal with their peers, although fluency had improved. In comparing this study with several other intensive programs, Torgesen concluded that the similarities in growth rates across studies, "given the right level of intensity and teacher skill, it may be possible to obtain these rates of growth using a variety of approaches to direct instruction of reading" (p. 529).

Lovett et al. (2005) cautioned however, that the achieved growth in reading via interventions might not be generalized and that failure to generalize reading skills may appear in students' later academic deficits. These authors recommended explicit "multidimensional " (p. 82) instruction which included subsyllabic (letter-sound) segmentation of words, multiple decoding strategies, dialogue between the instructor and student (prompts, cues, modeling of problem-solving), as well as systematic sequencing of the content, and "drill-repetition-practice" (Lovett et al., 2005, p. 83) in order to achieve lasting gains in reading.

Lastly, program accommodations and the development of compensatory strategies, such as the use of computer technology or peer tutors for reading and writing, provide students with reading difficulties the opportunities to benefit from curricular subjects at their level of learning (Muter & Snowling, 2009; Shaywitz, 2005).

Students at risk for reading disabilities require excellent, comprehensive and balanced literacy instruction as all students do. Interventions should be guided by ongoing assessments and clearly established goals. Effective instruction demands high

quality and sufficient materials and educators set within engaging and motivating learning environments. The foci of instruction for students at risk for or with reading disabilities should be on prevention and early interventions that stimulate language competencies. Intensive and explicit instruction should be provided to develop phonological awareness and phonics skills within a balanced, comprehensive, literacy program. Continued monitoring of the generalizations of reading gains through interventions is also recommended. Teachers' responses to the questionnaire item which asks them to list instructional strategies for students at risk for reading disabilities should reflect these key principles.

Summary

This synthesis of research on reading disabilities has highlighted aspects of the characteristics of students at risk for or with reading disabilities, the age at which students at risk for reading disabilities might be identified, assessment procedures for identifying these students, and instructional foci to best serve students who may be at risk for or who have developed a reading disability. It is acknowledged that new insights evolve constantly; however, this synthesis is useful for exploring the extent of teachers' understandings of reading disabilities and gaps in their understandings by comparing the teachers' responses in the pilot study and questionnaire to the findings in this chapter.

CHAPTER VII

Pilot Study of the Questionnaire on the Research to Practice Gap in the Identification and Instruction of Students at Risk for Reading Disabilities: Teachers' Perspectives

The pre-pilot study which I reported in Chapter V determined that the knowledge utilization theoretical framework, comprised of Knott and Wildavsky's (1980) and Stone's (2002) theories, was appropriate for understanding how teachers use research on reading disabilities and which obstacles impede their uses of research. Based on the findings of the pre-pilot, I developed a questionnaire for teachers to investigate these issues more precisely. I discuss the development of the questionnaire in the following methods section. A pilot study of this questionnaire was necessary to determine whether the instrument performed as anticipated; "pretesting is crucial to its success" (Cohen et al., 2005, p. 260).

Purpose

Specifically, the purpose of the pilot study was to answer the following questions:

1. Does the questionnaire elicit responses that (a) adequately describe the respondents; (b) reveal how and how frequently teachers use research on reading disabilities; (c) identify factors that interfere with teachers' uses of research on reading disabilities; and (d) identify ways in which use of research on reading disabilities may be facilitated?
2. Does the questionnaire generate data that are amenable to analyses and produce results that assist in answering the research questions?
3. Is the questionnaire clear, easy to use, and convenient with respect to the time required to complete it?

4. Is the online survey program, Survey in a Box ® (University of Western Ontario (2003) reliable, or are there technical problems?

Method

Participants

A convenience sample of ten elementary school teachers agreed to pilot the questionnaire. All the teachers were known by me and eight had also participated in the pre-pilot study. The questionnaire elicited the following demographic data. A range of teaching positions were represented; one junior-senior kindergarten teacher, one French immersion senior kindergarten teacher, one Grade 1 French immersion teacher, one Grade 2 teacher, one Grade 4 teacher, and three specialized teachers (one Learning Support, one Reading Recovery, one English as a Second Language) as well as two administrators (one principal, one unknown) participated. All the educators worked in the public school system. The mean age of the participants was 44.33 years (*SD* = 8.87), the mean number of years in their current positions was 8.40 years (*SD* = 6.47), and the mean total years of teaching experience was 18.20 years (*SD* = 7.77). Eight were females, one was a male, and one did not indicate a gender. Five (50%) had earned Bachelor's degrees and five (50%) had Master's degrees.

Instrument

The questionnaire represented an embedded mixed methods design (Creswell & Plano Clark, 2007) which means that questions generated both quantitative and qualitative data. Likert-style rating questions were structured, closed, and purposely created to generate numerical information that was "amenable to statistical treatment and analyses" (Cohen et al., 2005, p. 247). Questions with negative and positive inferences

appeared in random order to maintain the respondents' attention to the items and to avoid the projection of any particular researcher bias. Open-ended questions were used to collect demographic information and to extract qualitative, "rich and personal data" (Cohen et al., 2005, p. 248) with which to triangulate the results from the rating questions. They also provided opportunities for the respondents to express views that were otherwise not addressed. Three versions of the questionnaire were created before a copy was tested in this pilot study.

The first version of the questionnaire was guided by an instrument that Shultz (2007) employed to survey research use by university administrators. It reflected the seven stages of research utilization (reception, cognition, reference, effort, adoption, implementation, and impact) and three categories of obstacles to research use (supply, demand, context) drawn from the theoretical framework. I added an eighth stage of use (search) to explore the extent to which teachers actively search for research. The questions regarding obstacles also incorporated school-specific issues that teachers in the pre-pilot had identified. For example, Likert–style rating questions were additionally created to address factors such as curriculum expectations, high-needs students, encouragement to use research, support from others such special education teachers, administrators or educational assistants, professional development, responsibilities in and outside of school, and the provision of external incentives to use research. A second iteration of the questionnaire was necessary in order to incorporate suggestions from my thesis committee. At this time, rating questions were also added to discern whether teachers find research reports too technical or comprised of too many statistics, whether teacher education programs prepared the respondents to interpret research to improve

their practices, and whether other university courses prepared them to interpret research. In addition, open-ended questions were inserted to learn more from the respondents about features of research that make it difficult to use and that make it convincing, as well as from whom they expect to receive research. The third draft accommodated a request from the Faculty of Education Sub-Research Ethics Board to include a "no response" option to choice and rating questions. This draft consisted of 61 questions; five provided choices, 16 were open-ended, and 40 were rating questions. A copy of the final questionnaire may be found in Appendix D.

The contents of the questionnaire were transferred manually into the Survey in a Box © (University of Western Ontario, 2003) online survey program. This program was developed in the Faculty of Education at the University of Western Ontario to create online surveys and for generating data. A variety of types of questions are possible: open-ended, rating, and selections from which participants may choose an answer. Directions to respondents appeared on the first page of the survey which also directed respondents to read the letter of information. To enter the survey, there were two options; participants would either need to enter a password and be able to leave and return to the survey, or no password would be necessary and the questionnaire must be completed in one sitting. The latter option was selected because I felt that the need for a password might deter potential participants.

Examples of the various forms of questions are shown in Figures 8, 9, and 10. The open-ended questions as in Figure 8 provided boxes into which respondents typed their replies. A sample of a question which provided choices is shown in Figure 9. Figure 10 is an example of a rating question. With each question, participants had the option to

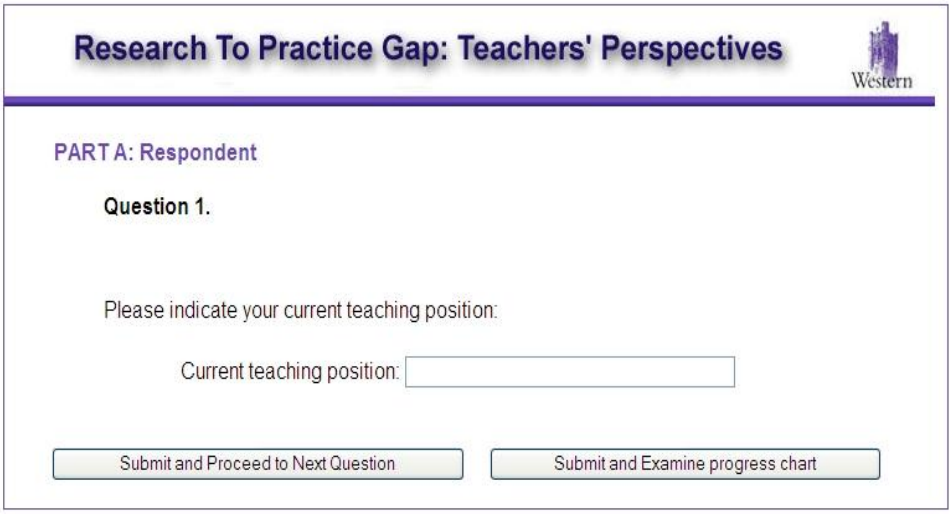


Figure 8. A sample open-ended question.

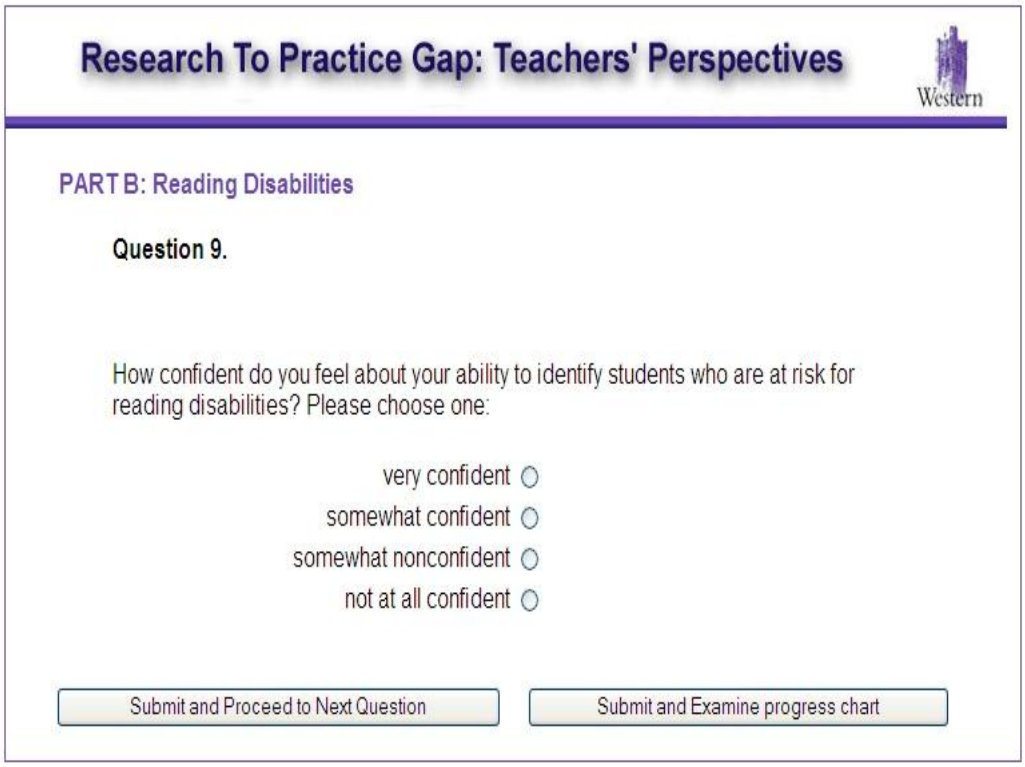
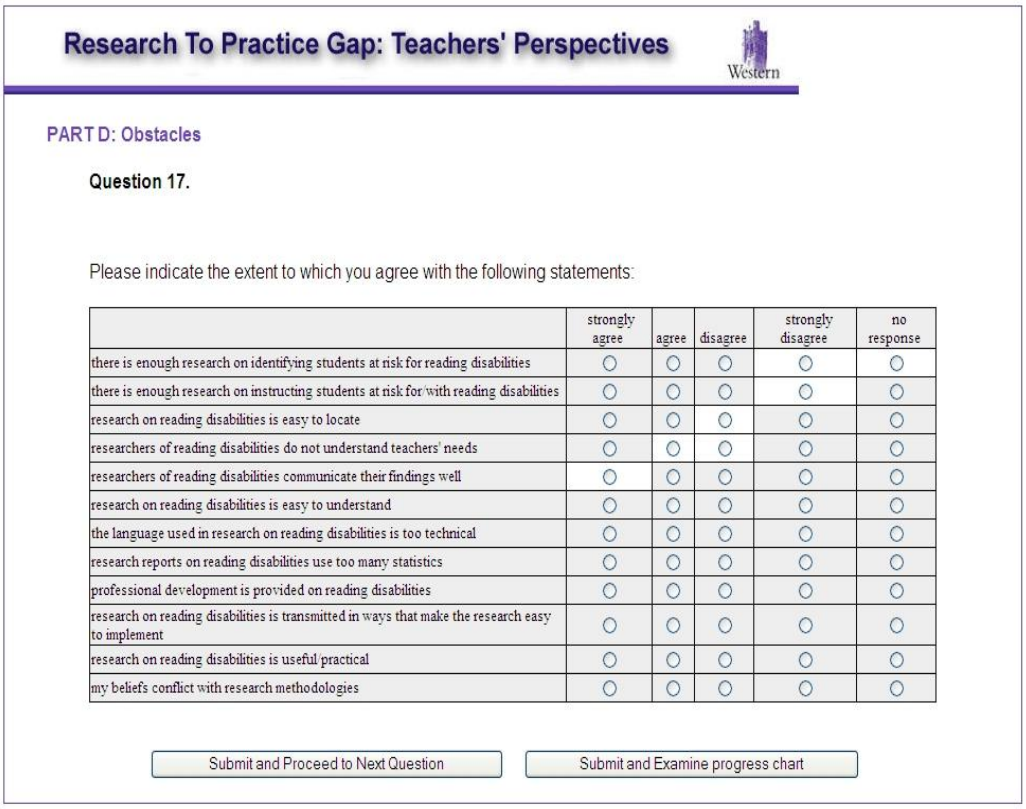


Figure 9. Sample of a selection style question.



Research To Practice Gap: Teachers' Perspectives

Western

PART D: Obstacles

Question 17.

Please indicate the extent to which you agree with the following statements:

	strongly agree	agree	disagree	strongly disagree	no response
there is enough research on identifying students at risk for reading disabilities	○	○	○	○	○
there is enough research on instructing students at risk for/with reading disabilities	○	○	○	○	○
research on reading disabilities is easy to locate	○	○	○	○	○
researchers of reading disabilities do not understand teachers' needs	○	○	○	○	○
researchers of reading disabilities communicate their findings well	○	○	○	○	○
research on reading disabilities is easy to understand	○	○	○	○	○
the language used in research on reading disabilities is too technical	○	○	○	○	○
research reports on reading disabilities use too many statistics	○	○	○	○	○
professional development is provided on reading disabilities	○	○	○	○	○
research on reading disabilities is transmitted in ways that make the research easy to implement	○	○	○	○	○
research on reading disabilities is useful/practical	○	○	○	○	○
my beliefs conflict with research methodologies	○	○	○	○	○

Submit and Proceed to Next Question | Submit and Examine progress chart

Figure 10. Sample of a Likert-style rating question.

submit and continue to the next question, to submit and view how much of the questionnaire they had completed, or to continue to the next question without submitting a response. They were also able to return to previous questions. A paper version was also available on request.

Procedure

The pilot study was approved by the Faculty of Education Sub-Research Ethics Board of the University of Western Ontario as the first component of my thesis research (see Appendix E). Approval was also granted by the school board in which the ten teachers were employed. Collection of the data occurred between January 6 and January 30, 2009. I sent an introductory email (see Appendix F) to the participants, with an attached Letter of Information (see Appendix G) and the link to the questionnaire. A reminder email to all the participants followed mid-way through the month. Response to the survey was considered to constitute consent to participate.

Data Analysis

Exploratory analyses were conducted to determine whether the questionnaire provided data that were amenable to analyses and whether the data answered the research questions. All the on-line responses were anonymous. The survey program automatically assigned an identification number to each respondent. I entered the responses from one completed paper questionnaire. Nominal values were assigned to the categorical demographic data (e.g., current and previous teaching roles, gender, school system, education) and to responses to the rating questions (see Appendix H, Tables H1 to H7). The category of "specialized teachers" included participants who reported working in English as a second language, literacy, or special education capacities. "Other" was

attributed to teaching positions that were not grade-specific, specialized, administrative, or school board positions (e.g., elementary school teacher, physical education / preparation time roles, itinerant French and music, supply teacher). Previous roles were assigned a "mostly" category by establishing which previous teaching position a teacher had held the longest. For example, if a teacher reported teaching kindergarten for three years, Grade 7 for two years, and special education for six years prior to his/her current teaching role, the participant was assigned a "mostly specialized" category for the past role. The actual reported values of the respondents' ages, years in current roles, and years in past roles were recorded.

Negatively and positively oriented statements in the sections concerning obstacles had been randomly ordered in the questionnaire. Therefore, on recording the coded responses, values for negative statements were reversed. For example, a strong agreement (value of 5) with a negatively oriented statement such as, "Research is too technical", was changed to a strongly disagree (value of 1) to "Research is not too technical." All missing data were coded as .999, and "no response" values of 0 were converted to .999, since the two types of responses were qualitatively similar; datum was essentially missing when "no response" was selected.

Analyses of the data were conducted using the Statistical Program for the Social Sciences version 17 (SPSS; IBM, 2008).The open-ended answers were compiled and categorized into themes that related to each question (e.g., sources of research, age of identification, and methods of instruction). Analyses also entailed the computation of descriptive data on demographic variables; frequencies of responses to the rating questions; correlations between the demographic variables and the uses of research,

the demographic variables and the obstacles, and between the obstacles and the uses of research. I listed the sources of research from most to least mentioned. I compared the responses to the open-ended questions to the results of the rating questions when they addressed the same issue. Lastly, I compared teachers' responses to questions on reading disabilities to findings in my synthesis of reading disabilities research.

Results

Demographic Data

The descriptive data that were collected about the respondents in Part A of the questionnaire proved to be valuable in three ways. The data adequately described the participants in the pilot study. The results indicated that the demographic data could be used to determine the extent to which the participants in the main study were representative of the target population which was Ontario elementary school teachers. Data such as ages, years of experience, and degree of education were also amenable to correlational analyses with levels of confidence, uses of research, and obstacles to research use; however, the sample of this pilot study was too small to generate meaningful results.

Research Use

Did the questionnaire generate information on the extent of a research to practice gap in the identification and instruction of students at risk for reading disabilities? First, responses to the questions which asked teachers about their feelings of confidence in identifying and instructing students at risk for reading disabilities in Part B of the questionnaire were informative. Eight respondents expressed a high level of confidence in the ability to identify students at risk for reading disabilities, yet only two expressed

Table 6
Mean Frequency Ratings of Reading Disabilities Research Use

Stage of research use	*n*	Mean
Reception	10	2.70
Search	10	2.70
Read/understand	10	3.00
Reference	10	3.60
Effort	10	3.60
Adopt	10	3.20
Implement	9	3.22
Impact	10	3.20

Note. The range of possible scores was 1-5, with 1= not at all, 2 = seldom, 3 = sometimes, 4 = often 5 = very often.

the same degree of self-assurance in being able to instruct such students Some data were missing; however, this question can potentially unveil the extent to which teachers lack information and whether needed information is in the identification or instruction of students at risk for reading disabilities.

The questions which asked respondents about the degree to which they use research in Part C of the questionnaire overwhelmingly elicited the response "sometimes" to all the stages of research use as shown in Table 6. It would be necessary to judge whether sometimes is acceptable. If there is indeed research that could help to identify and instruct students who are at risk for reading disabilities, is it acceptable that teachers receive it and use it only sometimes? The answer to this question would further determine whether there is a gap and at which stage of use. If "sometimes" is unacceptable, then research is underused according to all the eight categories that have been identified here. On closer examination, even these somewhat ambiguous results point to two stages of utilization that may be more problematic than the others: reception of and searching for research.

In addition, the reported sources of research which were elicited by an open-ended question in Part C of the questionnaire, were largely not academic (i.e., professional development, professional publications, colleagues, team meetings, administration, specialized teachers, Speech and Language Pathologists). Some researchers have considered such sources to reflect a gap in the access to research (Williams & Coles, 2007).

Responses to the open-ended questions on the identification and instruction of students at risk for reading disabilities in Part B of the questionnaire further evidenced the

extent of a gap between reading disabilities research and teachers' practices. Although many knowledgeable responses were given, less than half of the respondents revealed awareness of characteristics of students with reading disabilities, assessments to identify reading disabilities and instructional strategies for teaching students at risk for or with reading disabilities. Teachers' unanswered questions about reading disabilities also pointed to areas of deficient information about reading disabilities. The open-ended responses also repeated that access to research is problematic, thereby reinforcing that the stage of reception is a principle problem.

Demographic information at this point was somewhat informative with respect to correlations with confidence levels; results suggested that select teaching roles may explain where there is a gap. The pilot study established that the questionnaire did contribute to identifying the extent of a research to practice gap in the realm of reading disabilities.

Obstacles to Research Use

Secondly, did the questionnaire results suggest why there may be a gap between reading disabilities research and teachers' practices? Analyses of the frequencies and correlations of responses to the rating questions in Part D of the questionnaire, and responses to the open-ended questions in Part E of the questionnaire corroborated a number of obstacles to research use. Among the obstacles were revelations that: access to research is poor; research reports are too technical, statistics-laden, and difficult to understand; teachers' are unable to interpret research; and teachers modify research for their own purposes. With respect to the teachers' work contexts, the survey rating

questions and the open-ended questions elicited the perspectives that time, supplies, in-school support, curriculum expectations, and administration were significant factors in whether research was used. Therefore, the questionnaire did also address the question of why there may be a gap between research and practice.

How to Facilitate Research Use

Thirdly, did the questionnaire results generate data which proposed how a gap may be bridged? One might begin by addressing the obstacles in order to facilitate research use. In addition, teachers' responses to the open-ended question concerning ways to facilitate research use in Part E of the questionnaire provided insight into means to resolve the gap between research and practice. The participants reported that they require: more information; training; in-school collegial time; supplies; support; self-directed professional development; and improved contact with other professionals (e.g., specialized teachers, psychologists) and researchers. Therefore, the open-ended question served to corroborate as well as augment responses to the rating question on obstacles that need to be surmounted in order to facilitate research use.

Data and Questionnaire Efficacy

The data which this questionnaire generated proved to be amenable to analyses and the results indicated that a larger scale study would answer the research questions. The items in the questionnaire that was piloted in this study were therefore found to be valuable for the final questionnaire. Respondents also indicated that the questionnaire was comprehensive and not too time-consuming. Two preferred the paper formats.

However, results of the pilot study also evidenced minor problems. For example, the second question on knowledge use had only asked teachers whether they search for

research, and I was interested in discerning the extent to which teachers receive research by actively seeking it. Additionally, in response to the rating questions on obstacles to research use, participants in the pilot study had two options which were minimally informative: "neither agree nor disagree" and "no response." Neither of these selections expressed specific opinions regarding obstacles; it was unnecessary to retain both. In addition, the teachers' responses to the open-ended questions on their ages and years of experience in their current and past roles varied in format (e.g., 24 years, 2.5 yrs., and two years) which could conceivably complicate analysis. Also, initially an introductory statement to the last section of open-ended questions asked respondents to add comments about obstacles to research use. This statement appeared to be redundant, and therefore unnecessary to retain.

Technical Issues. The pilot study also exposed difficulty with responses registering to all questions. For example, respondents' genders, school board selections, and level of confidence did not print out on the results pages of the survey. The responses were found only with technical assistance from Media and Information Services at the Faculty of Education. Even then, only the responses of "female" and "very confident" were discovered. It is because nine of the participants were familiar to me that I knew in which school board they were employed and the genders of the nine. Printing the results also revealed that the section on previous employment was not fully displayed. These technical problems were resolved by Media and Information Services.

The Final Questionnaire

With minor revisions and technical improvements, the final questionnaire was developed (see Appendix D). To begin, the instructions to the participants were modified

as in Figure 11. In order to prepare the respondents for the format of the questionnaire, I detailed the types of questions they would encounter, and I explained that respondents may select the questions they wished to answer. My intention was to encourage respondents to carry on past the rating questions should they dislike this type of question. I had also noticed an error in one question of the original questionnaire.

In addition, I altered some questionnaire items according to my findings from the pilot study. I replaced "search for research" in the second question on knowledge use to "search and find research" to reflect my interest in respondents' reception of research by seeking it. Questions on the obstacles to research use were also modified. I removed the "neither agree or disagree" response option in the final survey, leaving "no response" as a selection along with "strongly agree", "agree", "disagree", and "strongly disagree." My goal was to force more specific answers regarding obstacles to research use. Furthermore, if "no response" inadequately relayed the teachers' views, they had another opportunity to express their opinions about obstacles in the open-ended question in Part E, which stated: "What makes research on reading disabilities difficult to apply?" In addition, three open-ended questions on teachers' ages and their years of teaching in their current and past roles were changed to drop-down menus as in Figure 12 for the purpose of consistency in replies.

Open-ended questions continued to address the respondents' current and past teaching roles, their education, and eleven items concerned reading disabilities and research (age of identification, characteristics of reading disabilities, assessments, instruction, unanswered questions about reading disabilities, sources of information on reading disabilities, features of research that make it difficult to use, individuals who are

responsible to transmit research, factors that would facilitate research use, additional comments, and focus group participation). Three demographic questions remained as selection questions which provided responses from which participants chose an answer (e.g., Please indicate your gender: male___ or female____), and 42 items remained as Likert-style rating questions, with two on respondents' confidence in identifying and instructing students with reading disabilities, eight on uses of research, twelve on obstacles related to research and researcher variables, ten on obstacles related to teacher variables, and ten on obstacles related to context variables. In total, therefore, there were 61 individual items to answer in the final questionnaire.

Summary

The questionnaire succeeded in providing informative data on the extent of a research to practice gap in the identification and instruction of students at risk for reading disabilities, reasons for a gap, and ways to bridge the gap from teachers' perspectives. The questionnaire proved to be unambiguous and convenient for respondents. Both online and paper versions would continue to be available to meet respondents' needs. In addition, with assistance from Media and Information Services in the Faculty of Education, the online survey program would be corrected in order that responses would record on the results pages of the questionnaire.

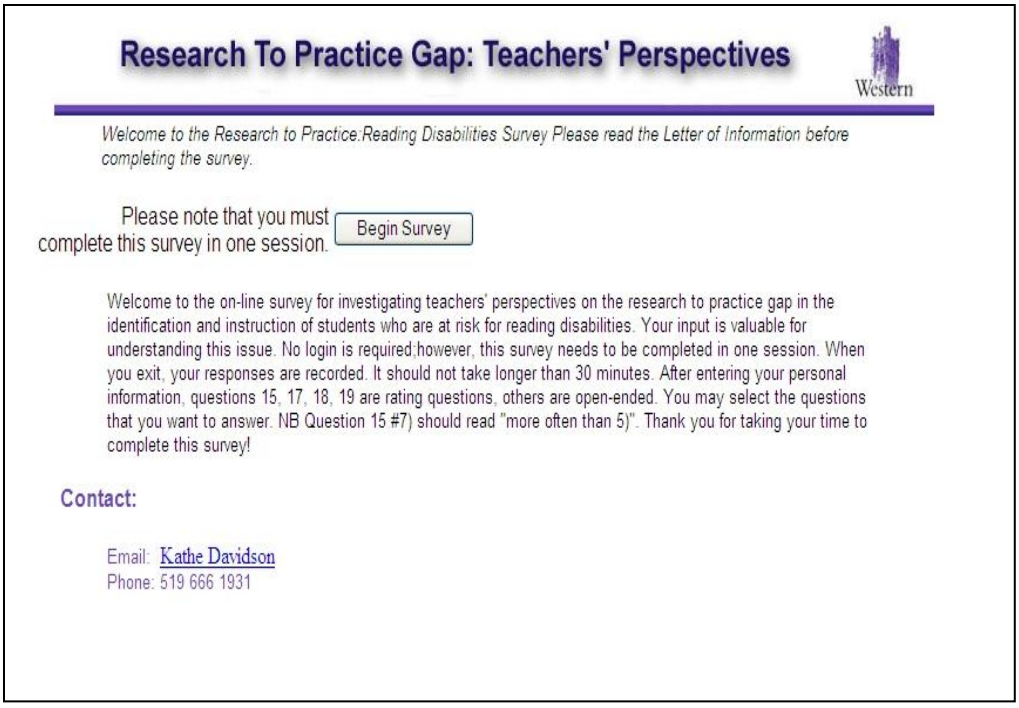


Figure 11. Introduction to the questionnaire.

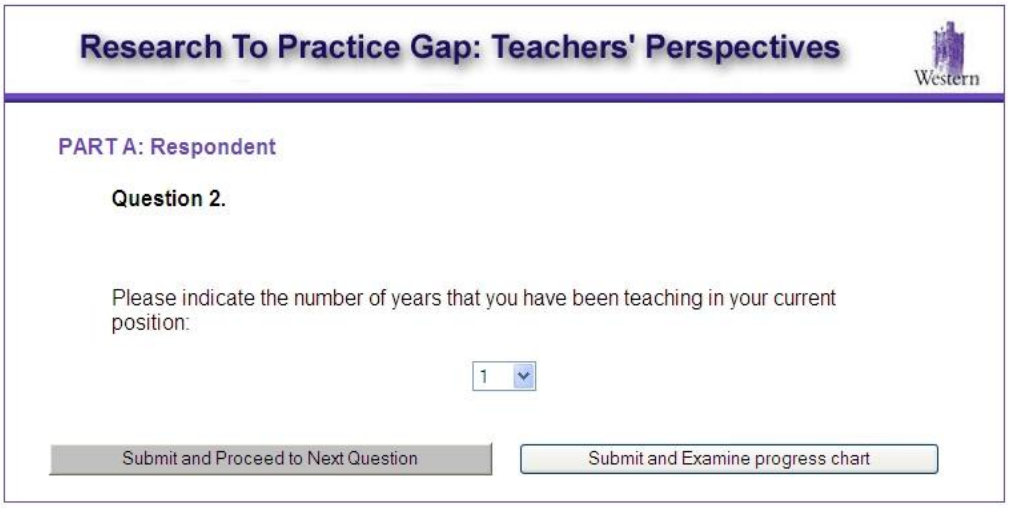


Figure 12. Sample question with drop-down menu.

CHAPTER VIII

Core Study: The Teacher Questionnaire

In this chapter, I report on the administration, analysis, and results of the teacher questionnaire which comprised the core component of the study. The purpose of the questionnaire was to answer the following research questions:

1. To what extent and where is there a gap between research on reading disabilities and teachers' practices?
2. Why is there a gap between research on reading disabilities and teachers' practices?
3. How could a gap between research on reading disabilities and teachers' practices be bridged?

Method

Instrument

Development of the teacher questionnaire (see Appendix D) is detailed fully in Chapter VII. The questionnaire items reflected the amalgamated knowledge utilization theories of Knott and Wildavsky (1980) and Stone (2002). Additional items represented specific education issues which arose from the pre-pilot study, from matters that arose in the literature, and from suggestions made by my advisory committee.

Procedure

Ethics approval was granted by the Faculty of Education Sub-Research Ethics Board at the University of Western Ontario (see Appendix E). The final online survey was posted by Media and Information Services in the Faculty of Education , University of Western Ontario at http://www.edu.uwo.ca/readingdisabilities/ by way of the Survey in a Box © (2003) program from March 2, 2009 until June 30, 2009. An advertisement to

publicize the questionnaire and a letter of information for prospective respondents may be found in Appendices I and J respectively. I forwarded the advertisement to school boards, principals, and agencies to distribute to teachers after they agreed to participate. The web site above connected participants to the letter of information, which included a link to the questionnaire by way of the "Enter Survey" option. Completion of the questionnaire was anonymous, voluntary, and constituted agreement to participate.

Participant Recruitment

Professional organizations. The most expedient means to inform Ontario elementary school teachers of the on-line survey was via professional organizations such as the Ontario College of Teachers, the Elementary Teachers Federation of Ontario, or the Ontario English Catholic Teachers Association. The only success was achieved with the Elementary Teachers Federation of Ontario who advertised my questionnaire in its online newsletter on March 10, 2009.

Ontario school boards. I also attempted to recruit teachers from a wide sampling of Ontario school boards; small, large, rural, urban, public and Catholic school boards were contacted. In total, I approached 33 school boards. School boards have varied personnel, guidelines, application dead-lines, and requirements with respect to external research. These disparities demanded time-consuming efforts to promote the questionnaire.

Initial communications with the school boards entailed an introduction to the study and requests for directives regarding external research applications by email or telephone beginning in December 2008, depending on the contact information that was provided on school board web-sites. At minimum, two requests were made to each school

board. On the second attempt, I sent a copy of the advertisement that might be forwarded to teachers. Six school boards did not reply at all; one school board rejected my request with the explanation that the school board administration had promised to not ask more of its teachers than had been planned for the year; representatives of another school board rejected the study because they disliked unidentified items on the questionnaire. I was unsuccessful in attempting to download two board applications. Guidelines for external research from two additional school boards arrived too late for me to meet the deadlines for their committees to consider my study or to distribute the questionnaires and collect data before the end of June, which was my timeline.

Of the remaining 21 school boards, five accepted the ethics protocol that had been approved by the Faculty of Education Sub-Research Ethics Board. The research officers from two of these school boards sent emails containing the notice for the on-line survey to their elementary school principals between March 11 and 12, 2009. From this point onward, it was the principals' prerogative whether they would or would not share the notice with the teachers in their schools. Three additional school boards, after reviewing the ethics approval, letters of information, and the questionnaire, also agreed to participate in the survey. One school board sent the notice directly to the elementary school teachers. The remaining two boards also emailed the survey information to schools between March 9 and April 2, 2009; however, I was unable to determine whether it was forwarded to the teachers.

Individualized application packages were sent to another sixteen Ontario school boards between January 22, 2009 and April 21, 2009. The majority were sent by the end of February. These packages included up to ten copies of my ethics approval,

letters of information, consent forms, the questionnaire, and a detailed description of the study depending on the school boards' requirements. I was also obligated to describe how the school boards' participation in the study would benefit the teachers, the school boards, parents or students, as well as how and when I plan to share the study's findings with them. All the applications additionally required the signature of my supervisor or a designate.

Seven school boards of this group eventually agreed to participate. One of these seven boards requested a revised focus group consent form which may be found in Appendix K. This necessitated another application for an amendment to the ethics review board. Two participating school boards directed me to personally contact the elementary school principals within their school boards regarding the notice for the questionnaire. As a result, of the 41 principals emailed in this board, two replied; one principal did not forward the notice about the questionnaire because the teachers in her school were already participating in a study, and one principal agreed to share the study information. I mailed paper copies of the questionnaire to 110 principals in an additional school board because their email addresses were not publicized. Five of these principals replied that they would forward the questionnaire information to their teachers. In late April to early May, I requested that the participating school boards send a reminder regarding the questionnaire as in Appendix L. The school boards again contacted either the teachers directly or the principals with the reminder. One school board recommended that I telephone its 48 elementary school principals to request that a reminder be sent to the teachers, and twenty of the principals who were successfully reached agreed to forward the first email or the reminder email.

. Reasons for rejections of the research application ranged from a lack of a rationale to reasoning that the application was incomplete, that the study or the questionnaire required several revisions, that teachers were too busy, or that the school board would simply not give teachers a questionnaire. Some school boards invited me to re-apply to conduct my research; however, the deadline for my questionnaire was June 30, 2009 which allowed insufficient time for re-submissions. In total 15 school boards approved the study.

Special interest groups. I emailed the Learning Disabilities Association of Ontario and the Ontario Branch of the International Dyslexia Association on March 2, 2009 regarding promotion of the on-line questionnaire. Both agreed to assist with this study. The Learning Disabilities Association published the notice as in Appendix I in its newsletter, the Spring-Summer Communique, in early June. The Ontario Branch of the International Dyslexia Association posted the same notice on the "NEWS" page of its on-line site, and the president of Ontario Branch of the International Dyslexia Association printed the notice for distribution at an April 22, 2009 lecture and at its May 2, 2009 conference, both held in Toronto.

Teachers. With ethics approval, I contacted teachers that I knew and who may not have received the notice of the questionnaire via their school boards. I mailed paper copies of the questionnaire as in Appendix D and information regarding the survey as in Appendix J to two teachers, and ten teachers were informed by email as in Appendix I or verbally.

Data Analyses

Coding of the data and entry of the data into the Statistical Program for the Social

Sciences version 17 (SPSS; IBM, 2008) was conducted as I detailed in Appendix H, Tables H1 to H7, and in Chapter VII, with the exception of responses to questions on the obstacles to research use in Part D of the questionnaire. The response option of "neither agree or disagree" had been removed from these rating questions; therefore, the coding for responses to these questions became: strongly agree = 4; agree = 3; disagree = 2; strongly disagree = 1; and no response = 0. The coding for all missing data and for "no response" choices remained .999 as in the pilot study.

To facilitate analyses, aggregated scores were calculated for age ranges, ranges of years in current teaching roles, ranges of years in past teaching roles, and for the categories of research use, research/researcher obstacles, user obstacles, and context obstacles. Statistical analyses entailed: inter-item reliability; descriptive statistics for the demographic variables and for the rating questions; bivariate correlations between obstacles and stages of research use; regression analysis to assess the prediction of research uses by the obstacles and by demographic variables; a one sample *t* test to compare the mean ages of the sample with the teacher population; two univariate analyses of variance (ANOVA) to investigate the effects of current and past teaching roles on research use; and two multivariate analyses of variance (MANOVA) to explore the effects of current and past teaching roles on obstacles. These analyses are detailed below.

Qualitative analyses of the open-ended questions involved thematic coding and categorizing of the narrative responses using the software tool WEFT QDA (Fenton, 2006). I organized the categories of responses for each question from most to least frequently mentioned in order to compare the narrative responses with the rating

questions on the same topic and with findings from the narrative synthesis for the open-ended questions on the identification and instruction of students at risk for reading disabilities in Part B of the questionnaire. Reliability of the qualitative coding was subjected to assessment of inter-coder agreement. For each of the open-ended questions, the online survey tool recorded the respondents' answers as they were entered, and each answer was assigned an identification number. I coded all the responses and compiled my coding guidelines.

In qualitative research such as this, Patton (2002) recommended multiple coders and the calculation of inter-coder consistency "to establish validity and reliability of pattern and theme analysis" (p. 545). While Patton stated that "no absolute rules exist" for determining reliability and validity of qualitative data (p. 432), Creswell (2007) recommended a minimum of 80% inter-coder agreement to establish reliability of coded data. With more than 2000 statements to code in my results, I decided to reduce the statements to a manageable amount for establishing inter-coder agreement. I therefore extracted 1/3 of the responses by cutting and pasting by computer every third participant's response. I provided the coding guidelines and 1/3 of the responses to a second coder, who was a Masters of Education student. We reviewed the guidelines and practised coding three or four items for each question together. The second coder proceeded to code the remaining 1/3 of the items for each of the 11 open-ended questions independently. A total 563 replies constituted 1/3 of the open-ended responses, averaging approximately 51 replies for the second coder to analyze for each question. In addition, each reply was often composed of several items that required coding. The resultant inter-coder agreements are reported below as I discuss the results of each question.

Discrepancies in coding were resolved through discussions between the coders.

Overall, missing data were a concern because 29% to 56% of the teachers did not answer some rating questions, and 1% to 38% of the respondents did not reply to some open-ended questions. The conversion of "no response" (value of 0) selections to missing data (value of .999) contributed 3% to the missing data on user obstacles; 7% to missing data on context obstacles; and 9% to missing data on research/researcher obstacles. I did not consider that this conversion contributed significantly to the missing data overall. However, Tabachnick and Fidell (2007) stated that "missing data is one of the most pervasive problems in data analysis" especially if the missing data are nonrandom (p. 62). For example, if most of the special educators in this study had failed to reply to the rating questions, the views of one classification of educators would be absent. Consequently, I analyzed the demographic features of the respondents who were responsible for the missing data in order to determine whether a pattern emerged.

Results

Inter-item Reliability

Cronbach's alpha is the most common form of reliability coefficient; it can be interpreted as the percent of variance the observed scale would explain in the hypothetical true scale composed of all possible items in the universe. Since a true instrument is not available, reliability is estimated from a high correlation among the variables comprising the scale. An alpha of .70 or higher indicates acceptable internal consistency (Christmann & VanAelst, 2006).

The inter-item reliability of the 40 individual items of the quantitative component of the questionnaire (i.e., the eight stages of research use, twelve items concerning

research/researcher obstacles, ten items regarding user obstacles, and 10 items on context-related obstacles) generated a Cronbach's alpha of .80 which indicated a good relationship between the items. The inter-item reliability of the eight questions on research use produced a comparably good alpha of .86. Items in the individual categories of obstacles produced reliability coefficients of .73 for the research obstacles, .71 for the context items, and .58 for the items related to the user category of obstacles.

Calculation of the inter-item reliability of the user category of obstacles identified the question on teachers' modification of research as the least congruent with the other user-related obstacles. Without the item on teachers' modification of research, a Cronbach's alpha of .63 was achieved for items in the user category of obstacles; the inter-item reliability of the full scale of 40 items was minimally changed without this one item. The poor item was retained for analyses since the difference in the inter-item reliability without it was minor (e.g., .63 versus .58). In addition, I considered the item to be meaningful enough to keep in the scale since researchers in the literature were concerned about the modification of research by teachers, and participants corroborated that they altered research when they used it. The resultant poor inter-item agreement of the user category indicated that all the items in this category did not necessarily reflect one construct.

Descriptive Data: Demographic

Approximately 300 respondents logged onto the questionnaire. Of these participants, 236 entered information; however, one respondent was not in the target population of elementary school teachers, and 31 submitted only minimal, uninformative demographic data. Consequently 32 respondents were eliminated from the results,

leaving useful data from 204 teachers.

Table 7 presents the summary of the demographic features of the respondents. With respect to their current and past roles, a range of positions were represented. Primary teachers comprised a significant group in both categories of current and past teaching roles, and administrators and board personnel represented a very small portion of the sample. Years spent in their current positions ranged from 1 to 35 years (M = 5.74, SD = 6.08), and the teachers' total years of teaching experience ranged from 1 to 37 years (M = 13.79, SD=8.77). The participants' ages ranged from 23 to 63 years (M = 42.06, SD = 10.15), with the largest representation from the 30 to 39 year age group. The average age and the relative sizes of the age groups closely resembled data reported in the Ontario College of Teachers 2008 Annual Report. The average age of the Ontario College of Teachers members was reported to be 42.56 years, with 18% at 20-30 years of age; 29% at 31-40 years; 23% at 41-50 years; 22% at 51-60 years; and 7% at 61 or more years of age. A one sample t test comparing the sample mean age with the teacher population mean age revealed no significant difference with t (201) = -.70, p = .484.With respect to the gender of the questionnaire respondents, the female majority produced a male to female ratio of approximately 1:9, which is a considerably smaller than the 1:3 ratio of males to females reported by the Ontario College of Teachers (2008). Regarding the respondents' highest educational attainments, a bachelor's degree was the most prevalent (n = 157). Lastly, with the majority of the teachers employed by a public school board, the ratio of teachers in the separate school board compared to the public school board was approximately 1:2, which mirrored the Ontario College of Teachers 2008 statistics. However, the ratio of teachers from independent schools to public schools (1:132) was

Table 7
Demographic Features of the Questionnaire Respondents

Characteristic		*n*	Percent
Current Teaching Role			
	Specialized	51	25.0%
	Primary Grades	48	23.5
	Junior Grades	38	18.6
	Intermediate Grades	26	12.7
	Other	24	11.8
	Administration/School Board	9	4.4
	No response	8	3.9
Previous Teaching Roles			
	Mostly Primary Grades	53	26.0
	Mostly Specialized	39	19.1
	Mostly Junior Grades	38	18.6
	Mostly Other	32	15.7
	Mostly Intermediate Grades	22	10.8
	Mostly Administration/School Board	7	3.4
	No Response	9	4.4
	Not Applicable	4	2.0
Years of Teaching Experience			
	Current Position		
	1-9 years	165	81.3
	10-19 years	26	12.9
	20-29 years	10	5.0
	30-39 years	2	1.0
	No response	1	0.5
	Total		
	1-9 years	81	39.2
	10-19 years	59	29.4
	20-29 years	54	26.5
	30-39 years	10	4.9
Ages			
	20-29 years	21	10.3
	30-39 years	69	33.8
	40-49 years	57	27.9
	50-59 years	47	23.0
	60+ years	8	3.9
	No response	2	1.0
Gender			
	Male	19	9.3
	Female	176	86.3
	No Response	9	4.4

Education			
	Bachelor's Degree (General)	119	58.3
	Bachelor's Degree (Honours)	38	18.6
	Master's Degree	45	22.1
	No Response	2	2.0
System			
	Public	132	64.7
	Separate	61	29.9
	Private	1	0.5
	No Response	10	4.9

much smaller than the Ontario College of Teachers report of approximately 1:48.

In summary, a wide range of educators responded to the questionnaire, and they were representative of the Ontario College of Teachers' members with respect to age and the public and separate school board affiliations. Demographic data of only elementary teachers in Ontario could not be located at the time of this writing.

Descriptive Data: Rating Questions

The extent of a gap between reading disabilities research and practice was investigated by way of the rating questions in Parts B and C of the questionnaire (see Appendix D). Questions 1 and 2 in Part B asked: "How confident do you feel about being able to identify students who are at risk for reading disabilities?" and "How confident do you feel about teaching students who are at risk for reading disabilities?" Part C of the questionnaire consisted of rating questions which directed respondents to indicate the level of their agreement with statements on their uses of research.

Teachers' confidence. Responses to Part B, questions 1 and 2 are reported in Table 8. Most teachers (90.2%) reported that they were somewhat confident to very confident in identifying students at risk for or with reading disabilities (M = 3.14, SD = 0.71). The majority (81.1%) were also confident in teaching students at risk for or with reading disabilities (M = 2.58, SD = 0.91).

Research use. The means of the responses to questions on the eight stages of research use are reported in Table 9. With the resultant range of mean scores between 2.58 and 3.30 for the eight stages of research use, the findings demonstrated that research was generally used "sometimes" (value of 3). Only means for the stages of "reception" and of "search for/ find" were below 3.00. In fact, almost one-third (32.3%) of the

Table 8
Respondents' Confidence Identifying and Instructing Students with Reading Disabilities

Extent of Teachers' Confidence	*n*	Percent
Identifying Students at Risk for Reading Disability		
Very confident	94	46.1%
Somewhat confident	90	44.1
Somewhat nonconfident	10	4.9
Not at all confident	2	1.0
No response	8	3.9
Instructing Students at Risk for Reading Disability		
Very confident	59	28.9
Somewhat confident	108	52.9
Somewhat nonconfident	22	10.8
Not at all confident	5	2.5
No response	10	4.9

Table 9
Mean Frequency Ratings of Reading Disabilities Research Use: Core Study

Stage of Research Use	*n*	Mean	SD
Reception	144	2.58	0.91
Search/find	144	2.92	0.87
Read/understand	144	3.07	0.83
Reference	140	3.06	0.92
Effort	142	3.30	0.83
Adopt	140	3.24	0.85
Implement	126	3.17	0.71
Impact	127	3.00	0.71

Note. The range of possible scores was 1-5, with 1 = not at all, 2 = seldom, 3 = sometimes, 4 = often 5 = very often.

respondents indicated that they seldom or never received research on reading disabilities, and only 9.8% reported receiving research often or very often. The degree to which respondents searched for and found research was reported to occur seldom or never by 22% of the participants and to occur often or very often by 18.2%. In contrast, the respondents reported greater engagement in the remaining stages of research use (read/understand, reference, effort, adopt, implement, and impact) with more teachers using research often or very often than seldom or not at all. Only "impact" was rated as taking place most definitively "sometimes", with often/very often and seldom/never reported to the equal extents, each by 12% of the teachers.

Obstacles to research use. Questions which explored the obstacles to research use comprised the third section of rating questions (Part D of the questionnaire in Appendix D). Questions were grouped into three categories of obstacles according to Stone's (2002) routes to knowledge use which I discussed in Chapter III. Questions 1 to 12 in Part D addressed obstacles related to research or researchers. Questions 13 to 22 in Part D concerned characteristics of the teachers, and questions 23 to 32 targeted variables within teachers' work contexts.

The possible range of aggregated scores for the research/ researcher category was 12.00 to 48.00. The possible aggregated scores for the user and context categories ranged from 10.00 to 40.00. High scores reflected teachers' beliefs that a variable was unlikely to impede their use of research. The resulting means of the aggregated scores for the category of research/researcher obstacles (M = 24.55, SD = 8.46), for the user (teacher) category of obstacles (M =26.08, SD = 4.27), and for the category of context obstacles (M = 1*8*.92, SD = 5.39) indicated that factors within teachers' work environments were

Table 10
Obstacles to Research Use: Mean Scores

Category of Obstacle	*n*	Mean	SD
Characteristics of Research/Researchers:			
There is enough research on identifying RD*	118	2.31	0.71
There is enough research on instruction	117	2.14	0.73
Research is easy to locate	119	2.44	0.62
Researchers understand teachers' needs	107	2.26	0.72
Researchers communicate well	110	2.46	0.59
Research is easy to understand	108	2.47	0.63
Research is not too technical	111	2.38	0.71
Research does not have too many statistics	103	2.37	0.74
Professional development is given on RD research	120	2.08	0.81
Research is transmitted so it is easy to use	106	2.04	0.62
Research is useful	102	2.69	0.66
My beliefs agree with research methodologies	89	3.02	0.56
Characteristics of Teachers:			
I am aware of research on RD	120	2.79	0.66
I know where to locate research on RD	120	2.61	0.58
I think research on RD is valuable	120	3.29	0.49
I am able to interpret research to use it	113	2.76	0.70
Teacher education prepared me to use research	118	2.17	0.84
Other courses prepared me to use research	109	2.72	0.87
I use research without modifying it	104	1.92	0.55
I want to know more about research on RD	116	3.13	0.57
I am willing to change my practices	108	3.29	0.47
I do not have too many responsibilities outside of school	113	2.73	0.84
Characteristics of the Work Context:			
My schedule allows me to use research	119	1.82	0.80
The curriculum allows me to use research	121	2.12	0.88
My students allow me to use research	101	2.45	0.81
Researchers are connected to the school context	102	2.36	0.79
Research is compatible with the school context	101	2.71	0.61
I am encouraged to use research	114	2.55	0.68
There is funding to support my use of research	99	1.74	0.68
There are supplies to support my use of research	100	2.00	0.72
There are external incentives to use research	101	1.74	0.70
There is support to use research	106	2.22	0.81

*Note.**RD= reading disability. The range of possible scores was 1-4, with 1= strongly disagree; 2= disagree; 3= agree; 4= strongly agree.

most likely to obstruct research use. In addition, the least troublesome category was that of user (teacher) characteristics or behaviours.

With respect to the individual items within each category of obstacles, mean scores had the potential to range from one to four (see Table 10). I interpreted individual item means of 2.50 and higher to signify that the respective items were not obstacles, since a score approaching 4 signified that respondents agreed that the variable was not an impediment. Consequently, the variables with means above 2.50 revealed that: (a) teachers do not have too many responsibilities outside of school; (b) teachers agree with research methodologies; (c) teachers are encouraged to use research; (d) research is compatible with school contexts; (e) teachers value research; and (f) teachers desire more knowledge about reading disabilities.

Conversely, I interpreted that a mean of 2.00 or less identified an explicit problem since "disagree" (indicating that a variable is an impediment to use) earned a score of 2. The results revealed that restrictions in teachers' schedules, teachers' uses of research with modifications, as well as the lack of external incentives (i.e., reimbursement, promotion), supplies, and funding to use research were reported to present particular obstacles to research use. However, since the majority of the items earned means only slightly above 2.00, most of the variables which were addressed in the questions appeared to be obstructions to research use.

Bivariate Correlations and Regression Analyses

Bivariate correlation and regression analyses examine the relationships between two continuous variables (Tabachnick & Fidell, 2007). Norusis (2008) stated that "the Pearson correlation coefficient is appropriate for variables measured at the interval level,

while the Kendall and Spearman coefficients assume only an ordinal level of measurement" (p. 488).While the variables that I am analyzing are measured on a Likert scale, which may appear to be ordinal, Likert scales are considered to comprise an "ambiguous measurement" which is often treated as a continuous scale (Tabachnick & Fidell, 2007, p. 7). A correlation analysis is conducted to explore the size and direction of a linear relationship where neither variable is considered to be independent or dependent; whereas, regression analysis explores the degree to which a score on one variable is predicted from knowledge of the score on another variable, where the predicted variable is the dependent variable (Tabachnick & Fidell, 2007).

I conducted both correlational and regression analyses. Pearson product-moment correlation coefficients were calculated to investigate the linear relationships between the means of each of the eight stages of research use and the means of the three aggregated categories of obstacles to research use (e.g., research/researcher, user, and context). In addition, I conducted a simultaneous linear regression analysis to discern the extent to which the aggregated categories of research, user, and context obstacles, as well as teachers' ages, education, current and total years teaching were predictive of the aggregated variable of research use. Respondents in the pre-pilot study and Shultz (2007) had proposed that demographic variables may influence research use; I therefore explored whether they contributed to the results of the current study. Only the demographic features which were measured in interval or ordinal scales were included in the regression analysis. I entered all the variables simultaneously in the regression analysis based on my projection that no one variable is more predictive than another. The correlation and regression analyses were conducted to potentially explain why there is a

Table 11
Pearson Product Correlations between Aggregated Scores of Research Uses and Categories of Research Obstacles

Research Use	*n*	Research Obstacles	User Obstacles	Context Obstacles
Reception	103	.31*	.19*	.23*
Search / Find	104	.42*	.48*	.25*
Read / Understand	104	.52*	.54*	.29*
Reference	100	.36**	.38**	.31**
Effort	102	.41**	.32**	.26**
Adopt	101	.23*	.31*	.29*
Implement	92	.39**	.57**	.28**
Impact	92	.44**	.51**	.29**

Note. ** $p < .01$; * $p < .05$, two-tailed

gap between research and practice.

Results of the bivariate correlations are presented in Table 11. The three categories of obstacles related positively and significantly with all eight stages of research use; however the strongest relationships were select moderate relations. The research/researcher and user categories of obstacles had significant, positive, and moderate linear relationships with the following stages of research use: search/find, read/understand, and impact. Research obstacles also related to respondents' efforts to try research to a significant, positive and moderate degree. Similarly, user obstacles were found to have a significant, positive, and moderate relationship with the implementation of research. Therefore, most marked were the findings that research uses increased as research/researcher and user obstacles lessened and vice versa.

With respect to the regression analyses as reported in Table 12, only the category of user obstacles was found to be predictive of teachers' uses of research on reading disabilities with t (109) = 3.73, $p < .001$. The category of user obstacles also explained a significant proportion of variance in the research use scores, $R^2 = .42$, $F(7, 100) = 10.50$, $p < .001$.

Comparison of Means between Groups

Analysis of variance tests compare means between two or more groups (Tabachnick & Fidell, 2007). I chose these analyses to investigate the degree to which participants' current and past teaching roles interacted with uses of research and obstacles to research use. The results provided additional insight into the relationship between demographic factors and research use and they thereby provided further understanding of why a gap between research and practice exists.

Table 12
Summary of Linear Regression Analysis for Variables Predicting Research Use

Variable	B	SE B	β
User Obstacles	.48	.13	.38**
Context Obstacles	.07	.09	.07
Research Obstacles	.12	.06	.19
Teachers' Ages	.10	.06	.19
Teachers' Education	.16	.53	.02
Teachers' Years in Current Role	.11	.08	-.13
Teachers' Total Years Teaching	.10	.08	.16

Note. $^{**}p < .001$

In order to conduct analyses of variance with interpretable results, four assumptions should be met. One concerns homogeneity of variances of the populations involved, so that differences in group variances do not influence the results of the comparisons of group means. This variable is measurable with Levene's tests for equality of variances. A significant result in Levene's test indicates that the variances of the two groups are unequal (Norusis, 2008). Levene's tests for equality of variances for the current data signified that equal variances within the groups could be assumed. A second assumption is random sampling of the participants. Additionally, while it is assumed that the samples for these analyses are drawn from populations with a normal distribution, analysis of variance is particularly robust to violation of this assumption (Gardner, 2001). Lastly the samples should be drawn from populations with equal means; this is difficult to determine for the groups being studied.

With the above considerations in mind, analysis of variance (ANOVA) were conducted to determine whether teachers' mean aggregated scores in research use (dependent variable) differed according to their current and past teaching roles (independent variables). A significant effect on the target variable of research uses was found only for current teaching roles with $F(5, 122) = 3.09$, $p = .012$, $\eta^2 = .11$. The η^2 value reflects the effect size, in other words, the "proportion of variance in the dependent variable that is associated with the independent variable" (Tabachnick & Fidell, 2007, p. 54). In the current study, the effect sizes revealed the extent to which participants' uses of research were related to their teaching roles. Effect sizes range from 0 to 1, and according to Cohen (1988) cited in Tabachnick and Fidell (2007, p. 55), a small effect size is $\eta^2 = .01$; a medium effect size is $\eta^2 = .09$; and a large effect size is $\eta^2 =$

.25. Therefore, the effect size of teaching role on research use was moderate; a moderate proportion of the variance in research use was found to be predictable from knowledge of teaching roles.

Tukey's Honestly Significant Difference (HSD) post hoc comparisons were undertaken to determine which teaching roles contributed most to above findings. The Tukey HSD test is one of the most widely used tests of comparisons because it allows for the comparison of all possible pairings of variables while maintaining a low risk for Type I error (Aron & Aron, 2003, p. 432). A Type I error occurs when the null hypothesis is wrongly rejected. In this instance, the null hypothesis was that teaching roles had no differential effects on research uses by teachers. Results indicated that research use by teachers currently in specialized roles (M = 25.73, SD = 4.73) was significantly greater than research use by intermediate grade teachers (M = 20.81, SD = 6. 09).

In addition, two sets of repeated measures multivariate analysis of variance (MANOVA) procedures were conducted. MANOVA tests whether the differences among group means on a combination of dependent variables may have occurred by chance (Tabachnick & Fidell, 2007). In these analyses, I explored whether teachers' mean aggregated scores in three measures of obstacles to research use (research/researcher, user, and context) differed according to either the teachers' current teaching roles and their past teaching roles independent of each other. A repeated measures analysis was selected since every teacher responded to questions on each of the three categories of obstacles. In the case of repeated measures analysis of variance, sphericity is required (Tabachnick & Fidell, 2007). This means that there needs to be homogeneity of covariance of all with-in subjects pairs of scores (Tabachnick & Fidell, 2007, p. 329).

Therefore, Mauchley's test of sphericity is used for this purpose.

In both MANOVA tests, the Mauchley's tests of sphericity were significant with $\chi^2 = 19.44$, $p = .001$ for the current roles-obstacles interaction, and a $\chi^2 = 14.54$, $p = .001$ for the past roles-obstacles analysis. In this case, the *F*– ratios of within-subjects effects tend to be inflated and the risk of a Type 1 error is increased (Gardner, 2001). The Greenhouse-Geisser correction factor was therefore used to adjust for this violation as recommended by Tabachnick and Fidell (2007). Consequently, the degrees of freedom used to determine the within subjects effects in both MANOVA tests were adjusted by multiplying the numerator and denominator of the *F* –ratio by the epsilon multiplier (ϵ) (Gardner, 2001). Results indicated that neither current teaching roles nor past teaching roles had significant effects on the three obstacles scores with $F(5, 94) = .935$, $p > .05$ for the current roles-obstacles MANOVA, and $F(6, 94) = .466$, $p > .05$ for the past teaching roles-obstacles MANOVA.

Analysis of Missing Data

Nonrandom missing data affect the generalizability of results (Tabachnick & Fidell, 2007, p. 62); therefore I conducted analyses of the missing data to determine whether I needed to be concerned about missing responses. I grouped the respondents according to the incidence of missing answers and types of questions as follows: (a) respondents who missed less than 25% of either or both rating and open-ended questions; (b) respondents who missed more than 25% of rating questions, but less than 25% of the open-ended questions; (c) respondents who missed more than 25% of the open-ended question, but less than 25% of the rating questions; and (d) respondents who missed greater than 25% of both rating and open-ended questions. Following this, I determined

the demographic features of the respondents in each group, and I compared the frequency of each feature with the sample population at large to determine whether the respondents who missed questions represented any particular demographic group. Features that appeared by 10% more in the missing data respondents than in the study sample were determined to indicate a significant divergence from the sample at large.

Results revealed a random occurrence of demographic features. In the category of respondents who missed less than 25% of either type of question (*n* = 25), 30 % were previously junior grade teachers compared with 17% in the study sample, 44% were in the 40 to 44 year age group compared with 28% in the study sample, and 76% worked in public school boards compared with 64% in the study sample. In the second category in which respondents primarily missed more than 25% of rating questions (*n* = 33), 27% currently held an "other" teaching role compared with 12% in the study sample, and 52% were in the 30 to 39 year age group compared with 34% in the study sample. In the third grouping of respondents who primarily missed open-ended questions (*n* = 15), 33% compared with 13% in the study sample had held their current teaching positions for 10 to 19 years, 33% were previously in specialized teaching roles, and 40% were from the separate school system compared with 30% in the study sample. Lastly, of the participants who missed more than 25% of both types of questions (*n* = 52), 58% had taught a total of 20 to 29 years compared with 26% in the study sample. No particular demographic group consistently missed both rating and open-ended questions; therefore, I concluded that the missing data were random and should not bias the results.

Narrative Data: Teachers' Knowledge of Reading Disabilities

Four questions of the questionnaire (in Appendix D) elicited respondents'

knowledge concerning the identification and instruction of students at risk for or with reading disabilities. Question 3 in Part B asked respondents: "At what age should students be identified for being at risk for reading disabilities?" Question 4 in Part B instructed participants to: "List the main characteristics that are exhibited by a student who is at risk for or who has a reading disability." The third of these questions was Part B number 5 which asked: "What assessments are used to identify students who are at risk for reading disabilities?" Fourth was question 6 of Part B which asked: "What instructional methods would you use to teach reading to someone who is at risk for or who has a reading disability?" Coding of these responses, as described in the data analysis section, achieved inter-coder agreements of 99% for question 3, 83% for question 4, 82% for question 5, and 85% for question 6. The responses were compared with findings in the narrative synthesis in order to further assess the extent of a gap between reading disabilities research and teachers' practices.

Age of identification. Researchers in the literature concurred that children should be monitored as early as the age of two years if there are language difficulties and a family history of a reading disability (Snow et al., 1998). In all cases, children at risk for reading problems should be identified as early as possible, which means during the pre-school years or at the cusp of school entry which at 4 or 5 years of age (Shaywitz, 2005).

The ages of identification which teachers (n = 202) proposed and the frequencies of the responses are summarized in Table 13. The ages were recorded in numerical values whenever possible. For example, in the statement, "early as possible, 5 years", 5 years was recorded as the answer. When no age was given as in the statement, "Grade 3 no later, if really obvious maybe grade (*sic*) 2", I calculated the age range for Grades 2 and 3

Table 13
Frequency and Percentage of Responses per Category of Age of Identification for Risk of Reading Disability

Earliest Age in Years	*n*	%
As early as possible	11	5
3	1	0
4	27	13
5	44	22
6	59	29
7	33	16
8	19	9
9	1	0
10	2	1
No specific age	5	2

(i.e., 6 to7 years and 7 to 8 years respectively) with the resulting age range of 6 to 8 years recorded for the above response. When "kindergarten" was the answer, I interpreted the response as senior kindergarten, with the age range of 4 to 5 years. Phrases only, (e.g., "as early as possible" or "as soon as possible") without reference to a grade level or age range, formed a separate category. In addition, statements such as:"before age 6", "before age 7" and "early primary" did not provide the earliest age of identification; therefore, I classified these statements as "no specific age." I grouped the ages given by the teachers according to the youngest age mentioned in an age range only because early identification was the thrust of the research. I totaled the number of teachers that answered within each age range.

The results revealed that, with the inclusion of "as early as" statements, less than half of the respondents (41%) proposed that children at risk for reading disabilities should be identified before or at school entry, given kindergarten as school entry. When the "as early as possible" category was excluded from the responses, 36% of the respondents who provided a specific age range matched the research findings as reported in the synthesis (Muter, 2003; Shaywitz, 2005; Snow et al., 1998). Indications are therefore, that less than half of the teachers were aware of the early age of identifying students at risk for reading problems as the literature recommended.

Characteristics of reading disabilities. Secondly, participants listed the main characteristics that are exhibited by a student who is at risk for or who has a reading disability; each respondent listed one characteristic or more. The frequencies of teachers' references to each of the characteristics which were identified in the literature on reading disabilities are demonstrated in Table 14. The percentage in the table indicates the

percent of all the respondents that made reference to the particular attribute listed. Less than half of the 186 respondents mentioned that the following difficulties are main characteristics of students with reading disabilities: deficient letter-sound knowledge, poor understanding of phonics principles, inadequate reading comprehension, and deficient phonological skills (e.g., rhyme, syllabication, phonemic awareness) which is the core deficit in reading disabilities of English language speakers (Snowling, 2004).

Less than 25 % of the respondents named the remaining key features of reading disorders such as difficulties in decoding, sight word knowledge, memory, spelling, writing, word retrieval, speech and language, vocabulary, reading fluency, word retrieval, rapid naming, or background knowledge. Only one teacher referred to genetic variables, and none listed neurobiological characteristics of reading disorders. Rather than eliminating environmental deprivation from the identifying features of reading disabilities, 7% of the teachers considered the lack of exposure to print, neglect, abuse, and compromised family situations as characteristics of individuals with reading disorders. Granted, these conditions may jeopardize students' opportunities to develop the language skills needed for reading (Snow et al., 1998), and assessment should consider these factors (Alexander & Slinger-Constant, 2004; Muter, 2003). However, their existence in fact precludes the diagnosis of a reading disability if such variables indicate that students have been deprived of effective literacy tutelage.

Several references were also made to students' lack of motivation to read as an indicator of a reading disability. For example 18% of the teachers mentioned an avoidance of reading or writing; 9% listed a disinterest in reading and a lack of confidence with respect to reading; 8% named frustration with reading or writing; and

Table 14
Characteristics of Reading Disabilities: Research Findings and Teachers' References

Characteristics in the Research	*n*	%
General Literacy Skills		
Difficulty learning letters and sounds / phonics	89	48
Poor reading comprehension	70	38
Poor word recognition	45	24
Poor decoding	44	24
Inaccurate reading (delayed reading)	30	16
Dysfluent reading	26	14
Difficulties writing	17	9
Poor spelling	14	8
Phonological Skills		
Poor phonemic awareness	36	19
Poor rhyme awareness/production	15	8
Phonological awareness in general	12	6
Poor memory (long term, short term, visual, auditory)	31	17
Speech/language delays or difficulties	40	22
Higher level cognitive or non-reading strengths	15	8
Poor vocabulary	4	2
Poor word retrieval	1	1
Genetic disposition	1	1
No environmental deprivation	0	0
Poor rapid naming or naming on command	0	0
Weak background knowledge	0	0
Neurobiological evidence	0	0

4% considered behavioural outbursts in response to reading as symptoms of a reading disability. A poor attitude, negative self-talk, fear, and anxiety were additionally mentioned by 1-2% of the teachers. While the above behaviours may be legitimate forewarnings of reading difficulties and they may reflect poor pre-school experiences with literacy (Snow et al., 1998), they do not necessarily signify a phonologically-based reading disorder.

Additional features were listed by the respondents. These included a deficient application of reading strategies such as the use of context, picture cues, or visual (letter) cues, mentioned by 15% of the respondents. Additionally, inattention, distractibility, and fidgeting or hyperactivity, which do often co-occur with reading difficulties, were named by 9%, 2%, and 1% of the teachers respectively. Eleven percent of the teachers also considered a poor understanding of concepts about print, such as the role of punctuation, the distinctions between letters, words, or numbers, and particularly left to right directionality in reading as problematic. The latter difficulties may be valid concerns; however, it is possible that they simply represent an individual's lack of exposure to print. Social, emotional, and behavioural problems in general were also listed as features of students with reading disabilities by 9% of the respondents, and these are possible ramifications or co-morbid conditions of such a learning difficulty.

Participants also made references to characteristics of learners which were even less likely to be identified as main features of reading disabilities in the literature. Among these were visual perceptual issues in general which were named by 3% of the participants. Specifically, reversals of letters and words were listed by 9% of the teachers, and visual tracking problems were named by 6% of the teachers. To a lesser extent, 4%

of the respondents identified poor grapho-motor skills as characteristic problems of students with reading disabilities, and 3% named the inability to follow directions, difficulties with subjects other than language, and slow processing. Poor problem-solving, organization and personal management were reported as major characteristics of students at risk for reading problems by 2% of the respondents. One percent of the respondents cited the following as being typical of students with reading difficulties: being male, speaking English as a second language, having poor gross motor coordination, poor "visual-verbal linkage", math problems, visual and hearing impairments, auditory processing difficulties, inability to select books to read, inability to express oneself verbally, cheating, a lack of facility in predicting sounds or words when reading, and eye discomfort (rubbing and shading eyes, requiring low light and coloured overlays on print). At best, half of the significant characteristics of reading disabilities were known by less than 50% of the teachers, and numerous less significant and incorrect features were presented.

Assessments. In response to the succeeding question, respondents (n = 176) named assessments that they believed are employed to identify individuals with reading disabilities. The responses were at times abbreviations, misspellings, or too general to allow accurate coding (e.g., "GB", "Slosson" which could be an intelligence test or reading test); however, the values that I am reporting demonstrate the relative weight that respondents gave the various categories of measures. For example, 63% of the educators listed informal reading assessments such as the Developmental Reading Assessment (Beaver, 2006; Beaver & Carter, 2003), which was named by 39%; the CASI (comprehension, attitude, strategies, interests) reading assessment (Doctorow, Bodiam, &

McGowan, 2003), named by 16%; PM Benchmarks (Nelley & Smith, 2000), listed by 15%; running records or miscues, listed by16%; and "Brigance", named by 9%, which may refer to one of several inventories or screening tools that are published by Curriculum Associates. Additional informal means identified by 1-3% of the educators included simply "reading assessments", "oral reading", or checklists , guided reading, reading conferences, portfolios, and tools such as the Accelerated Reader (Renaissance Learning, 2006) computer program, the Dyslexia Early Screening Test (Nicolson & Fawcett, 1996), First Steps Reading (Rees, 1994), Peer-Assisted Learning Strategies (Fuchs & Fuchs, 2005), reading logs, an "early reading inventory", and "multi fluency tests."

Another 34% of the respondents referred to formal reading assessments, which were primarily the Woodcock Johnson Tests of Achievement (WJ II or WJ III; Woodcock et. al., 2007) which were named by 27%. Three percent simply stated "formal" reading tests, and 1% named the Gray Oral Reading Test (Wiederholt & Bryant, 2001) and the Woodcock Reading Mastery Tests (Woodcock, 1998).

An additional 29% of the teachers referred to assessments which would typically be conducted by psychologists or psychometrists. Nine percent named psychology or psycho-educational assessments in general;13% listed intelligence tests specifically such as the Wechsler Intelligence Test for Children (Wechsler, 1974), the Detroit Tests of Learning Aptitude (Hammill, 1998), and the Canadian Cognitive Abilities Test (Nelson Education Limited, 2009). Furthermore, 7% of the teachers listed more achievement tests such as the Kaufman Test of Educational Achievement (Kaufman & Kaufman, 1985), the Wechsler Individual Achievement Test (Psychological Corporation, 2001), and the Wide

Range Achievement Test (Wilkinson, 1994) which may be administered by psychometrists, psychologists, or possibly by school special education teachers.

Speech and language assessments were also included by 14% of the respondents who indicated that oral language skills in particular should be evaluated. The most frequently listed measure was the Peabody Picture Vocabulary Test (Dunn & Dunn, 2007), named by 3%; while measures such as the Cottage Acquisition Scales (Wilkes, 1999), No Glamour Grammar (Watt, 1986), Laura Lee Language (Lee, 1971), and "Slingerland" (Slingerland Screening Tests for Identifying Children with Specific Language Disability) (Slingerland, 1979) were each mentioned once. In this category of responses, I also incorporated the nonspecific single mentions of "Mondo", "Crevola", and "language fundamentals" which may refer to language skills assessments or to literacy assessments in general.

Responses additionally included several assessments of specific literacy skills. For example, 16% of the participants listed assessment of phonological skills in general or select tests such as the Comprehensive Test of Phonological Processing (Wagner et al., 1999), the Phonological Awareness Test (Robertson & Salter, 1997), the Rosner Tests of Auditory Analysis (Rosner, 1979), and the Yopp-Singer Test of Phoneme Segmentation (Yopp, 1995). Measures of sight word recognition were mentioned by 14% of the teachers; Dolch word lists (Dolch, 1936) and the Slosson Oral Reading Test (Slosson & Nicholson, 1991) were examples of such measures. Twelve percent of the teachers also listed evaluations of letter-sound knowledge in general, and specifically with the Dynamic Indicators of Basic Early Literacy Skills (Good & Raminski, 2002). As well, Marie Clay's (2005) measures of literacy skills (i.e., the observation survey,

concepts about print) were named as assessments of reading disabilities by 10% of the participants, and gauges of phonics skills such as "blends" or "digraphs" were recommended by 8% of the educators. Measures of comprehension were cited by only 3%, and of spelling and writing only once. Therefore the range and frequency of references to specific literacy assessments varied extensively.

More generally, 10% of the respondents suggested that teacher observations and questioning may comprise assessment of students at risk for reading problems; referrals to specialized teachers or to team meetings were listed by 5%; and 1% considered parents' contributions and the Ontario Ministry of Education Quality Assurance Office test results to be valuable in assessing students. Students' individual education plans, the use of the Ontario Ministry of Education guidelines, and students' functioning in hearing, vision, auditory processing, visual processing, and mathematics were each mentioned once.

No references were made to gathering background histories, employing response to intervention strategies which were described in Chapter VI, or to assessing reading fluency and rapid naming. Teachers were clearly cognizant of the need to compare students' reading achievements with age or grade expectations; however far fewer pointed out that reading achievement should be compared with accomplishments in non-reading skills, and a minority was cognizant of the specific literacy and language abilities that need to comprise assessments of students with potential reading disabilities.

Instruction. In addition, 173 teachers identified up to five instructional strategies that they would use with students at risk for reading disabilities. As shown in Table 15, teachers identified several methods which are recommended in the literature; however,

Table 15
Frequencies and Percentages of Respondents Who Identified Instructional Strategies

Strategy	*n*	%
Intense instruction (often; repeated; 1:1 or small group)*	72	42%
Reading (guided, shared, read aloud, silent)*	72	42
Accommodations (computer; books on tape)	69	40
Phonics instruction*	48	28
Word knowledge*	40	23
Multi-modal/ multi-sensory instruction	38	22
Reading strategies (semantic, syntactic, visual)*	37	21
Quality reading materials*	36	21
Phonological / phonemic awareness*	30	17
Peer reading/ coaching	28	16
Comprehension*	27	16
Decoding*	25	14
Explicit / systematic instruction*	21	12
Monitoring*	10	6
Quality teachers*	7	4
Graphic organizers	6	3
Home Reading	6	3
Language*	5	3
Spelling*	4	2
Writing*	4	2
Concepts about print*	2	1
Grammar*	2	1
Dictionary work	1	1
Fluency*	1	1
Fill-in-the blanks sheet work	1	1
Listening skills	1	1
Memory Development	1	1

Note. * Indicates instructional strategies mentioned in the literature.

the highest degree of agreement between teachers' responses and the literature was less than 50%, and it was with respect to intensive instruction (frequent, 1:1 or small group) and regarding the importance of students' exposure to reading. The remaining strategies that arose in the synthesis were cited by less than 30% of the respondents. In fact, the value of qualified teachers and tuition in spelling, concepts about print, language, writing, fluency, and grammar were recognized by less than 5% of the respondents. On the other hand, 26% of the respondents did consider accommodations and especially the use of computer technology as valuable teaching methods. As well, 21% of the teachers referred to multi-modal techniques for instruction. Yet, these later forms of instruction were not the most advantageous practices recommended in the literature.

Narrative Data: Teachers' Sources of Information on Reading Disabilities

Williams and Coles (2007) and Shultz (2007) considered teachers' sources of knowledge to be indicators of the extent to which teachers use research. In the current study, 156 educators responded to a question on sources of information which stated: "Please list the most common three sources for information on reading disabilities that you use, starting with the most frequently used source." Inter-coder agreement, which was determined as I outlined in the data analysis section for the questionnaire, was 88% for the responses to this question.

The results indicated that actual research or scholarly journals were mentioned by 3% of the participants; specific titles included the *Annals of Dyslexia*, ERIC (Education Resources Information Center) and the *Journal of Learning Disabilities*. Ontario Ministry of Education documents were cited by 12% of the teachers. These included titles such as *Education for All* (Ontario Ministry of Education, 2005) and *The Ontario Early*

Reading Strategy (Ontario Ministry of Education, 2003) which are generally based on research.

The most frequently cited sources appeared to be professional, although the lack of specificity in the responses was difficult to interpret. For example, 31% listed particular journals (e.g., *Professionally Speaking, Voice, The Reading Teacher*), assessment manuals (e.g., *CASI*), and books related to literacy instruction (e.g., *Guided Reading* (Fountas & Pinnell, 1996). However, 24% simply responded with "books" or "articles", and 10% identified texts from additional qualification or university courses as sources, all of which may or may not consist of original research.

The second most frequently used source of information on reading disabilities was from within the school. In-school sources were identified by 46% of the teachers. These in-school sources included largely special education teachers who were mentioned by 24% of the respondents and colleagues in general, who were listed by 21%. Information was occasionally received from the principal/administration by 6% of the respondents, from a librarian, literacy teacher, or Reading Recovery teacher by 4% and from school meetings by 1%.

The internet resulted as the third most frequent source of information, listed by 43% of the educators. Specific web sites related to learning disabilities (e.g., "LD Online" and "SNOW"), as well as the internet in general were named. Once again, sources from these sites may or may not provide trustworthy, research-based practices.

Education by way of professional development, conferences, and workshops/seminars was mentioned by 26% of the participants. Nine percent of the respondents reported that some of this professional development was provided by the

school board. The school boards were additionally credited with disseminating information on reading disabilities by way of consultants, documents, or special education teacher meetings by another 18% of the teachers.

To a lesser extent, teacher and community organizations (e.g., The Ontario College of Teachers, The Elementary Teachers' Federation of Ontario, The Learning Disabilities Association of Ontario, The International Dyslexia Association, The Canadian Language and Literacy Research Network) were recognized as sources of research by 16%. Other professionals such as psychologists and speech and language pathologists, as well as expert teachers in specialized schools were listed by 3%; teachers' own experiences accounted for 3% of responses; newspapers were sources for 1%, and 4% of the respondents were unaware of any sources of research.

The resources listed as respondents' first source of information mirrored the above findings. The most frequently mentioned were professional journals and books, which were priorities for 39% of the participants; second were in-school colleagues (special education teachers, administrators, classroom teachers) for 36%; and third was the internet which was named by 26% and primarily included the Learning Disabilities Association of Ontario site (http://ldao.ca). Overall, it was difficult to discern the extent to which many of teachers' sources of information avail educators of first-hand accounts of research (e.g., texts, internet, and organizations). It was apparent that research-based sources were explicitly cited by less than 20%.

Narrative Data: Why Research on Reading Disabilities is Difficult to Apply

The fourth question in Part E of the questionnaire (in Appendix D) provided participants with an additional avenue to express their views about factors that impede

research use by asking: "What makes research on reading disabilities difficult to apply?" The teachers' (n=142) coded responses were readily categorized according to Stone's (2002) three routes to knowledge use: context, research/researcher (supply), and user/teacher (demand) with the exception of six responses that were minimally informative (e.g., "don't know"). Inter-coder agreement of 80% was achieved in the coding of the responses to this question according to the procedure which I detailed in the data analysis section of the questionnaire report.

Context. The context category of obstacles garnered the most comments with 62% of the teachers having identified problematic variables within their work settings. The lack of time to read, learn about, plan to use, and apply research was a recognized issue by 33% of the respondents. The second most frequently identified environmental barrier was classroom composition, with 24% of the educators having reported that large class sizes as well as intellectually, socially, and behaviourally diverse and needy students preclude teachers' uses of research. A lack of support in the form of educational assistants or special education teachers was named by 12%; resources such assistive technology and commercial programs were reported by10%; and funding resulted as the third significant category of context obstacles, named by 9% of the respondents. Six percent also pointed to excessive demands in the work place as noteworthy issues. In addition, the Ministry of Education, school board, and school policies that delay the identification of reading disabilities until the junior grades, which focus on standardized test scores, that limit the role of special education teachers, and that reflect "entrenched views about literacy", were identified as barriers by 5% of the respondents. Three percent considered both poor parental attitudes and the school's or classroom's incompatibility

with research to be blockages; while 2% referred to excessive curricular expectations. A lack of collegial time as well as limited space, a disconnection from researchers, and frequent staff changes were the least problematic, having been identified by 1%.

Research/researchers. Secondly, features of research and, to a lesser extent, researchers were identified as obstructions to research use by 41% of the respondents. The majority of the complaints, which came from 25% of the respondents, were about research. It was considered to be impractical, unrealistic, or inapplicable with respect to the respondents' classrooms. For example, one-to-one instruction by classroom teachers is usually not feasible. Furthermore, 4% of the educators indicated that research results were problematic because they were not generated in authentic classrooms, and 1% stated that research results were problematic because teachers were not involved in the research. Another 6% of the observations were directed at the obtuse and technical language of research reports, and 4% criticized the plethora of statistics in research reports. Four percent of the teachers also reported that research on reading disabilities is too difficult to access, and 3% bemoaned both the absence of specific classroom strategies in research reports and the lack of adequate dissemination of research. Lastly, 1% of the respondents indicated that research needs proof that it is effective; and the cost to implement research, the lack of resources to implement it, the difficulty for teachers to keep up with the volumes of research and the conclusions were each mentioned once.

Teachers. The third category of barriers to research use was identified as the teachers' themselves by 13% of the participants. Of this group, 9% indicated that they or teachers in general lack the knowledge, training, expertise, or experience to find and employ research with students who have reading difficulties. Teachers' "comfort level"

with research, opposition to innovations, aversion to technology, and difficulty with maintaining consistency were further identified as blocks to their application of research by one respondent each. For example, one educator suggested that "when research recommends broad sweeping changes to current practices, opposition to comply comes from teachers", and another stated, "Teachers teach classes, not individuals." Once again, context factors were reported to comprise the greatest obstacles to teachers' uses of research, while research/researcher variables placed second, and teachers' characteristics were identified least.

Narrative Data: Unanswered Questions about Reading Disabilities

The first question of Part E explored the gap between research and practice further by asking the participants: "What unanswered questions do you have about reading disabilities?" The teachers' queries may also suggest where to begin closing a gap. Coding of the responses (n =127) as I described in the data analysis of the questionnaire report, resulted in seven main categories of queries: instruction, context variables and instruction, identification, causes, prognosis, research, and no specific question. Inter-coder agreement of 84% was achieved.

Instruction. The most frequently unanswered questions concerned instruction. More than half of the respondents asked questions such as: "What are the current best practices to help these children?", "What are some new practical strategies for classroom teachers?", and "How can I apply research?" Some individuals were more specific, asking about the ideal age to intervene, how to achieve comparable fluency and comprehension levels, and how brain research has influenced teaching strategies. Others wondered when to begin using assistive technology, what could be substituted for

assistive technology, how to teach a student who is hyperactive and at risk for a reading disability, and how to address the needs of a struggling reader during guided reading.

Instruction and work context. Included in the queries about instruction were concerns about teaching students with reading disabilities within particular work contexts. For example, 13% of the teachers questioned how to accommodate students with reading disabilities within diverse, regular, or split grade classrooms. One respondent conveyed the following: "In a class of 27 students, where many students have difficulties in reading, how is it possible to effectively address the needs of each child? Differentiating instruction for so many becomes far to *(sic)* difficult on a daily basis." Another posed the question: "How do teachers meet the needs of all students within a split grade, 28 students, 6 reading levels, behaviour distractions/challenges, extra-curricular interruptions, minimal parental involvement?" Yet another asked: "How can we incorporate the helping of students with reading disabilities within a more whole class approach that recognizes and values the different strengths and weaknesses of all members of our community?" Additional contextual matters were identified by a respondent who asked: "How do I accommodate the students within the limits of resources, time allotted for language and the demands of the teaching profession in our time?" Further questions about context variables were with respect to delayed interventions, the funding and accessibility of programs and technology, the provision of classroom support, and about school board decisions to discontinue Reading Recovery and to institute balanced literacy. Questions were also raised about the Ontario Education Quality and Accountability Office testing of struggling readers and about report cards for these students. For example, two respondents challenged the process of subjecting

students with individual education plans to standardized testing, one inquired about the discontinuation of standardized testing, and another asked why students with individual education plans do not have separate, standardized report cards. Furthermore, teachers questioned the role parents play in interventions, why some parents do not assist their children, and what to do when parents refuse to help.

Identification. Second to instruction, the topic of identification elicited queries from 20% of the teachers. The most common questions were in reference to the features of a reading disability, the age of identification, and what tools or testing methods are employed to identify reading disabilities. For example, one teacher asked: "What is reading disabilities? Is a reading disability tied to a learning disability? Is reading disabilities tied to behaviour issues?" Another respondent wrote: "What exactly is dyslexia? Why don't we use that word?" Additional inquiries were: "Are there different types that can be identified specifically?" and "Why do so many fall through the cracks or get misidentified as IMD or Behaviour?" In addition, methods to differentiate reading disabilities from learning disabilities, from developmental challenges, and from poor attitudes toward reading were concerns. Participants also expressed curiosity about the age at which reading disabilities are identified as demonstrated in this question: "What is the ideal age to diagnose [?]." Three percent of the participants were particularly concerned about the delay of identification. For example, one teacher asked, "Why is it difficult to identify students for IEPs before Grade 3?" Others questioned, "Why is it that sometimes we wait to (*sic)* long to get students tested?"; "Why are we not able to identify students earlier so that we can avoid the social and personal stigmas attached to learning disabled students? "; and "Why do some boards wait to identify until the third grade

[?]…what a shame." Regarding measures for identification, inquiries were the following: "What is the best tool to identify what the reading disability is[?]" and " Is there a test for each grade that can be administered to help pinpoint next steps for students as they continue on in their school career?" An additional concern was: "It is difficult to know how early to test for disabilities and know that they are reliable results."

Research. The next most frequent category of questions targeted reading disabilities research and its dissemination, with queries from 14% of the respondents. For example, the following concern highlighted one issue: " I often do not understand much of the research I am presented with and do not usually understand how I can implement it into a class." Another teacher added: "Why be so technical with stats and percentages? Just explain what are the deficiencies and provide several alternatives on how to address them so if one doesn't work [you] can try another or a combination of alternatives." With respect to the researchers, a teacher questioned, "Why is it that the research on reading disabilities or other areas in education involving students is often conducted by people who have little contact with the realities of students in a classroom?" However, the majority of teachers' questions about research (9%) focused on its availability. For example, one teacher asked:

> Why is there such a disconnect between the abundant body of research on effective teaching methodologies for students with RD and actual teaching practice? What will it take to connect researchers with the teachers of teachers (Faculty of Education professors and adjunct staff) [?]

Another respondent queried: "Is there a forum for connecting teachers and teachers locally?" Additional questions were: "Why the research is not shared by the ministry of education?"; "Where is the research, if any exists?"; " Is there funding provincially to

further support teachers to access and learn about resources and current research on reading disabilities?"; and "Why do we not have enough PD on the subject?" How to find research on reading disabilities was also a concern.

Causes, prognosis and other. A few additional topics elicited minor concern. For example, 3% voiced interest in the causes of reading disabilities with questions such as: "What causes them?"; "Is there a higher number of reading disabled children in the lower socio-economic classes?"; "Why does it seem to increase with the years?" ; and "Do parents read less to their children?" In addition, a small number of teachers (2%) were curious about the impact of instruction on students' futures. Respondents asked: "How much can we change? …What do I do about the grade 8 student that can't read? Is it too late?"; "What is the long term prognosis for these children; do they develop the necessary skills and catch up?"; and "What are their lives likely to be like?" Lastly, 4% of the respondents replied that they either had numerous or too many questions to ask, and 17% stated that they had no questions at this time.

Clearly, interest in instructional strategies dominated the respondents' unanswered questions; however, queries regarding causes, identification, and prognoses also provided insight into the basic knowledge about reading disabilities that remains to be disseminated to teachers.

Narrative Data: Who Should Provide Information on Reading Disabilities?

The second question in Part E of the questionnaire (in Appendix D) asked: "Who is responsible for communicating research on reading disabilities to teachers?" Responses to this question provide insights into means for bridging a gap between research on reading disabilities and teachers' practices. Included in the 149 responses were multiple

potential sources of information which I grouped into nine categories: in-school support, school board, teachers themselves, other professionals, organizations, education, government, publications, and no source. The coding was conducted as I detailed in the data analysis of the questionnaire report. Inter-coder agreement of 94% was achieved.

The majority of the respondents (58%) held individuals within their schools responsible for providing information on reading disabilities. The most frequently listed was the special education teacher, who was named by 36% of the teachers. Although one teacher stated, "my school's SPST gives any teacher who requests information the necessary tools to do so", others qualified that though they thought the special education had this role, "they are overloaded as it is"; "we have one special education teacher in a school of 400 students";and "they have no time to support students or teachers either physically or with information - they are too busy filling out forms."

Secondly, school administrators were identified as a likely in-school source of information by 33% of the respondents. This figure included 26% of the teachers who referred to the principal; 7% who referred to administration and management in general; and 1% who mentioned the vice-principal. Educators suggested that the principal might receive information from the school board to share with the teachers or that a principal often shares research articles during professional learning communities and staff meetings. One respondent complained, however, that information presented by the principal as well as others, is often biased, and that "the best research is ignored and fought by many principals."

Among the additional in-school supports, "literacy coaches", "literacy teachers", or "literacy partners" were named by 7% of the respondents, while colleagues or peers in

general were referred to by 7% of the teachers as well. Next in degree of frequency cited, 3% proposed that the acquisition of information is a team approach. For example, one teacher stated that everyone, the classroom teacher, administrators, parents, board level, union memberships, and paraprofessionals "hold responsibility." Another teacher mentioned the student services team, and yet another stated that the classroom teacher and the special education teacher shared the role. The following in-school supports were mentioned by1% of the respondents each: instructional leader, librarian, parents, Reading Recovery teacher/leader, reading resource teacher, teacher leader, and teachers who are experienced with reading disabilities.

The school board and its various representatives were the second most frequently cited potential sources of information, named by 50% of the participants. Most common was the school board in general, with the following school board positions cited by 1% to 5% of the respondents: consultants (in general, primary, teacher), coordinators (in general, curriculum, language, learning, literacy curriculum), curriculum leader or support staff, English facilitator, itinerants, learning supervisors, liaison teachers, professional/staff development department, Special Education Advisory Committee, special education (consultants, coordinators, department, head, support staff), student services (central, resource), superintendant, support staff, system resource teachers, and system specialists.

Professional development by way of the school board was indicated as a possible source by 4% of the teachers. One respondent suggested that "the school board's staff development department should have the responsibility of supporting initiatives related to research on reading disabilities", and another commented that the school board should

impart information to teachers by way of the principal or special education teacher. This additional suggestion was also forwarded:

> There should be someone within the school board who can gather useful journals and articles, books and then forward the information to a school designate. Professional Development days could be used to unpack the information for the staff. The information can then be passed on to another school and staff can stay informed.

On the other hand, another respondent reported: "While we are often receiving workshops, the regular class teachers very rarely receive training." Yet another teacher added, "Frequently material is sent to the board offices and not distributed to the teachers working in the field every day." One respondent additionally contended that it should be the ministry of education that informs the school board of the latest research. This teacher stated, "It should not depend on the board you work for or if you are a separate board or a public school teacher."

In addition, teachers were mentioned as sources of information. Thirteen percent of the respondents shared the following view: "We are responsible for researching the information that we need." Another stated, "It's for my own benefit and will help me become a better teacher / professional", and one teacher explained, "Teachers seem to be motivated when they encounter a student that needs the help." On the other hand, a first grade teacher claimed that it is not expected by the school board that teachers at that particular grade level acquire research on reading disabilities. Respondents also reported difficulties with seeking and finding research, and these are revealed under the category of obstacles.

To lesser degrees, various other organizations and individuals were named as potential resources. For example, 2% of the respondents held the government in general

responsible for providing them with research knowledge, while one teacher named the provincial government. However, the Ministry of Education was specifically identified by 9% of the respondents who often viewed it the ministry's role to find and share current research with the school boards who would then transmit it to the teachers. Also, professionals such as psycho-educational consultants, school psychologists, and "professionals trained in the field "(of reading disabilities) were each referred to once as sources of information. One teacher suggested that "perhaps we need a middle-man", and 4% of the respondents suggested that researchers should take the responsibility to communicate their findings to others via the media, courses, and professional publications. As well, professional and community organizations were considered to be potential providers of research information by 5% of the teachers. For example, the Ontario College of Teachers was suggested once, and the Elementary Teachers' Federation of Ontario was referred to by 3% of the educators (once via its magazine) as sources of knowledge about reading disabilities. "Community" organizations and the Learning Disabilities Association were each mentioned once as providers of research. Additionally, information dissemination via university in-services, courses or teacher education was identified by 5% of the respondents. Conferences were mentioned only once. One teacher proposed that journal and textbook authors take responsibility for transmitting research knowledge, and another respondent reported learning by way of a book club.

Finally, 11% of the teachers indicated that they did not know who was responsible for providing research on reading disabilities or that they were unsure. Some of these respondents followed the comment with suggestions of possible sources, while two stated

that they were unsure because "It's not happening" and "Because I'm not getting any information and neither are my colleagues." In addition, 3% of the respondents indicated that no one is responsible with the comments: "There is no clear person responsible for this" and "No one that I am aware of." One teacher commented that "It is not expected."

Narrative Data: What Makes Research on Reading Disabilities Convincing?

In light of the respondents' commentary on the faults of reading disabilities research, the third question in Part E of the questionnaire, which may be found in Appendix D, sought solutions for providing research that teachers are more inclined and/or able to employ. The question stated: "How is research on reading disabilities made convincing to you?" Coding of the responses was conducted as I described in the data analysis section of this report. Inter-coder agreement of 80% was achieved.

The results indicated that more than half (n = 69) of the 135 respondents to this question forwarded that there must be evidence that the research is successful in order for it to be convincing. Included in the 69 responses, 21% of the teachers indicated that research must demonstrate "immediate", "statistically significant", or "tangible" outcomes. Another 30% of the participants specified that the most compelling evidence of successful research originates from work with authentic students, in genuine classrooms conducted either by researchers, colleagues or by themselves. Secondly, 34% of the teachers submitted that convincing research is practical, with "doable" strategies that assist teachers "to improve student learning and success." In addition, 9% cited the importance of quality in research in the areas of methodology, sampling, reliability, validity, and general scientific rigor. Another 7% of the teachers reported that the source or the authors of the information must be reliable. Colleagues, friends, or someone who

has teaching experience qualify as trustworthy sources for some. Lastly, 5% of the teachers suggested that convincing research is compatible with teachers' beliefs, or it "rings true" with their personal experiences, and they are able to relate to it because they have witnessed similar results in their classrooms.

Narrative Data: How to Facilitate Reading Disabilities Research Use

Given that there is convincing research on reading disabilities, how might teachers' uses of the research be assisted? Teachers' (*n* =127) views on the topic were elicited by the fifth question in Part E of the questionnaire (in Appendix D). This question asked: "What factors would facilitate your use of research on reading disabilities?" Coding the responses to this question was conducted as I described in the data analysis section of this report. Inter-coder agreement of 86% was achieved.

Changes in teachers' work contexts were cited by 48% of the respondents. For example, 21% of the teachers proposed that they needed time during the school day to search for, plan for, and try innovations. Additionally, 14% of the participants advocated for increased in-class support from educational assistants, specialized teachers and volunteers to assist them to implement research. Opportunity for professional dialogue with colleagues was an identified need by 13% of the respondents. Thirteen referred to collegial time or professional learning communities; three suggested that observations of other teachers or networking with teachers of students with reading disabilities would be beneficial; and team teaching and sharing by way of team meetings were each proposed once. Nine percent of the teachers also recommended that resources such as texts, specific programs, and technology are needed for implementing research. Funding for more resources, teacher training, and special education services were also identified

needs by 8% of the respondents. In-school support to learn about advancements in pedagogy from experts, whether from administration, specialized teachers, or researchers, was forwarded by 6% of the teachers. Additionally, 6% of the participants suggested that policies and practices should change to permit early identification and instruction of students at risk for reading disorders, and that possibly a modification of everyone's philosophy of teaching might be required. Changes to class constellations were proposed by 4% of the respondents who expressed that single grades and the inclusion of fewer high needs students in classes would assist educators to implement research. Three percent of the educators also identified the necessity for realistic expectations of teachers; while the following were recommended by one teacher each: "freedom to try new ideas"; "autonomy" for professional development; more parental support; incentives other than money for upgrading; and involvement in action research.

Furthermore, 30% of the respondents suggested the need for greater access to research in order for them to use it. Six percent commented that they simply need to receive more information. The teachers' sentiments could be summed up with: "Just give me some to read!" Another 17% posited that professional development or workshops would avail them of the knowledge they need. Two percent of the teachers recommended demonstrations to aid their learning of research innovations, professional journals and school board emails. Additional qualification courses were mentioned by one teacher.

In addition, 16% of the teachers referred to select features of the research which would facilitate its implementation. For example, research which is accompanied by practical and applicable strategies was proposed by 9% of the educators. "Teacher friendly" research, referring to comprehensible language, was suggested by another 6%

of the respondents. Two percent of the participants also recommended that research should be easy to locate, and 1% commented that "effective reviews" of "best practices, accompanying resources, online materials, and assessment tools would aid teachers' utilization of research. Lastly, 4% of the teachers shared how they learned about reading disabilities by reading and taking courses. This may be an additional avenue for increasing research use.

Narrative Data: Additional Comments

Finally, the last question of the questionnaire (in Appendix D), invited participants to add comments by asking: "Do you have any additional comments about the survey or the use of research on reading disabilities by teacher?" The 116 replies were categorized into the following topics: the research to practice gap, reasons for a gap, how to bridge the gap, the questionnaire, other, and no comment. Coding was conducted as I detailed in the data analysis section of the questionnaire report. Inter-coder agreement of 88% was achieved.

For a number of respondents (5%) the disconnection of reading disabilities research from teachers' practices was very tangible. For example, they commented: "research and the every day (*sic*) classroom are light years apart", "the gap is definitely there between what is known in the research field and what is occurring in classes" and " [I] don't see any teachers using research on reading disabilities."

Regarding reasons for a gap between research and practice, while several themes were reiterated, some new rationales were also offered. Faults of research were restated. It needs to be useful and applicable to the real classroom in order to be accepted. Also, excessive research may be too overwhelming for practitioners to apply. In addition, poor

accessibility of research was reinforced; it appears that "teachers are WAY left out in the dark" as one respondent expressed.

On the other hand, participants suggested that teachers are not interested in research, or that they "often have a jaded view that the research being touted is just another fad in education. The result being it may be greeted with cynicism and not taken seriously." In addition, some teachers "often continue doing what they've always done just to get through everything." Teachers also admitted that they know very little about reading disabilities or where to find information and they have little time to search. Context variables such as limited time and funding, difficult classrooms, and excessive demands on teachers were repeated. However, one teacher also questioned whether the ministry of education is employing current research; is that the source of the problem?

With respect to bridging the gap between research and practice, several issues were reinforced. Firstly, research will be used if it is manageable, effective, applicable, and accompanied with practical strategies, resources and possibly assessments. In addition, partnerships between schools and researchers would facilitate a bidirectional flow of ideas. Primarily, teachers require access to research either by way of teacher education programs, additional qualification courses, ministry documents, or professional development opportunities. In-school collaboration, mentoring, and administrative support would be beneficial as well. Of course, improvement of context variables such as time, in-class support, ministry and school board measures to improve the identification and instruction of students with learning disabilities, and funding for special educators, training, and resources were restated recommendations to increase research use. Teachers' participation in action research was again suggested.

Other comments regarding the topic included discussions of Irlen syndrome, the benefits of conferences such as the Reading Recovery conference, and websites. Ten respondents remarked on the survey; one considered it to be too long, one found the language difficult; and eight felt it was interesting and useful, and they hoped that it might produce positive results.

Summary

Underutilization of research was found across all levels of use. The correlation analysis highlighted that research/researcher and user variables related moderately to research use; therefore, the more problematic these categories of obstacles are, the more research use declines and vice versa, without a causal relationship actually having been determined. The results did however imply that the user obstacles may be weakly predictive of research use. Further insight into reasons for a gap between research and practice was enhanced by one of the ANOVA tests which indicated that the use of reading disabilities research by teachers may be related to teachers' roles. Current intermediate teachers in particular were identified as less likely to use such research than current specialized teachers. On the other hand, the MANOVA tests produced no evidence that teachers' roles were associated with degrees of research use by teachers.

Throughout the qualitative results section, the teachers provided additional insights into the extent of the gap between research on reading disabilities and teachers' practices, reasons for the gap, and means to bridge the gap. First, the degree of teachers' uses of research was addressed by the questionnaire which elicited teachers' knowledge of reading disabilities. Results indicated that less than 50% of the respondents were aware of the potential to identify students at risk for reading disabilities before school or very

early in their school career. Fewer than 50% identified the main characteristics of individuals at risk for or with reading disabilities. While the majority of teachers recognized that the assessment of students' reading levels with respect to their ages or grades was a vital step in identifying possible reading disorders, less than 30% identified assessments of the several valuable signs that were mentioned in the literature. Furthermore, less than 50% of the respondents demonstrated knowledge of the pedagogical practices which are forwarded in the current research, with less than 5% of the respondents identifying the need to instruct students at risk for reading disorder in very basic literacy skills. Rather, approximately 25% of the teachers identified two instructional methods (e.g., multi-modal strategies and technology) that are not strongly recommended in the literature. The teachers' unanswered questions further demonstrated their need for more information about instructional methods for students at risk for reading disabilities. Teachers' reported sources of knowledge, namely professional publications, in-school colleagues, and the internet, also suggested a paucity of research-based information on reading disabilities. These results, in addition to teachers' comments that they lack access to research and professional development, all confirmed that there is indeed a gap between reading disabilities research and practice

Secondly, the results added to an understanding of reasons for research underutilization. The majority of the respondents indicated that first and foremost, several factors within their work contexts prohibit them from seeking, learning about, and instituting innovations in their classrooms. Repeatedly, the lack of time, support, funding, resources, for example, present blocks to research use. Features of the research such impracticality, inaccessible language, and the lack of supportive materials ranked second

in barriers to its use by teachers. Thirdly, features of teachers such as deficient expertise and experience as well as resistance were reported by the participants.

Means to close the gap were elicited by the questionnaire. Results indicated that teachers expected in-school colleagues and school boards to provide information about reading disabilities. In addition, the majority expressed that research is convincing if there is evidence of its effectiveness. Also, research that is practical and is conducted with authentic students is most convincing. In order for research to be implemented, the environmental barriers must be alleviated, access to research must be improved, and research must be more useable. Lastly, teachers' opinions and ability to access and apply research innovations need to be addressed.

CHAPTER IX

Core Study: Focus Groups

Focus groups are interviews with a small group of people on a specific topic (Patton, 2002). Focused group interviews are cost-effective, time-saving, and they facilitate the collection of valuable qualitative data. In a focus group, participants may also feel less targeted by the questions, and they may benefit from hearing and responding to the opinions of others. Group interviews were useful in the current study for triangulating the group interview results with the data from the open-ended and rating questions of the questionnaire. The focus groups provided a means of member-checking for verification, explanation, and elaboration of the questionnaire findings.

Method

Participants

Focus group members were recruited by way of the final item on the questionnaire which stated: "Are you willing to participate in a 1 to 1 ½ hour group discussion about these results with 4-5 other teachers?" I invited interested respondents to notify me by email. This process retained the confidentiality of the questionnaire responses, since names and addresses were provided to me by email, independent from the questionnaire. In total, 20 teachers indicated an interest in participating; however, when I contacted the volunteers in order to arrange meetings, one teacher did not respond, one indicated that she was no longer available, another teacher's email address had changed, and all but seven were dispersed too widely across the province to find a location that was convenient for them to congregate in groups greater than two. I considered that groups of four or more members would be ideal for productive

conversations. As a result, two focus groups with four teachers each were conducted. Seven of these participants had completed the online questionnaire, while one participant was enlisted by a fellow group member.

One focus group consisted of four females whose teaching experiences ranged from 10 to 30 years. They taught kindergarten, English as a second language, special education, and intermediate grades. The second group was comprised of three females and one male. Their teaching careers ranged from 1 to 35 years. One participant in this group was a supply teacher, and three held special education positions. The special education roles were in a withdrawal program, in a segregated class for special needs, and in a class for students with dyslexia. In each focus group, one of the members taught in the separate school board, and three taught in the same public school board. Two members in each of the focus groups were acquainted with each other; however, they taught in different schools. The remaining members were unacquainted.

Procedure

Ethics approval to conduct focus groups as a component of the overall study was granted by the Faculty of Education Sub-Research Ethics Board and by individual school boards. (Please refer to the segment on participant recruitment in Chapter VIII or more details) After I completed cursory analyses of the rating questions in September 2009, I contacted the teachers who had volunteered for focus group participation by email regarding convenient times and locations for meetings. The email also contained an attached copy of the letter of information regarding the focus groups (see Appendix M).

Focus groups took place in November 2009 in two major southwestern Ontario cities. Both meetings occurred between 5:00 and 7:30 in the evening, one in the

boardroom of a dental practice and one in a meeting room of a condominium building. A light meal was served at the beginning of each session. The letter of information was available again for the members to peruse before they signed the consent form (see Appendix N). I began each discussion with a welcome and an invitation for the group members to introduce themselves. Name tags facilitated members' ability to address each other.

I reiterated that the purpose of the focus group which was to collect their feedback on the results of the questionnaire. I reported the demographic data of the questionnaire respondents, frequencies of responses to questions on the uses of reading disabilities research and obstacles to research use, as well as my analysis of the qualitative responses regarding the facilitation of research use. I selected this content because it addressed the study's three questions most directly. For the participants' information, I also presented the key findings from my narrative synthesis regarding the identification and instruction of students at risk for reading disabilities. Throughout the sessions, members were free to ask questions and discuss the information. The proceedings were audio-recorded and transcribed.

Data Analysis

The transcribed interviews were entered into WEFT QDA (Fenton, 2006) for coding and categorization. Findings from the two focus groups were combined for reporting the results. The categories for coding the interview comments matched the key content areas which I mentioned above: demographic information about the questionnaire respondents, reading disabilities research use by teachers, obstacles to research use (research/researcher, teacher, and context), methods to facilitate research use, and

research on reading disabilities. To establish inter-rater reliability, one-third of the coded comments were extracted by cutting and pasting every third comment into another word document. The comments were arranged in random order to avoid clusters of statements from the same categories. This one-third of the comments was also coded by a Master of Education graduate. Inter-coder agreement of 82% was achieved. Discrepancies in coding were resolved through discussions between the coders.

Results

Demographic Data of Questionnaire Respondents

Members commented primarily on the male to female ratio and on the teaching roles of the questionnaire respondents. Members relayed that the 1:6 ratio of males to females was not surprising, since the target group was elementary school teachers where male teachers are less prevalent than in secondary schools. Participants also remarked that the high representation of primary teachers relative to junior and intermediate educators was "typical of how you get response, even within a school."

Reading Disabilities Research Use

The questionnaire data indicated that teachers used research "sometimes" across the eight stages of use, with the stages of reception and searching for research having lower frequencies than reference, effort, adopt, implement and impact. The group members' were largely astonished with these results; although they considered that "sometimes" was too vague, they concomitantly thought that teachers' reported use of research was overestimated. One group member suggested that respondents might have selected "sometimes" when they did not know what to choose. Another group member proposed that "sometimes" might reflect the use of research only twice, which is "bad",

and another group participant stated that "sometimes" was a "shocking" response because it was not "concrete" enough. One member stated that "sometimes" was encouraging; it was better than "not at all."

In addition, feedback regarding the reported degree of research received by teachers included: "I was surprised, I mean, research, I don't think I've ever had PD on reading disability"; "the only research in our board we get is what's the mandated way of doing it according to (name)'s particular wave at the moment, so……we don't get the research"; "they don't get it"; and "we don't receive it directly….what we receive is somebody's version of what they want us to do, we are told what it is we are doing." Another member related that when she asks for the evidence from administration or from consultants, she might receive anecdotal accounts which she does not consider to be "scientific research" .The evidence should emanate from "controlled studies "; but, she exclaimed, "We do not receive that information…I have yet to receive an intelligent answer." Therefore, rather than receiving research on reading disabilities sometimes or seldom, the focus group members indicated that teachers do not receive such information at all.

With respect to searching for research, one member offered, "I chose to seek it out myself." Yet another member commented on teachers' reported levels of reading research with: "I have never in my 35 years seen a teacher during the day sit down and look at the research between classes." Additional comments which reflected the group members' disbelief concerning the reported use of research in the classroom were: "Research has nothing to do with what goes on in the classroom, absolutely nothing"; "I'm shocked. I don't see teachers use research"; "Most people are not going to fully implement it"; and

"Most teachers teach according to what they learned themselves, what worked with them, or what worked, even if you just discovered it while going along, or what you are comfortable with." This lack of full implementation is how the focus groups rationalized teachers' reports that they only sometimes achieved desired results from research implementation. With respect to the impact of research, one participant pointed out that although teachers reported searching for research, they still attained expected results only sometimes; that was "amazing." Another questioned: "You also have to wonder…they're implementing it, but are they implementing [it] the way it's supposed to be implemented or are they implementing a skewed version of it and is that why the impact is only sometimes?" Overall, there was skepticism about the reported use of research and apparent inconsistencies.

Obstacles to Research Use

Research / researcher variables. In reaction to the questionnaire respondents' views that there is not enough research on reading disabilities, one member exclaimed, "There's abundant research….you could fill libraries with the research that has been done on teaching kids with reading disorders." Others posited that research is often not applicable to a classroom, that it is not useful, and that it lacks concrete suggestions on ways to implement it. One member also commented that researchers have limited views of issues; research is "very narrow…a small slice." Therefore, three members agreed that there is a paucity of useful research, and they conjectured that the questionnaire responses may have reflected this view.

Both focus groups agreed that the dissemination of research on reading disabilities by way of professional development opportunities simply does not occur in

their boards. One group member had however benefitted from a great deal of professional development on reading disabilities, and she informed the others of educational events sponsored by the Ontario Branch of the International Dyslexia Association. The other group members were unaware of this organization. Most of the members agreed that useful research on reading disabilities may be lacking or it may be poorly transmitted to teachers.

Teacher variables. One group opined that it is a teacher's professional responsibility to seek out research and that teachers want to help students. On the other hand, they expressed surprise at the high regard that the questionnaire respondents reported for reading disabilities research. In addition, while the results signified that teachers knew where to locate research, one participant claimed, "A lot of people don't know where to even get started to look for research." Members also concurred that teachers do not know how to instruct students to read, and that teacher education programs inadequately prepare teachers to teach reading or to access research.

Members of both focus groups affirmed that teachers modify research when they implement it. They suggested that classroom demands, old habits, aversions to prescriptive programs, a lack of planning time, and the impression that differentiated instruction means taking bits and pieces of research as needed, explained why teachers modify researched instructional strategies. One member stated, "Good teachers do that….they know their students." However, most of the members viewed the modification of research as an obstacle to its use because, as one expressed, "You may not get the results at all because you've changed it." Therefore, the group members refuted the questionnaire results that teachers' value research and that teachers are aware

of sources of reading disabilities research. They agreed that teachers alter research-based methods for their own purposes.

Context variables. Several context-related obstacles generated discussion in both focus groups. For example, most questionnaire respondents reported that their schedules prevented them from using research. One focus group concurred that planning, yard duty, meetings, and schedules in general place excessive demands on teachers. "Just get me through the day!" was expressed by one member. Yet, one member believed that schedule demands depended on the teachers' roles. Special education teachers, for example, may be required to search for and use research as part of their work. Another context-related obstacle concerned annual learning plans. One member proposed that annual plans stifle teachers' attempts to learn about and implement research. She proposed that searching for and attempting innovations may require more than a year; however, learning plans are set for only one year. In addition, the focus groups verified that curriculum expectations pose a barrier to research use. For example, one member stated, "That's very consistent with the feeling from colleagues. I mean the curriculum is at a point that is ridiculous. You can't fit everything." The groups also agreed that split grades presented additional complications to meeting curricular demands; however, and there was a belief that curriculum expectations have been slackened because they are impossible to fulfill.

Members also agreed that classroom compositions presented added barriers to research use. The questionnaire results indicated that students do not "allow" teachers to try research use; implying that classes of students with high needs or with behavioural and social problems may obstruct teachers' abilities to search for and try research.

However, the results were more positive than the focus group members expected. One explanation for the positive view of classrooms was that respondents may have interpreted "allow" to connote "provide opportunity to." For instance, if teachers had students with exceptionalities in their classes, the teachers would be more inclined to search for and try research; therefore, these teachers would indicate that their students permit them to use research. Another member explained that teachers with special education classrooms would also be more apt to search for and try research to meet their students' needs. The results may therefore have reflected the relatively high number of respondents who were special education teachers and who would have such reasons to search for and use research. On the other hand, as one member expressed, "If I don't have a lot of kids with those issues, it's not going to drive me." However, the term "allow" may have skewed the results if respondents interpreted it as one member suggested: "That is to me, they're granting me permission almost and, um, they don't usually have that kind of power on my day."

Other results regarding several context variables were questioned by the focus groups. For example, group members were "surprised" with the degree to which the questionnaire respondents reported that researchers were connected to schools. Although the results indicated that this variable was a concern, focus group members considered researchers to be mostly absent with respect to the dissemination of information and the observation of research implementation. Others suggested that the responses may have reflected the extent to which researchers conduct research with students in schools and are thereby visible to teachers.

The relatively positive questionnaire results about the match between the school

context and research also generated comments from one member who stated, "That's a high number that agree." She posited that the results may reflect "a real positive culture" that is "invading" her school board; only positive comments are apparently encouraged from teachers.

The next item under discussion concerned the extent of encouragement that teachers receive to use research. The focus group members were again puzzled with the seemingly positive questionnaire results. The members speculated that respondents interpreted "encouraged" to denote "interested." Therefore, the teachers may have meant that they were curious about reading disabilities research. If questionnaire respondents in fact implied that they received encouragement from someone, both focus groups questioned who that might be. The members agreed with one member's statement that, "Nobody is encouraging me." On the other hand, another member agreed that teachers may be encouraged to search for knowledge, go to the library, or take courses; "they're not going to say don't learn about reading disabilities." However, this member also stressed, "It's not funded or supported with supplies; they don't actually give it to you."

It followed therefore, that the questionnaire results which indicated that deficiencies in funding and supplies block research use, were uncontested by the focus groups. The members agreed, despite some special government funding such as the Ontario Focused Intervention Partnership (OFIP) initiatives, that schools generally lack financial and material support to apply research.

Discussion also ensued concerning results about the degree of support teachers receive from others to implement research. The questionnaire responses were only slightly negative, indicating that support in classrooms was lacking. The focus groups

were in accord that they have inadequate in-class support; however, they stressed that the questionnaire responses should have been less positive. On the other hand, one member suggested that the term "support" is ambiguous. She proposed, "Maybe some think the support is time and dollars to use research…or support from the principal…through prep time, or LST." This last member felt that she would be supported to try innovations.

Lastly, the questionnaire results indicated that there is an absence of external incentives to implement research. One focus group discussed this issue with resultant mixed views. A member argued that there are incentives such as encouragement to find research or to attend workshops, and another added that they might receive a set of books as compensation for agreeing to try a program. On the other hand, another member contended, "That's your job", and an additional member added, "It's the professional commitment and the satisfaction as a teacher helping a kid overcome that hurdle that hopefully is the incentive for most people." Other members understood that questionnaire respondents felt that there was no compensation for trying to use research. They conceded, "You don't get rewarded in any way to do it" and "People are really burnt out, so I suppose sometimes it's that 'what's in it for me?' factor."

For the most part, the focus groups agreed that context features such teachers' schedules, the curriculum, classroom compositions, a disconnect between researchers and schools, a mismatch between research and school contexts, and the lack of encouragement, support, funding, supplies and incentives impede research use. The members also speculated that the questionnaire results may have been more positive than expected because the terms such as "encouraged" and "support" may be ambiguous, or that teachers are encouraged to relay only positive messages.

Means to Facilitate Research Use

Both groups of teachers agreed that research on reading disabilities is disconnected from school practices, and they concurred with many of the questionnaire respondents' suggestions regarding means to facilitate research use. The most noteworthy suggestion concerned the need for more professional development on reading disabilities. They also restated the value of professional development within schools and by someone from the school, including teacher moderation, observations of others, and collegial time during which teachers may share knowledge with each other and continue discussions on an on-going basis. In addition, the focus groups highlighted the benefit of release time during school hours, networking with other schools, and provision of the necessary supplies for learning about and implementing innovations. The focus groups also reinforced researchers' responsibilities to provide research with practical strategies and examples or videos that demonstrate the implementation of research ideas. Furthermore, research use in authentic classrooms should be demonstrated.

Research on Reading Disabilities

Before concluding the focus groups, I presented a summary of my findings regarding current research on the identification and instruction of students at risk for reading disabilities for the teachers' information. The discussions that ensued generated some telling comments that deserve mention.

Regarding identification for example, a student's background provides valuable insight into the student's development and experiences; however, members questioned whether interviewing for background information is within their purview. Also, with respect to genetic predispositions, members asked whether they have the right to

investigate this and how much parents will reveal or in fact know. Most of the teachers agreed with early identification or the "red flagging" of students at risk for reading problems. However, one teacher reported that her principal informed the teachers in her school that the average age at which students learn to read is 7 years, therefore one must be cautious in identifying reading disorders at an earlier age. Another member commented on the difficulty in obtaining a speech and language assessment for young children despite the significance of language problems as precursors of reading problems. The teachers agreed, however, that kindergarten and Grade 1 teachers are adept at identifying students who are at risk, by observing for many of the indicators that I listed. One teacher was cognizant of response to intervention methods and correctly cautioned that it relies on well-trained educators and evidence-based interventions.

The topic of assessment also spawned discussion. Group members confirmed the value of speech and language assessments, checklists, and phonemic awareness testing. However, they also reported that assessments for reading disabilities occur after students are referred to their special education teacher or to the school psychologist; therefore, classroom teachers are generally unaware of assessments that are employed. They are reportedly "left in the dark."

Questions about the characteristics of students with reading disabilities also arose during this discussion. One member was surprised that letter formation in printing was absent from the list, because she had witnessed this problem frequently with learning disabled students. Some confusion with phonological awareness and hearing problems as well as between word retrieval and expressive language were evidenced by some members.

Lastly, comments on the instruction of students with learning disabilities reinforced that no definitive programs are in place despite teachers' skills at identifying students at risk. In addition, members agreed that intensive programs that require up to 90 minutes a day do not seem feasible when the 30 minute Reading Recovery sessions are considered to be too costly. Additionally, while successful commercial programs may exist, another member pointed out that experts may or may not endorse packaged programs; therefore, it is difficult to know which program to purchase. Also, multi-sensory approaches are promoted; but they require more research to demonstrate their merits. The existence of a gap between known successful interventions and practice was reinforced.

Summary

The focus groups were valuable for identifying ambiguities in the questions and for providing rationales for some responses. They both challenged and supported results from the questionnaire. Overall, they disputed the extent to which teachers reportedly use research despite the high frequency of a "sometimes" response, and they affirmed that teachers do not know how to teach reading. Both views supported the existence of a gap between research and practice. They agreed with many of the obstacles which the questionnaire respondents identified; however, they were more vehemently convinced that issues such as teachers' knowledge of where to locate research, teachers' value of research, the usefulness of research, and the degree to which classroom compositions, researchers' connections with schools, research's compatibility with school contexts and support to use research were impediments to research use. The members' feedback is considered further in combination with the questionnaire results in the following chapter.

CHAPTER X

Discussion and Conclusions

In a time of international and interdisciplinary proclivity for evidence-based practice and when there is sufficient research to ameliorate a high percentage of reading disabilities (Barnes, 2007; Greenwood & Abbott, 2001), a divide between education research and classroom practice is concerning. In the current study, I explored this concern. The purpose of this study was to investigate the extent to which a gap exists between reading disabilities research and teachers' practices, reasons for such a gap, and means to bridge a gap from the perspectives of educators. The findings revealed that: (a) a gap exists between research on the identification and instruction of students at risk for reading disabilities and teachers' practices across eight stages of use: reception, search and find, read and understand, reference, effort, adopt, implement, and impact; (b) research, researcher, teacher, and context variables contribute to the gap; and (c) the gap may be bridged by addressing features of the research, teachers' work environments, and the accessibility of reading disabilities research. In the following discussion, I present an overview of the results which contributed to the above conclusions from a knowledge utilization perspective which addresses research use, barriers to research use, and means to bridge research and practice and from a critical viewpoint which raises issues of power imbalance in the production of and access to reading disabilities research. I also discuss the study's limitations, its theoretical and practical implications, suggestions for further research, and final thoughts.

The Extent of a Gap between Reading Disabilities Research and Practice

To what extent is there a gap between research on the identification and

instruction of students at risk for reading disabilities and teachers' practices? Responses to the rating questions on research use, to open-ended questions, and to focus group topics shed light on this first research question.

Reading Disabilities Research Use

To begin, responses to the rating questions on research use assisted in identifying the extent of a gap and the stages of knowledge use at which a gap occurred. Specifically, the responses indicated that teachers "sometimes" read and understood, talked about, adopted into policy, made an effort to try, implemented fully, and implemented with desired results, research on reading disabilities. They also revealed that teachers received, searched for, and found such research less than "sometimes."

Focus groups members assisted in interpreting the significance of the answer "sometimes" to clarify whether there was a gap between reading disabilities research and practice. While a few considered "sometimes" to be positive, most found this answer to be meaningless or inadequate. Still, concurrent with the inadequacy of a "sometimes" response, focus group members thought that teachers had over-estimated their use of research; members reported that research on reading disabilities is in actuality, seldom used. Additionally, even if "sometimes" implied half of the time, the results represented the existence of a gap between research and practice according to Burns and Ysseldyke (2009). This finding concurred with open-ended answers as well.

Furthermore, the report that research on reading disabilities was received or searched for and found by teachers less than sometimes was also corroborated in the open-ended responses and by the focus group members. Expected sources of research such as school administrators, special education teachers, school board consultants, and

professional development programs rarely provided the participants with information on reading disabilities.

In addition, many obstacles in the teachers' work environments reportedly prevented them from searching for research. It appeared that teachers acquired little research information on reading disabilities; however, they sometimes used research that they obtained. In summary, the survey and focus group responses to questions regarding research use revealed the existence of a gap between reading disabilities research and teachers' work at all eight stages of the knowledge utilization model, with the stages of reception and searching/finding as the most problematic.

Teachers' Knowledge of Reading Disabilities

Survey questions which explored teachers' knowledge and questions about the identification and instruction of students at risk for reading disabilities additionally substantiated the divide between available research and the classroom. For example, only half of the responding educators were aware of the early identification of children at risk for reading disabilities, characteristics of reading disabilities, assessments, and instructional strategies. Teachers' unanswered questions also revealed that less than half of the respondents were familiar with instructional methods for students at risk for or with reading disabilities. These findings were analogous to those of Wilson et al. (1998) who ascertained that educators were unaware of interventions for difficult-to-reach students. Furthermore, the focus groups opined that teachers do not know how to teach reading, thereby supporting the results of previous researchers (Bos et al., 2001; Cunningham et al., 2004; McCutchen et al., 2002; Moats & Foorman, 2003; Spear-Swerling & Brucher, 2005). It is curious that most students do learn to read.

Sources of Reading Disabilities Research

Moreover, the teachers' stated sources of knowledge about reading disabilities added further insight into their uses of research. Unlike Galton's (2000) results, the respondents did not receive research on reading disabilities from in-service sessions. However, as Williams and Coles (2007) and Sari (2006) discovered, colleagues, professional publications, and the internet were the most frequently cited sources by this study's participants. Williams and Coles considered these avenues to be inadequate supplies of first-hand research compared with academic journals, government bulletins, or systematic reviews. On the other hand, e-journals may well be academic and some individuals might consider articles in professional journals and books to constitute research knowledge. However, given that teachers' references to specific peer-reviewed academic publications or to contact with researchers were scant, it may be surmised that teachers' sources of information further reflected limited contact with research on reading disabilities.

On the other hand, the dismissal of professional journals as valid sources of research may represent a privileging of academic knowledge over professional knowledge. According to criticalists, no particular knowledge should be privileged in this way (Barnes et al., 2003). In addition, the sources of research that teachers cited largely relied on the teachers' initiative to seek needed information. Systemically, support and avenues for accessing research appeared nonexistent or minimal. Criticalists may also conclude that these dynamics reflect a control of knowledge by individuals within the school system; they may reflect a power imbalance which fails to facilitate teachers' access to information on reading disabilities. Giroux (1988) argued that teachers should

be more involved in curricular decisions; however, if teachers do not have access to current knowledge as they reported, "the present structures of most schools isolate teachers and cut off the possibilities for democratic decision making" (p. 9).

Teachers' Confidence with Reading Disabilities

Despite acquiring limited information on reading disabilities and in contrast to Bos et al.'s (2001) revelations, the majority of the respondents reported that they were very or somewhat confident in identifying and in instructing students with reading disabilities. These results were unexpected and perplexing, given teachers' reported paucity of knowledge about the topic. An explanation for this apparent inconsistency may be that the respondents to this question differed from the participants who claimed that they received little information on reading disabilities. A second rationale may hearken back to Cunningham et al.'s (2004) finding that teachers over-calibrated the extent of their knowledge. Alternatively, the respondents may have considered their knowledge on reading disabilities to be sufficient, albeit minimal, to identify and instruct students who are at risk for reading disabilities. However, a consequence of this degree of teachers' confidence in their ability to identify and instruct students at risk for reading disabilities may be that they would be less inclined to search for additional information (Cunningham et al., 2004). It may also be problematic if the information which sustains their confidence in dealing with reading disabilities is not research-based. As a result, teachers' confidence in identifying and instructing students at risk for reading disabilities did not support the presence of a gap between research and practice; however, the high level of confidence may be considered another obstacle to the stage of searching for and finding research information by teachers.

Summary

Therefore, in response to the first research question, findings converged on the conclusion that educators used reading disabilities research to a limited extent throughout the eight stages of knowledge utilization. Additionally, teachers' knowledge, unanswered questions, and sources of information supported the conclusion that a gap exists between reading disabilities research and teachers' practices. Teachers' confidence in identifying and instructing students with reading difficulties revealed a potential reason for their low level of seeking information and it, therefore, emerged as a possible barrier to research use. However, these findings may not be as transparent as they appear. From a critical perspective, one must also consider the role that power relations play in controlling the knowledge that teachers access and in facilitating teachers' awareness of research.

Obstacles to Research Use

Responses to the second question of this study," Why is there a gap between research on reading disabilities and teachers' practices? ", disclosed additional barriers to teachers' use of reading disabilities research. The information conformed to Stone's (2002) three categories of obstacles: context, supply (research/researcher), and demand (user/teacher) variables. Replies to the rating and open-ended questions identified teachers' work contexts as the most problematic; however, statistical analyses reported in Chapter VIII revealed that research, researcher and user variables were in fact related more positively with stages of research use. Characteristics of teachers were the most predictive of research use in general. However, closer inspection of the responses provided richer insights into the obstacles that were most significant for the teachers.

Context Variables

Findings from the rating questions, open-ended questions, and focus groups converged on multiple context-related obstacles to research application. Prominent among these obstacles in the rating questions were the lack of funding and incentives. Financial support for teacher training, resources, and special education services were reportedly scarce. Inadequate funding additionally overlapped with a lack of supplies and shortage of in-class support from educational assistants and special education teachers. Furthermore, external incentives to employ innovations were rated as rare; although what might constitute an external incentive was not disclosed. Also, the demands on teachers limited their time to search for, learn about, read, discuss, or try research, and in-school time was infrequently granted for these ventures. The shortage of time was in fact the most frequently cited blockage to research use in the open-ended answers. Additionally, curriculum expectations contributed to the excessive demands on teachers; they were generally considered to be difficult to achieve. As well, classroom compositions such as split grades and the inclusion of students with behavioural, emotional, and learning problems compounded the above difficulties. Teachers also identified that policies which emanate from the schools, school boards, or the Ministry of Education regarding the roles and numbers of special educators and concerning the delayed identification of reading disabilities hampered their usage of new evidence. One respondent in particular questioned whether educational policies are research-based. This issue, which was also broached in the literature by Broekkamp and van Hout-Wolters (2007), deserves consideration, because teachers are accountable for abiding by these policies. Lastly, teachers declared that a shortage of parental support and space were barriers to

implementing innovations in their classrooms.

While teachers' work contexts presented as practical hindrances to teachers' uses of research, a critical view again calls for interrogating the underpinnings of these hindrances. After all, as Tripp (1992) suggested: " How things are is never seen as having occurred by chance and for no particular reason; all social systems and their practices are seen to be as they are in order to serve the interests of a particular group" (p. 7). With this mindset, one must question whether the work demands that are imposed on teachers are serving a purpose other than the education of students. For example, Kincheloe (1993) described the realm of education as a context of "top-down, unquestionable standards", for the purpose of "social regulation" (p. 5). He suggested that the drive for technical standardized education practices (e.g., Education Quality and Accountability Office tests) spawned the current treatment of students and teachers as "objects of management" (p. 5), implying that demanding work conditions serve to control both the students and teachers. Kincheloe also proposed that if teachers had the freedom to be self-directed, they might seek alternate work arrangements, and this would conceivably pose "threats in the eyes of advocates of top-down, technical, and standardized standards" (p 5). Therefore, not only do the demands on teachers undermine their use of innovations, they may also serve to suppress teachers' critiques of the system and attempts at self-direction. In fact, Kincheloe further proposed that teachers who do aspire to being self-directed leave teaching. Therefore, do the conditions that the respondents reported actually serve to preserve the status quo? While teachers' work settings pose barriers to their uses of research, a critical perspective suggests that possibly both the conditions and reasons for such conditions demand attention. In addition, Giroux's 1988 claim that teachers as

"transformative intellectuals" have the opportunity to "organize collectively to improve the conditions under which they work "in order to demonstrate that they play a vital role in school reform remains relevant (p. 122). Teachers who are over-challenged by work expectations may well be prevented from being transformative intellectuals.

Research and Researcher Variables

In addition, the results confirmed that features of the research and of researchers interfered with research implementation. Research was reported to be difficult to locate and understand. Respondents also agreed that research was frequently unrealistic and not useful, particularly when it was time-consuming, lacked practical strategies and guidelines for its implementation, and when it was not conducted with real students in authentic classrooms. Also, an excessive amount of research was conceivably overwhelming and prohibited teachers from staying abreast of developments in reading disabilities research. Very general or extremely specific research may additionally be difficult to implement. Technical language, undue statistical content, incompatibility with the curriculum, and a failure to address the identification of reading disabilities were additional problems attributed to research. In reality, however, there is an abundance of research on the identification of reading disabilities; therefore, the last complaint revealed that teachers' were unaware of the research that is available.

Researchers were also held accountable for the underutilization of their findings. They were charged with being disconnected from schools and with not understanding teachers' needs. Although this last issue bordered on the need for researchers to acknowledge teachers' knowledge, the respondents did not explicitly identify a disregard of teachers' contributions to knowledge creation as an obstacle to research use. Teachers

did however recommend that their participation in research might facilitate its use. Lastly, as was recognized by Boardman et al. (2005), Greenwood and Abbott (2001), and Sindelar and Brownell (2007), to name a few, the dissemination of information on reading disabilities by way of professional development was lacking. Dissemination is discussed further in an upcoming section.

Once again, through a critical lens, one might question whether researchers knowingly or inadvertently maintain a divide between themselves and teachers by producing research that is inaccessible both in its language and its availability. Do teachers' difficulties with research possibly serve to preserve researchers as "experts" above the "masses" (Kincheloe, 1993, p. 5), thereby sustaining a power imbalance between those who produce and comprehend knowledge and those who use it? Researchers on the other hand are also socialized into an academic culture which values and expects academic research and publications. Do education researchers critically consider the expectations of themselves and their role in the research to practice gap? Clearly, the dynamics which produce the divide between research or researchers and practitioners present added variables that warrant exploration with respect to the utilization of education research.

Teacher Variables

Finally, teachers' responsibility in research underutilization was recognized; albeit, with some controversy. For example, the rating questions identified two issues as problematic: teacher education programs did not prepare teachers to use research and teachers modified research in order to use it. The first of these results was corroborated by the focus groups and open-ended questions, and it may understandably be the initial

source of the research to practice gap. If teacher education programs do not model and teach the use of research on reading disabilities, where will teachers be initiated into seeking and implementing research knowledge?

In fact, Giroux (1988) attributed the "devaluing" and "deskilling" (p. 122) of teachers' work partially to teacher preparation programs as well. Similar to Kincheloe (1993), Giroux contended that the standardization of school knowledge diminished the intellectual work of teachers and he claimed that teacher preparation programs were at the root of the problem. According to Giroux, pre-service programs are preoccupied with the practical "how to" (p. 123) aspects of teaching without encouraging pre-service teachers to think critically or to question classroom methods, research techniques, and theories of education. Therefore, from teacher education programs onwards, teachers are socialized to an extent to NOT be the "transformative intellectuals" (Giroux, 1988, p. 121) for which Giroux advocated. Rather, they are treated as "specialized technicians" (Giroux, 1988, p. 122) who are expected to carry out programs that are conceptualized by others.

With respect to the second item, researchers have considered teachers' modifications of research to be a misuse or underuse of the research (Baker & Smith, 2001; Pressley & El-Dinary, 1997); however, while focus group members concurred that teachers modified research, they were divided regarding the disadvantages and benefits of doing so. For example, if evidence-based strategies are altered, one should not expect the same results as the researchers found. On the other hand, individual students' needs may require accommodations by way of modified teaching methods, and teachers know their students and their needs.

Critical theorists have also argued that research knowledge is inappropriately privileged above the personal, contextualized knowledge of teachers and that this dynamic additionally serves to maintain the positioning of researchers as "experts" above the "masses" (Kincheloe, 1993, p. 5). This assumption also relegates teachers to the demeaning role of "specialized technicians" rather than the intellectuals they have potential to be (Giroux, 1988, p. 122). The value of teachers' local knowledge and experience should be recognized. From a critical perspective therefore, the interpretation of teachers' modification of research as a misuse or underuse of knowledge remains debatable. It may in fact be a manifestation of self-direction and resistance to underlying power relations inherent in the top-down approach to knowledge dissemination.

In addition, scholars have claimed that teachers are not interested in research, unwilling to try it, and that they have a neutral or low opinion of research (Boardman et al., 2005; Broekkamp & van Hout-Wolters, 2007; Dagenais et al., 2008; Konings et al., 2007; Sari, 2006). On the contrary, respondents to the rating questions indicated that they valued research on reading disabilities and desired more. Conversely, focus group members and a few open-ended answers contradicted these reported sentiments, admitting that some teachers resisted innovations. Once again, one might consider whether such resistance is actually an expression of self-reflection and opposition to the traditional top-down approach of research transmission rather than a resistance to change.

Other questionable results concerned teachers' awareness of available reading disabilities research and where to locate it. For example, the questionnaire respondents indicated that they were cognizant of reading disabilities research. The respondents' complaints of delayed identification of reading disabilities (e.g., to grade 3) also revealed

an awareness of current beliefs regarding identification. Yet, in a previous section on research-related obstacles, they incorrectly claimed that there was too little research on identifying students with reading disabilities, and their questions about identification and the ages for identification that they reported reflected inadequate knowledge of the identification of reading disabilities. According to Knott and Wildavsky (1980), teachers' lack of awareness of the research is an obstacle to research use, and this lack was exposed throughout the study.

Respondents to the rating question also indicated that they knew of sources of information on reading disabilities; yet, the focus groups claimed that teachers were unaware of such sources. These conflicting views suggested that user variables may present more obstacles to research use than the rating questions alone identified. The disparate views of the participants may be a consequence of self-reporting; the respondents possibly tended to portray themselves favourably in the rating questions. On the other hand, the questions may have been ambiguous, which highlights the short-coming of questionnaires versus interviews where clarification may be sought. If the focus groups accurately appraised teachers' knowledge of sources of research as inadequate, then a systemic flaw was again revealed in the education system's role in fostering teachers' awareness and implementation of research. The control of knowledge transmission has been addressed previously in this discussion of the findings and it applies here as well. Still, the respondents to the questionnaire out-numbered the focus group members considerably; therefore, their views may in fact be more representative of teachers' opinions than the focus groups.

Lastly, the impact of demographic variables on research use was analyzed. Only

one significant finding was generated; specialized teachers were found to utilize research more than intermediate teachers. The rationale may be that specialized teachers are responsible for supporting classroom teachers and for assisting students with learning difficulties and are, therefore, more inclined to engage with research on reading; while intermediate grade teachers focus less on reading instruction than other teachers.

Overall, in addition to a deficiency in received research, teachers reported that conditions within their work environments posed the greatest barriers to their use of reading disabilities research. It was apparent, however, that features of research, researchers, and teachers also contributed to the problem of research underutilization. Additionally, critical insights to the systemic dynamics that may account for these barriers should also be considered when attempting to understand teachers' uses of research and variables that pose barriers to research use.

Means to Bridge the Gap

This study also elicited suggestions from teachers regarding means to facilitate their use of reading disabilities research in order to answer the third research question: How could a gap between research on reading disabilities and teachers' practices be bridged? The teachers' propositions were related to three main issues: the research, teachers' work contexts, and access to research.

Research

To begin, teachers asserted that research must demonstrate evidence of its success and it must be useful in order for it to be convincing and to be applied. From the teachers' perspectives, evidence is most influential when the research has been conducted with real students in genuine classrooms and when teachers can experience immediate,

tangible and significant outcomes with their students. In addition, the respondents recommended that research findings should be accompanied by examples of how to implement it, practical and manageable strategies, and possibly the required materials and assessments. Of less significance were issues of research quality (sampling, reliability, validity, methodology), the sources of the information, the researchers, and the research's compatibility with teachers' beliefs. The majority of these recommendations echoed suggestions made in the literature; however, the teachers did not propose that research should be locally based or conducted with teachers. Yet, these actions too would likely boost the believability and use of research (Gersten et al., 1997; Ratcliffe et al., 2005; Scribner, 2005).

Ironically, while teachers recommended ready-made packages to help them to implement research, Giroux (1988) argued that such packages actually deskill teachers and deny them the latitude to develop, plan, and judge curricula. He considered that "teacher-proof" (p. 124) curriculum packages represent a practice of "management pedagogy" (p. 124) which is based on the assumptions that teachers need to be controlled in order to be consistent and predictable across schools. In addition, such packaged programs disregard the heterogeneity of students and classrooms with respect to experiences, languages, cultures, and talents which teachers are best able to identify and address (Giroux, 1988). Curiously, teachers did not appear to recognize these shortcomings of packaged programs as criticalists might.

Context

Secondly, recurring findings highlighted the need for change within teachers' work environments to facilitate research use. Schools and teachers require financial

sustenance for training, supplies, and for increased in-class support such as special educators and educational assistants. Release time during school hours would aid teachers to seek, attempt, and share new concepts for teaching students with reading difficulties. In addition, the teachers proposed that realistic expectations of them, more contact with experts, policy changes regarding early identification and interventions, and smaller classes composed of fewer students with exceptionalities in their classrooms would assist their efforts to investigate and try research ideas. However, I have conducted this study precisely because students with reading difficulties are in regular classrooms and have the right to effective instruction in those classrooms. Ideally, reduction of the research and context impediments to research use would enhance teachers' facility to deal with these students in their classrooms.

Furthermore, as I discussed in the section on obstacles in this chapter, the conditions of teachers' work contexts may reflect underlying, systemic power dynamics that I suggest must also be interrogated and resolved in order to support professional learning communities of teachers within schools.

Access to Research

Lastly, the perennial issues of limited access to research or inefficient research dissemination re-emerged as obstacles to overcome in order to advance education research use. These longstanding dilemmas spawned attempts to remedy research transmission in the past, with the discovery that passive diffusion of research did not guarantee its adoption (Thompson et al., 2006). Scholars previously have determined that knowledge utilization needed to be understood in order to enhance it. I attempted to understand teachers' utilization of reading disabilities research with this study; yet, the

discussion has returned again to the problem of dissemination. The teachers stressed that they are amenable to reading and learning about reading disabilities; however, access to research needs to be facilitated in order for it to be used.

Participants suggested that teachers' access to research may be improved through teacher education programs, additional qualification courses, Ministry of Education documents, professional publications, teachers' contacts with researchers, and professional development. The first of these, teacher education programs, which were also identified in the pre-pilot study and in the literature (Broekkamp & van Hout-Wolters, 2007; Joshi et al., 2009; Lyon &Weiser, 2009; Moats, 2009; Sindelar & Brownell, 2001), appear to be logical launching points for the transmission of knowledge about reading disabilities. However, the first hurdle to surmount is teacher educators' seemingly inadequate knowledge of means to effectively instruct pre-service teachers in reading (Joshi et al., 2009). To this end, the International Reading Association (2010) has prepared *Standards for the Reading Professional – Revised 2010* which may be used for teacher education programs. This publication may inform pre-service education in reading instruction; still, both in-service programs and additional qualification courses would be well-advised to include courses on evidence-based identification and instruction of students with reading disabilities as well.

With respect to publications, respondents forwarded that more research on reading disabilities needs to be distributed by the Ministry of Education and publishers of professional sources. In fact, a great deal of research is published by several sources, some of which the teachers had already identified. In addition, CLLRNet (2009a) had distributed informative packages on literacy instruction in the past (e.g., *Foundations for*

literacy: An evidence-based toolkit for the effective reading and writing teacher). Current information such as the monthly bulletin, *What Works? Research into Practice* is dispersed by the Ontario Ministry of Education (2010), and the Ontario Ministry of Education (2005) has published *Education for All: The Report of the Expert Panel on Literacy and Numeracy Instruction for Students with Special Education Needs, Kindergarten to Grade 6* with another for kindergarten to Grade 12 in draft form. Recently, the Elementary Teachers' Federation of Ontario (2010) also encouraged teachers to share their research findings with other educators by way of its website, and the federation posted access to *Teachers' Gateway to Special Education* for current information on special education. Publications are available; but informing educators of the publications requires a concerted effort. The question remains: Who is responsible for informing teachers of the research?

Teachers considered in-school colleagues to be the prime sources for knowledge about reading disabilities, namely special education teachers, administrators and to a lesser extent other specialized teachers and classroom teachers. Outside of school sources, the school board was recommended as a provider of research knowledge. A minority held themselves responsible for acquiring the information and a few suggested the government, other professionals (Speech and Language Pathologists, Psychologists, universities) as potential sources. A reliance on other educators or professionals to locate and share information may however also prove to be unrealistic. For example, according to McLeskey and Billingsley (2008), special education teachers also face such adverse working conditions that they are unable to employ evidence-based practices.

Augmented researcher – school connections were also proposed as means to

transmit and reinforce research use, as was action research. Several successful studies of collaborative research studies with teachers were previously reported in Chapter II with findings that teacher involvement with research did motivate the teachers to employ it. Fischer (2010) agreed that teacher participation by way of "Research Schools" is invaluable for connecting research and practice and for producing practical and useful knowledge. Potential sources of information have been identified; the challenge is to ensure that the sources are in place and that they provide reliable and valid information. Additionally, the collaboration of researchers, teacher educators, and educational leaders could facilitate the dissemination of research knowledge. The teachers have demonstrated awareness of the issue and means to improve it. They need to feel empowered to be a part of solution.

Lastly, professional development efforts have been long-standing as I described in Chapter II; yet, participants in the current study reiterated the dire need for professional development on reading disabilities. In addition, respondents throughout the study stressed that in-service should ideally occur within their schools and by someone with whom they work. The teachers suggested that although experts from outside the school may be beneficial, continuous in-school support in addition to collegial time and networking with other teachers and other schools during school hours would be most effective for their professional growth. They also recommended that more autonomy in planning their own professional development would free them to concentrate on reading disabilities.

With respect to supports for professional learning however, none of the participants mentioned opportunities that Elementary Teachers' Federation of Ontario

and the Ontario Ministry of Education have already offered which might assist teachers' professional development. For example, in 2009-2010, the Elementary Teachers' Federation of Ontario sponsored a *Reflections on Practice* program for women teachers who were interested in action research and participation in a professional learning community. The Ministry of Education also encouraged professional development by way of *The Teacher Learning and Leadership Program* which funded teacher projects for educators either as individuals or as part of a community of practice. These are two additional examples of routes through which teachers might enhance their knowledge about reading disabilities. Once again, the message about such opportunities needs to be transmitted effectively and there is no doubt that professional development providers should consider including more content on reading disabilities.

The strategies for effective professional development are beyond the scope of this discussion; however, researchers such as Klingner (2004) suggested addressing many of the issues that teachers have brought forward. For example, Klingner recommended ongoing assistance and support, positive student outcomes, strong relationships between researchers and teachers, and the feasibility and fit of new teaching methods.

Another consideration, which a few respondents mentioned, was the responsibility of the educators themselves for improving their access to and implementation of reading disabilities research. Phrasing of the questionnaire may have inadvertently contributed to the passive positioning of teachers as recipients of research (e.g., "Who is responsible for communicating research on reading disabilities to teachers?"); however, there were opportunities for teachers to express themselves openly as well (e.g., " Do you have any additional comments…?"). The respondents reported

that they seldom seek information and one stated "It's not expected." Several reported that they were unaware of assessments because they did not administer them and apparently these teachers did not attempt to learn about assessments either. They reported that special education teachers might receive professional development on reading disabilities; but the information does not reach the classroom teachers, implying that someone else controls knowledge. Do teachers see themselves as passive recipients of knowledge, incapable of being proactive and of taking charge of their own learning? If yes, this would appear to be another significant impediment to research use that may require intervention. The longstanding approach to teacher education and teacher management, which have been critiqued by Giroux (1988) and Kincheloe (1993), may have socialized teachers to unwittingly accept much of the present control of knowledge and of their work contexts. How might these dynamics be changed in order to foster "scholarly reflection and practice " (Giroux, 1988, p. 122) by teachers?

In summary, the knowledge utilization framework underpinning this study facilitated the identification of a gap between educational research and teachers' practices, the stages at which underutilization is most prevalent, and the existence of three categories of impediments which lead to understanding how to bridge research and practice. In addition, the teachers provided their views on how to facilitate their implementation of reading disabilities research. Analysis of the existing conditions with a critical perspective also unveiled some underlying factors which enlightened leaders and teachers might consider when attempting to understand and bridge the gap between reading disabilities research and practice. As the first Canadian study that elicited teachers' views on this issue, it is surprising the degree to which the results concurred

with findings in the literature while adding salient points that resonate with Ontario elementary school educators.

Limitations of the Study

Components of this study possess some short-comings that deserve mention. Among these are the limitations of; (a) questionnaires and specifically web-based questionnaires; (b) sampling; and (c) the data.

Questionnaires, such the one in the current study, enlist self-reporting by respondents and this feature presents some difficulties with respect to the validity of the responses. Respondents may interpret the questions inconsistently, and this is "the heart of the problem of questionnaires" (Cohen et al., 2005, p. 251). In addition, the researcher is unable to clarify and probe responses (Gay & Airasian, 2003), or verify the truthfulness of the answers; participants may "deliberately falsify their replies" (Cohen et al., 2005, p. 254). Thirdly, Cohen et al. (2005) forwarded that most individuals prefer to not be extremists; therefore, respondents tend to avoid the "extreme poles at each end of a continuum of rating scales" (p. 254). This inclination was particularly witnessed in the responses to questions on research uses, where the majority of the replies clustered around the choice of "sometimes." This answer is difficult to interpret. Open-ended questions present additional challenges in that responses may be difficult to compare (Cohen et al., 2005). Additionally, the length of the current questionnaire may have discouraged participants from completing all the questions; therefore, the option of selecting questions to answer was given. Consequently, the response rate to the various items varied a great deal. Curiously however, although open-ended questions required more effort and time, the average response rate was greater for the open-ended questions

than the rating questions. An additional issue concerned web-based questionnaires which are acknowledged to have small response rates and the possibility of multiple replies from a single individual (Gay & Airasian, 2003). Lastly, although a paper copy was available, the questionnaire was primarily web-based. Therefore, despite the ubiquitous nature of computers, not everyone has access to the internet, or is capable and interested in engaging with online tasks and this issue may limit the number of participants (Berends, 2006; Gay & Airasian, 2003).

Sampling limitations also determine the inferences that may be made about the target population, which currently was Ontario elementary school teachers. Convenience sampling presented as the best option within the study's time frame to recruit a large and diverse sample. The sample was therefore self-selected which posed a potential problem of participant bias; respondents who voluntarily answered may have been more interested in or more experienced with reading disabilities. Respondent bias may have additionally been introduced by recruitment methods which included ads in the Learning Disabilities Association and the Ontario Branch of the International Dyslexia Association publications. Furthermore, since both school boards and school administrators first screened the study and determined whether to forward it to teachers, the bias may have begun at the stage of the study's approval or disapproval. This initial screening also prohibited calculation of the response rate to the questionnaire; regardless of school boards' approval, principals had the prerogative to anonymously abstain.

The sample size entails another limitation. With a population of approximately 80, 000 elementary school teachers (Ontario Ministry of Education, 2008), a probability sample of 384 teachers is required to generalize the sample statistics to the population at

large with a confidence level of .05 (Teddlie & Tashakorri, 2009, p. 183). The representativeness of the sample of respondents to the questionnaire was also jeopardized by the skewed representation of females, males, special education teachers, and administrative/school board educators. In addition, limited time and the distance between volunteers restricted the focus groups to two groups of four which potentially precluded reaching a saturation of information from the groups. Despite this drawback, from a qualitative viewpoint, rich information was nevertheless generated in answering the research questions.

With respect to the data, the number of missing responses has potential to raise concern about the validity of the findings. However, in Chapter VIII, I detailed my analysis of the missing responses and I determined that the missing data warranted being considered random. No particular group of respondents consistently missed or abstained from replying to the survey questions. The validity of the findings was further supported by triangulation of responses to the research questions; the rating questions, open-ended questions, and the focus groups addressed the three issues of this study and inconsistencies that were discussed above.

Theoretical and Practical Implications

The current study applied a knowledge utilization framework and a critical theoretical perspective to explore the research to practice gap in the identification and instruction of students at risk for reading disabilities. The modified version of Knott and Wildavsky's (1980) eight stages of use were valuable for defining "use" and for identifying the kind of research use that was most problematic. Other studies (e.g., Dagenais et al., 2008; Williams & Coles, 2007) have not defined "use" as explicitly. Nor

have previous studies identified the potential impediments to research use as thoroughly. Stone's (2002) three routes to knowledge use, namely supply, demand and context variables were helpful in suggesting categories of variables and specific variables that may interfere with research use. The categories also lead to adding and classifying variables that obstruct elementary school teachers' implementation of research specifically. Stone's categories additionally aided in classifying the avenues by which research on reading disabilities could be improved. This theoretical framework may be beneficial for continued study of research use in other domains of education as well as in other disciplines.

"Reading is essential for success in our society" (Snow et al., 1998) and if current and effective research-based instruction is not being provided for students with reading disabilities, many individuals have potentially lost the opportunity to be successful. Teachers reported limited access to and utilization of research on reading disabilities. Several obstacles related to teachers' work environments, the research and researchers and to themselves impede their attempts to find and attempt innovations. The findings from this study demonstrated that actions are required to connect teachers with reading disabilities research and to alleviate impediments in order for teachers to effectively instruct students at risk. At minimum, this study has demonstrated that the gap between reading disabilities research and teachers' practices is a current issue that requires attention and that there are practical means to begin rectifying the problem.

In practical terms, therefore, a number of possible interventions arose. Researchers may need to reconsider what they study and how they report research findings that are intended for use by teachers. Teachers want evidence of the research's

success and practical, doable strategies with readily available resources for implementation and assessment. With respect to work contexts, research-informed practices should be shared, modeled, facilitated, and supported by experts and ideally reinforced by way of professional learning communities during school hours. The mindset for such continued professional learning should begin in teacher education programs and thereafter be fostered by the Ministry of Education, school boards, administrators, and teachers. Moreover, research must be accessible. For example, a central body which collects analyses and disperses research on reading disabilities specifically may be called for. Although agencies such as the Learning Disabilities Association, the Ontario Ministry of Education, the Knowledge Mobilization Network and E-Best in Ontario are collecting education research evidence and there may be an abundance of information, the sources appear to be too fragmented and the findings may be too diverse for teachers to independently seek out, evaluate, adopt, and fully implement the most effective evidence-based practices. One location for such research would facilitate access whether for pre-service and in-service teacher educators or for teachers themselves. Linking agents, such as knowledge brokers, may be a solution in connecting teachers with research (Levin, 2003); however, teachers strongly voiced their preferences for experts with whom they are familiar if that is possible. Increased researcher-school connections are yet another possibility. More engagement with explicit knowledge production through collaboration with researchers and by way of practitioner research/action research may contribute to teachers' awareness of and interest in research, and the knowledge they generate may be submitted to a central bank of information to share with others. Coincidentally, simultaneous with the writing of this dissertation, on

November 29, 2010, the Ontario Ministry of Education released a memorandum that it is partnering with two universities to begin collaborative research, the syntheses of educational research and the installment of knowledge brokers. More information about this Knowledge Network for Applied Education Research (KNAER) may be found in Appendix O. In any case, the Ministry of Education, school boards, teacher educators, community agencies and researchers who are invested in improving the utilization of research on reading disabilities should consider the recommendations that teachers proposed in this current study and collaborate with school administrators and educators in order to further research use.

Secondly, the critical standpoint which underpinned the research from start to finish demonstrated that teachers provide valuable insights which should be enlisted to understand and resolve education issues. Noteworthy as well is the unexpected insight that teachers' voices presented regarding their positions in knowledge production and use. They appeared to accept their roles as recipients of research knowledge, and one must question whether this is a problematic reality that should be challenged. McLaren (2007) alerted us to the power relations that are inherent to issues concerning schools, knowledge, teachers and research. Therefore, a critical standpoint requires that we evaluate existing arrangements and consider other possibilities (Calhoun, 1995). I conceptualized teachers as intellectuals who could contribute to our understanding of the gap between reading disabilities research and practice and who could propose solutions for closing the gap. However, several findings indicated that within the work context, teachers have possibly internalized and accepted their roles as recipients and users of researchers' knowledge and of having the dissemination of research about reading

disabilities under the control of others. Are such attitudes instilled in pre-service programs as Giroux (1988) suggested? Are practising educators inadvertently or intentionally socialized to see themselves as users and not producers of knowledge? Do teachers consider the option of seeking, evaluating, or creating knowledge? A few references were made to action research by respondents; however, the same obstacles which prevent their use of research likely restrict action research. On the other hand, do teachers select the teaching profession in preference over engaging with research? In any case, education research is intended to benefit students and it should be reaching classrooms; but systemic changes within education are required to develop a culture of respect and support of teachers as "transformative intellectuals" (Giroux, 1988, p. 122) who are able contribute to the knowledge base and who are willing to learn about and employ research.

In considering the possible interventions and the critical view of the current situation, I have designed a potential action plan that I propose may resolve the gap between research and practice in the identification and instruction of students at risk for reading disabilities. While this plan may appear idealistic, I suggest that it may be financially and practically feasible if the use of reading disabilities research became a government priority. To begin, one national body should be responsible for collecting, reviewing, and synthesizing the most current research on reading disabilities, whether the research is conducted by academic researchers, teachers, or by researcher-teacher collaborators. Concepts for such a body have already been developed (e.g., E-Best, KNAER). In consultation with teachers, the research findings would need to be translated into practical and feasible classroom practices, with consideration given to the varied

classroom compositions and available human and material resources. This central body would also be responsible for disseminating its findings on a regular basis, possibly annually, to faculties of education and to school boards.

Within faculties of education, teacher educators would remain abreast of the most current, evidence-based practices by way of the central body, and the teacher educators would provide instruction in the identification and instruction of students at risk for reading disabilities to pre-service teachers. Faculties of education should also assist pre-service teachers to develop skills for accessing, interpreting, and evaluating research, as well as for conducting practitioner research.

Within school boards, select individuals would ideally be employed as liaisons to receive the current evidence-based practices related to reading disabilities from the central body, and to disseminate the information to schools. One reading disabilities specialist teacher within each school would be appraised of and trained in the current evidence-based practices, and this teacher would subsequently inform, train and support colleagues within her/his school to implement the innovations. Professional learning communities within schools, conducted during school hours, would provide the venues for the transmission and support of innovations on a regular basis, possibly monthly. Such professional learning communities may be arranged by divisions (e.g., primary, junior, intermediate) and be facilitated by the school administration with respect to scheduling of release time. In my role as a literacy teacher, I witnessed the benefits of a school board's focus to improve literacy development in the primary grades. Funding was available from the Ministry of Education for school board consultants to research effective instructional strategies and to train school-based literacy teachers in these

strategies. The literacy teachers returned to their schools to share the information with classroom teachers by modeling and by way of division meetings. Regular division meetings provided opportunities for the teachers to learn, share and problem-solve curricular matters collaboratively. Release time was made possible by grouping classes for music or library, or by having administrators teach in lieu of the classroom teacher. Teachers might also observe each other's classrooms for mutual support and feedback.

Educators may also contribute to the research. As teachers explore innovations that are transmitted to them from a central body, they would provide feedback to the specialist teacher in their school, who in turn would report to the liaison in the school board, who then would report back to the central body regarding the evidence-based practices that had been attempted. Simultaneously, teachers and researchers might also work collaboratively to assess the appropriateness of the current identification and instructional strategies that had been introduced. Teachers would therefore contribute to the most recent body of evidence to improve educational practices in the area of reading disabilities while remaining abreast of the most effective practices.

Suggestions for Further Research

This study has spawned a number of directions which further research may take. To begin, a larger scale study of the same nature might generate more useful data on the issue. In advance of another study, I would recommend that (a) the questionnaire be shortened; (b) that questions be "cleaned up" so that only one concept is being considered (e.g., separate "search" and "find"); (c) that responses to each question be mandatory with "no response" remaining as an option; (d) that questions in the user category of obstacles be revised and a better inter-item reliability be established for this category; and

(e) that a pilot study be conducted to test the theoretical construct of the questionnaire by way of a factor analysis.

The format and methodology of the current study may also be replicated in investigations of research use in other curricular areas of education, disciplines, cultures, and nationally or internationally. As an adjunct to the survey and focus group research, further study of this issue may include classroom observations of literacy practices. In addition, the impact of efforts to alleviate the identified barriers to research use such as enhanced pre-service education, in-service programs, researcher-teacher collaborations, in-school experts, professional learning communities, and syntheses of current evidence-based practices might be explored. As well as the recommendations by teachers, several studies in the literature suggested models of professional development that might be investigated with respect to improving educators' knowledge and implementation of evidence-based identification and instruction strategies for students with reading disabilities.

Final Thoughts

The current study revealed a significant divide between available research on reading disabilities and teachers' knowledge and utilization of this information due to a multiplicity of issues. Consequently, school children at risk for reading disabilities are potentially underserviced and they are in jeopardy of not achieving to their potential. Continued study is needed to understand the state of this dilemma more thoroughly and to conceive of means to rectify it. I also recommend that teachers continue to be involved in the research of classroom practices. This study has demonstrated that their perspectives are invaluable for identifying the issues and prospective solutions.

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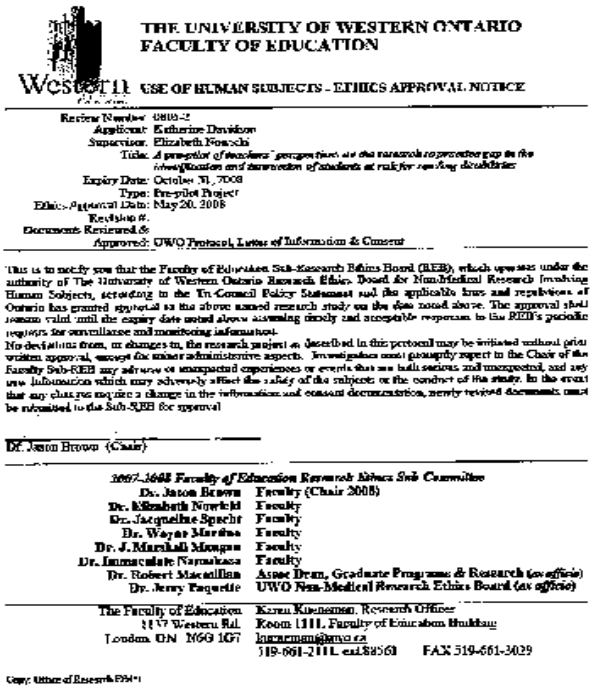
Appendix A

Ethics Approval for Pilot Study



THE UNIVERSITY OF WESTERN ONTARIO
FACULTY OF EDUCATION

Western

USE OF HUMAN SUBJECTS - ETHICS APPROVAL NOTICE

Review Number: 0808-2
Applicant: Katherine Davidson
Supervisor: Elizabeth Nowicki
Title: *A perception of teachers' perspectives on the research to prevention gap in the identification and intervention of students at risk for reading disabilities*
Expiry Date: October 31, 2008
Type: Pre-pilot Project
Ethics Approval Date: May 20, 2008
Revision #:
Documents Reviewed & Approved: UWO Protocol, Letter of Information & Consent

This is to notify you that the Faculty of Education Sub-Research Ethics Board (REB), which operates under the authority of The University of Western Ontario Research Ethics Board for Non-Medical Research Involving Human Subjects, according to the Tri-Council Policy Statement and the applicable laws and regulations of Ontario has granted approval to the above named research study on the date noted above. The approval shall remain valid until the expiry date noted above assuming timely and acceptable responses to the REB's periodic requests for surveillance and monitoring information.

No deviations from, or changes to, the research project as described in this protocol may be initiated without prior written approval, except for minor administrative aspects. Investigators must promptly report to the Chair of the Faculty Sub-REB any adverse or unexpected experiences or events that are both serious and unexpected, and any new information which may adversely affect the safety of the subjects or the conduct of the study. In the event that any changes require a change in the information and consent documentation, newly revised documents must be re-submitted to the Sub-REB for approval

Dr. Jason Brown (Chair)

2007-2008 Faculty of Education Research Ethics Sub Committee

Dr. Jason Brown	Faculty (Chair 2008)
Dr. Elizabeth Nowicki	Faculty
Dr. Jacqueline Specht	Faculty
Dr. Wayne Martino	Faculty
Dr. J. Marshall Mougon	Faculty
Dr. Immaculate Namukasa	Faculty
Dr. Robert Macmillan	Assoc Dean, Graduate Programs & Research (ex officio)
Dr. Jerry Paquette	UWO Non-Medical Research Ethics Board (ex officio)

The Faculty of Education
1137 Western Rd.
London, ON N6G 1G7

Karen Kinnear, Research Officer
Room 1111, Faculty of Education Building
kkinnear@uwo.ca
519-661-2111 ext.88561 FAX 519-661-3029

Copy: Office of Research ES#1

Appendix B

Letter of Information for the Pre-pilot Study

Introduction

My name is Katherine Davidson and I am a Ph.D. student at the Faculty of Education at The University of Western Ontario. I am currently conducting an investigation of teachers' perspectives on how teachers use and conduct research and what obstacles make the use and conducting of research difficult. I will be asking about the use of research related specifically to the identification and instruction of students at risk for reading disabilities. I would like to invite you to participate in this pre-pilot project.

Purpose of the pre-pilot project

The aims of this project are to learn about the ways that teachers acquire research information, how they use the information, how teachers produce their own knowledge, and what factors make the use and production of knowledge difficult for teachers. This information will be useful in designing a questionnaire for teachers.

If you agree to participate

If you agree to participate in this study you will be asked to respond to seven basic questions. The interview will be audio-taped and will take up to 30 minutes. The location and time of the interview will be at your convenience. At the conclusion of the project, you will receive a report of the findings.

C**onfidentiality**

The information collected will be used for research purposes only, and neither your name nor information which could identify you will be used in any publication or presentation of the project results. All information collected for the project will be kept confidential. The audio-tape and the transcribed interview will be secured in a locked filing cabinet for five years after the findings have been used for designing a questionnaire and after the study has been published. After five years, the tape will be disposed of in a magnetic disposal, and the paper copy of the interview will be shredded.

Risks & Benefits

There are no known risks to participating in this study.

Voluntary Participation

Participation in this study is voluntary. You may refuse to participate, refuse to answer any questions or withdraw from the study at any time with no effect on your employment status.

Questions

If you have any questions about the conduct of this study or your rights as a research participant you may contact the Manager, Office of Research Ethics, The University of Western Ontario at XXXX or XXXXX If you have any questions about this study, please contact Katherine Davidson at XXXX or Dr. Elizabeth Nowicki at XXXX.

This letter is yours to keep for future reference.

Katherine Davidson

Appendix C

Consent Form for the Pre-pilot Study

A Pre-pilot Investigation of Teachers' Perspectives on the Research to Practice Gap in the Identification and Instruction of Students at Risk for Reading Disabilities

Katherine Davidson, Ph.D. Student; Dr. Elizabeth Nowicki, Supervisor

Consent Form

I have read the Letter of Information, have had the nature of the study explained to me, and I agree to participate. All questions have been answered to my satisfaction.

Name (please print):

Signature: Date:

Name of Person Obtaining Informed Consent:

Signature of Person Obtaining Informed Consent:

Date:

Appendix D

The Questionnaire

The Research to Practice Gap in the Identification and Instruction of Students at Risk for Reading Disabilities: Teachers' Perspectives

Survey Questionnaire

Directions:
Before completing this questionnaire, please read the letter of information.
On completion, please return the survey to Katherine Davidson in the enclosed envelope.

Part A: Respondent

1. Please indicate your current teaching position: _____

2. Please indicate the number of years you have been teaching in this position: _____

3. How long have you been teaching in total? _____

4. Please list other teaching positions that you have held and the numbers of years spent in each:
   Teaching position: _____ number of years: _____
   Teaching position: _____ number of years: _____
   Teaching position: _____ number of years: _____
   Teaching position: _____ number of years: _____
   Teaching position: _____ number of years: _____

5. What is your age? _____

6. Please indicate the degrees that you have obtained:
   Bachelor's (B.A. /B.Sc.)____ Major: _____ Ph.D./Ed/D._____ Major:_____
   Bachelor of Education ____ Other_____ No response_____
   Master's ____ Major: _____

7. Are you female_____ or male _____? No response_____

8. Do you teach in the public system ____, separate system ____, or private system____
   or no response___

Part B: Reading Disabilities

1. How confident do you feel about being able to identify students who are at risk for reading disabilities?

Very Confident	Somewhat Confident	Somewhat Non-confident	Not at all Confident	No response
○	○	○	○	○

2. How confident do you feel about teaching students who are at risk for reading disabilities?

Very Confident	Somewhat Confident	Somewhat Non-confident	Not at all Confident	No response
○	○	○	○	○

3. At what age should students be identified for being at risk for reading disabilities?

4. List the main characteristics that are exhibited by a student who is at risk for or who has a reading disability:

5. What assessments are used to identify students who are at risk for reading disabilities? List them here:

6. What instructional methods would you use to teach reading to someone who is at risk for or who has a reading disability? List up to five:

Part C: Use of Research

In the following sections, *research* refers to:
Evidence of means to identify and instruct students who are at risk for or who have a reading disability; these means have been shown to be effective by multiple methods and/or studies.

How often do you do the following?	Very Often	Often	Sometimes	Seldom	Never	No Response
1. Receive research about reading disabilities.	○	○	○	○	○	○
2. Search for and find research about reading disabilities	○	○	○	○	○	○

	Very Often	Often	Sometimes	Seldom	Never	No Response
3.Read and understand research about reading disabilities	◯	◯	◯	◯	◯	◯
4. Find that research about reading disabilities changes my views and/or I discuss research about reading disabilities with others	◯	◯	◯	◯	◯	◯
5. Try some ideas from research about reading disabilities	◯	◯	◯	◯	◯	◯
6. Plan to put ideas from research on reading disabilities into policy for my programming	◯	◯	◯	◯	◯	◯
7. Implement ideas from research on reading disabilities(more than in 5)	◯	◯	◯	◯	◯	◯
8. Implement ideas from research on reading disabilities with the desired results	◯	◯	◯	◯	◯	◯

Please list the most common three sources for information about reading disabilities that you use, starting with the most frequently used source:

_____

_____

_____

Part D: Obstacles

Please indicate the degree to which you agree with the following statements:	Strongly Agree	Agree	Disagree	Strongly Disagree	No Response
1. There is enough research on identifying students at risk for reading disabilities	◯	◯	◯	◯	◯
2. There is enough research on instructing students at risk for/with reading disabilities	◯	◯	◯	◯	◯
3. Research on reading disabilities is easy to locate	◯	◯	◯	◯	◯

	Strongly Agree	Agree	Disagree	Strongly Disagree	No Response
4. Researchers of reading disabilities do not understand what teachers need	◯	◯	◯	◯	◯
5. Researchers of reading disabilities communicate their findings well to teachers	◯	◯	◯	◯	◯
6. Research on reading disabilities is easy to understand	◯	◯	◯	◯	◯
7. The language used in research on reading disabilities is too technical	◯	◯	◯	◯	◯
8. Research reports on reading disabilities use too many statistics	◯	◯	◯	◯	◯
9. Professional development sessions provide research on reading disabilities	◯	◯	◯	◯	◯
10. Research on reading disabilities is transmitted to teachers in ways that make the research easy to apply	◯	◯	◯	◯	◯
11. Research on reading disabilities is useful and practical	◯	◯	◯	◯	◯
12. The methodologies used in research on reading disabilities are incompatible with my beliefs	◯	◯	◯	◯	◯
13. I am unaware of the research about reading disabilities	◯	◯	◯	◯	◯
14. I know where to find current research on reading disabilities	◯	◯	◯	◯	◯
15. I think that research on reading disabilities is valuable	◯	◯	◯	◯	◯
16. I am able to interpret research on reading disabilities in order to use it	◯	◯	◯	◯	◯
17. My teacher education has not prepared me to interpret research on reading disabilities to improve my practice	◯	◯	◯	◯	◯
18. University courses other than in teacher training have prepared me to interpret research	◯	◯	◯	◯	◯

	Strongly Agree	Agree	Disagree	Strongly Disagree	No Response
19. I use research on reading disabilities without modifying it or adjusting it to my practices	◯	◯	◯	◯	◯
20. I would like to know more about research on reading disabilities	◯	◯	◯	◯	◯
21. I am willing to change my practices in order to adopt research about reading disabilities	◯	◯	◯	◯	◯
22. My responsibilities outside of school do not allow me to seek or try research on reading disabilities	◯	◯	◯	◯	◯
23. My teaching schedule permits me to search for and try research on reading disabilities	◯	◯	◯	◯	◯
24. Curriculum expectations do not give me time to find and try research on reading disabilities	◯	◯	◯	◯	◯
25. The students that I teach allow me to search for and try research on reading disabilities	◯	◯	◯	◯	◯
26. Researchers of reading disabilities are not connected with teachers and schools	◯	◯	◯	◯	◯
27. Research on reading disabilities is incompatible with my school context	◯	◯	◯	◯	◯
28. I am encouraged to learn about reading disabilities	◯	◯	◯	◯	◯
29. Funding is available for me to search for and try research ideas about reading disabilities	◯	◯	◯	◯	◯
30. I have supplies to support the use of research on reading disabilities	◯	◯	◯	◯	◯
31. I do not have support from others to help me use research on reading disabilities	◯	◯	◯	◯	◯
32. There are external incentives for me to try research ideas about reading disabilities	◯	◯	◯	◯	◯

Part E: Research to Practice

What unanswered questions do you have about reading disabilities?

Who is responsible for communicating research on reading disabilities to teachers?

How is research on reading disabilities made convincing to you?

What makes research on reading disabilities difficult to apply?

What factors would facilitate your use of research on reading disabilities?

Part E: Other

Do you have any additional comments about this survey or the use of research on reading disabilities by teachers?

Are you willing to participate in a 1 to 1 ½ hour group discussion about these results with 4-5 other teachers? If yes, please email Kathe Davidson at: . THANK YOU!

Appendix E

Ethics Approval for the Pilot Study and Core Study

THE UNIVERSITY OF WESTERN ONTARIO
FACULTY OF EDUCATION

USE OF HUMAN SUBJECTS - ETHICS APPROVAL NOTICE

Review Number: 0812 2
Applicant: Katherine Davidson
Supervisor: Elizabeth Nowicki
Title: *The research to practice gap in the identification and instruction of students at risk for reading disabilities: teachers' perspectives*
Expiry Date: December 31, 2009
Type: PhD Thesis
Ethics Approval Date: December 11, 2008
Revisions:
Documents Reviewed & UWO Protocol, Letter of Information & Consent, Invitations, Advertisements and Approved: Reminders

This is to notify you that the Faculty of Education Sub Research Ethics Board (REB), which operates under the authority of The University of Western Ontario Research Ethics Board for Non-Medical Research Involving Human Subjects, according to the Tri-Council Policy Statement and the applicable laws and regulations of Ontario has granted approval to the above named research study on the date noted above. This approval shall remain valid until the expiry date noted above assuming timely and acceptable responses to the REB's periodic requests for surveillance and monitoring information.
No deviations from, or changes in, the research project as described in this protocol may be initiated without prior written approval, except for minor administrative aspects. Investigators must promptly report to the Chair of the Faculty Sub REB, any adverse or unexpected experiences or events that are both serious and unexpected, and any new information which may adversely affect the safety of the subjects or the conduct of the study. In the event that any changes require a change in the information and consent documentation, newly revised documents must be submitted to the Sub-REB for approval.

Dr. Jason Brown (Chair)

2008-2009 Faculty of Education Sub-Research Ethics Board

Dr. Jason Brown	Faculty (Chair)
Dr. Elizabeth Nowicki	Faculty
Dr. Jacqueline Specht	Faculty
Dr. John Barnett	Faculty
Dr. J. Marshall Morgan	Faculty
Dr. Immaculate Namukasa	Faculty
Dr. Robert Macmillan	Assoc Dean, Graduate Programs & Research (*ex officio*)
Dr. Jerry Paquette	UWO Non-Medical Research Ethics Board (*ex officio*)

The Faculty of Education
1137 Western Rd.
London, ON N6G 1G7

Karen Kuenemann, Research Officer
Faculty of Education Building
kuenemann@uwo.ca
519-661-2111, ext 88561 FAX 519-661 3029

Dept: Office of Research Ethics

Appendix F

Introductory Email for the Pilot Study

I am now conducting a pilot study of a survey questionnaire on teachers' uses of research on reading disabilities and obstacles to teachers' uses of reading disability research. I am requesting your help at this point, to determine whether this questionnaire answers my research questions, whether any of the items are clear or ambiguous, whether the questionnaire is easy to complete, and how long it takes. A letter of information about this pilot study is attached. The link to the online survey is included in the letter of information. A paper version of the questionnaire is also available if you prefer. You may email me at XXXX to request a hard copy. I will mail it to you with a stamped self-addressed envelope if you provide me with your mailing address. I hope to receive the completed questionnaires by January 30, 2009. I will email you again in two weeks as a reminder.

If you have one or two colleagues who are elementary school teachers and who would like to participate in this pilot study, please have them email me, and I will send the information to them.

Thank you very much.

Appendix G

Letter of Information for the Pilot Study

The Research to Practice Gap in the Identification and Instruction of Students at Risk for Reading Disabilities: Teachers' Perspectives
A Pilot Study

LETTER OF INFORMATION

Introduction

My name is Katherine Davidson and I am a Ph.D. student at the Faculty of Education at The University of Western Ontario. I am currently conducting a pilot study of a survey questionnaire about teachers' uses of research related specifically to the identification and instruction of students at risk for reading disabilities. I would like to invite you to participate in this pilot study.

Purpose of the pilot study

The aims of this study are to test the clarity and convenience of an on-line survey questionnaire about the ways that teachers acquire research information, how they use the information, and what factors make the use research knowledge difficult for teachers. Are the items on the survey questionnaire clear? Does the questionnaire take a reasonable amount of time to complete? This study is also assessing the quality of information that the questionnaire generates.

If you agree to participate

If you agree to participate in this study you will be asked to respond to a survey questionnaire and to provide your feedback about the quality of the questions and the length of the survey. The survey should take no longer than 30 minutes. The location and time of the survey completion will be at your convenience by January 30, 2009. The survey questionnaire may be completed on-line at XXXX, or you may request a paper copy from the researchers directly. Completion and return of the questionnaire indicates your consent to participate in this study.

C**onfidentiality**

The information collected will be used for research purposes only, and neither your name nor information which could identify you will be used in any publication or presentation of the project results. All information collected for the project will be kept confidential. The completed on-line survey will be password protected and available only to the researcher. Paper copies of completed surveys will be secured in a locked filing cabinet during the study and for five years after the findings have been used for designing a final questionnaire. After five years, the paper copies of the survey will be shredded and electronic data will be destroyed in a manner that maintains the confidentiality of the data.

Risks & Benefits

There are no known risks to participating in this study.

Voluntary Participation

Participation in this study is voluntary. You may refuse to participate, refuse to answer any questions or withdraw from the study at any time with no effect on your employment status.

Questions

If you have any questions about the conduct of this study or your rights as a research participant you may contact the Manager, Office of Research Ethics, The University of Western Ontario at XXXX or XXXX. If you have any questions about this study, please contact Katherine Davidson at XXXX or XXXX, or Dr. Elizabeth Nowicki at XXXX. This letter is yours to keep for future reference.

Katherine Davidson

Appendix H

Coding of Pilot Study Demographic Data and Rating Question Responses

Table H1

Codes for Teaching Positions

Teaching position	Code
Other (supply, itinerant)	1
Primary (Grade JK-3)	2
Junior (Grade 4-6)	3
Intermediate (Grade 7-8)	4
Specialized (special education, Literacy, ESL)	5
Administration (principal, Vice-principal)/School Board	6

Note. ESL means English as a Second Language

Table H2

Codes for Types of School Systems

School System	Code
Public	1
Separate (Catholic)	2
Private	3

Table H3

Codes for Gender

Gender	Code
Female	1
Male	2

Table H4

Codes for Highest Level of University Degree Earned

University Degree	Code
Bachelor's (Arts, Science) 3 year	1
Bachelor's, Honours	2
Master's	3
Doctorate	4

Table H5

Codes for Levels of Confidence (Questions 9 and 10)

Level of confidence	Code
Very confident	4
Somewhat confident	3
Somewhat nonconfident	2
Not at all confident	1
No response	0

Table H6

Codes for Frequency of Research Use (Question 15)

Frequency of research use	Code
Very often	5
Often	4
Sometimes	3
Seldom	2
Never	1
No response	0

Table H7

Codes for Degree of Agreement with Statement Regarding Obstacles to Research Use (Questions 17, 18, and 19)

Degree of agreement	Code
Strongly agree	5
Agree	4
Neither agree nor disagree	3
Disagree	2
Strongly disagree	1
No response	0

Appendix I

Ad for the Questionnaire

Thank you for agreeing to inform elementary school teachers of my survey questionnaire.
Please post the following and the attached letter of information:

Is research about reading disabilities reaching teachers, and can the research be used in classrooms?
If you are an elementary school teacher in Ontario, you are invited to respond to a survey about the accessibility and use of research on reading disabilities. To what extent is research on identifying and instructing students who are at risk for reading disabilities available to teachers? To what extent can the research be used, and what are the obstacles to research use?
You can provide insight toward understanding the degree to which there is a divide between available research on reading disabilities and its use, reasons for a divide, and how a divide could be bridged.
Connect to the on-line survey at XXXX. Please read the letter of
information on the first page before beginning the survey.
This survey will be open from March 2, 2009 to June 1, 2009.
If you prefer a hard copy of the survey questionnaire, please request one from the researcher and provide your mailing address. A paper format will be sent to you with a stamped, self-addressed envelope.
Thank you for participating!

For additional information and results contact: Katherine Davidson at XXXX or
Dr. Elizabeth Nowicki at XXXX.

Appendix J

Letter of Information for the Core Questionnaire

The Research to Practice Gap in the Identification and Instruction of Students at Risk for Reading Disabilities: Teachers' Perspectives

LETTER OF INFORMATION

Introduction

My name is Katherine Davidson and I am a Ph.D. student at the Faculty of Education at The University of Western Ontario. I am currently conducting an investigation of teachers' uses of research related specifically to the identification and instruction of students at risk for reading disabilities. I would like to invite you to participate in this research.

Purpose of the study

The aims of this study are to elicit teachers' views on the identification and instruction of students at risk for reading disabilities, on how they acquire research information about identifying and instructing students at risk for reading disabilities, on how they use the information, and on what factors make the use research knowledge difficult for teachers. The information provided by teachers may promote a better understanding of the extent of and reasons for a gap between research and practice in the area of reading disabilities, and means to bridge a gap.

If you agree to participate

To participate in this study, you will be asked to complete a survey questionnaire which should take no longer than 30 minutes. The on-line survey will be open from March 1, 2009 to June 1, 2009. If you would prefer to complete a paper copy, please contact the researchers directly. The location and time of the survey completion will be at your convenience. Completion and return of the survey questionnaire indicates your consent to participate in this study.

You will also be asked to consider participating in an optional follow-up group interview. If you would like to have more information about this part of the study or would like to volunteer, you may email the researchers.

C**onfidentiality**

The information collected will be used for research purposes only, and neither your name nor information which could identify you will be used in any publication or presentation of the project results. All information collected for the project will be kept confidential. The completed on-line survey will be password protected and available only to the researcher. Paper copies of completed surveys and data on compact discs will be secured in a locked filing cabinet during the study and for five years after the findings have been published. After five years, the paper copies of the survey will be shredded and compact discs and electronic data will be destroyed in a manner that maintains the confidentiality of the data.

Risks & Benefits

There are no known risks to participating in this study.

Voluntary Participation

Participation in this study is voluntary. You may refuse to participate, refuse to answer any questions or withdraw from the study at any time with no effect on your employment status.

Questions

If you have any questions about the conduct of this study or your rights as a research participant you may contact the Manager, Office of Research Ethics, The University of Western Ontario at XXXX or XXXX. If you have any questions about this study, please contact Katherine Davidson at: XXXX or XXXX, or Dr. Elizabeth Nowicki at XXXX or XXXX..

Katherine Davidson

Appendix K

Revised Focus Group Consent Form for One School Board

The Research to Practice Gap in the Identification and Instruction of Students at Risk for Reading Disabilities: Teachers' Perspectives
Focus Group
Katherine Davidson, Ph.D. Student; Dr. Elizabeth Nowicki, Supervisor

CONSENT FORM

I have read the Letter of Information and I have had the nature of the study explained to me.

Please check beside the appropriate statements:

a. ___ I agree to participate in this study or

___ I do **not** agree to participate in this study

b. ___ I consent to being **audio-taped** during the interview or

___ I do **not** consent to being **audio-taped** during the interview

All questions have been answered to my satisfaction.

Name (please print):

Signature: Date:

Name of Person Obtaining Informed Consent:

Signature of Person Obtaining Informed Consent:

Date:

Appendix L

Reminder Email for the Core Questionnaire

Dear Principal,
On _____ I contacted you about my study of teachers' uses of research on reading disabilities. A survey questionnaire is available for the teachers complete either on-line at XXXX or in hard copy if they prefer. The intended deadline for this survey is June 30, 2009. I would appreciate it very much if you would draw the teachers' attention to this survey once more.
If any teacher would prefer to be interviewed to complete this survey, please give the teacher my email address to make arrangements: XXXX.

Appendix M

Letter of Information for Focus Groups

The Research to Practice Gap in the Identification and Instruction of Students at Risk for Reading Disabilities: Teachers' Perspectives
Focus Group

LETTER OF INFORMATION

Introduction
My name is Katherine Davidson and I am a Ph.D. student at the Faculty of Education at The University of Western Ontario. I am currently conducting an investigation of teachers' uses of research related specifically to the identification and instruction of students at risk for reading disabilities. I would like to invite you to participate in the focus group component of this study.

Purpose of the study focus group
The aims of this study are to elicit teachers' views on the identification and instruction of students at risk for reading disabilities, on how they acquire research information about identifying and instructing students at risk for reading disabilities, on how they use the information, and on what factors make the use research knowledge difficult for teachers. Teachers' responses to a survey questionnaire on these matters have been compiled. The focus group of teachers will assist in interpreting, clarifying, validating, and possibly expanding on the survey results.

If you agree to participate
If you agree to participate in a focus group, you will be asked to take part in a 1-1 ½ hour group discussion of the survey results. The discussion will be digitally audio-recorded and transcribed into written format. The researcher will record written notes. The location and time of the focus group will be arranged at the group members' convenience.

C**onfidentiality**
The information collected will be used for research purposes only, and neither your name nor information which could identify you will be used in any publication or presentation of the project results. Participants in the focus group will be instructed to maintain confidentiality with respect to everything discussed during the group meeting. All information collected for the project will be kept confidential; the recording and the transcriptions on the computer will be protected by a password. The digital audio-recording will also be deleted from the recorder and saved on a compact disc. The compact disc, the transcriptions, and the written notes will be secured in a locked filing cabinet during the study and for five years after the findings have been published. After five years, the compact disc and electronic recordings will be destroyed in a manner that maintains the confidentiality of the data. Paper transcriptions and notes will be shredded.

Risks & Benefits There are no known risks to participating in this study.

Voluntary Participation
Participation in this study is voluntary. You may refuse to participate, refuse to answer any questions or withdraw from the study at any time with no effect on your employment status.

Questions
If you have any questions about the conduct of this study or your rights as a research participant you may contact the Manager, Office of Research Ethics, The University of Western Ontario at XXXX or XXXX. If you have any questions about this study, please contact Katherine Davidson at XXXX or XXXX, or Dr. Elizabeth Nowicki at XXXX or XXXX. This letter is yours to keep for future reference.

Katherine Davidson

Appendix N

Consent Form for Focus Groups

The Research to Practice Gap in the Identification and Instruction of Students at Risk for Reading Disabilities: Teachers' Perspectives
Focus Group
Katherine Davidson, Ph.D. Student; Dr. Elizabeth Nowicki, Supervisor

CONSENT FORM

I have read the Letter of Information, have had the nature of the study explained to me, and I agree to participate. All questions have been answered to my satisfaction.

Name (please print):

Signature: Date:

Name of Person Obtaining Informed Consent:

Signature of Person Obtaining Informed Consent:

Date:

Appendix O

Knowledge Network for Applied Education Research Memorandum

Ministry of Education Ministère de l'Éducation
Deputy Minister Sous-ministre
Mowat Block Édifice Mowat
Queen's Park Queen's Park
Toronto ON M7A 1L2 Toronto ON M7A 1L2
Telephone (416) 325-2600 Téléphone (416) 325-2600
Facsimile (416) 327-9063 Télécopieur (416) 327-9063

MEMORANDUM TO: Directors of Education
Deans of Education
FROM: Kevin Costante
Deputy Minister
DATE: November 25, 2010

SUBJECT: Knowledge Network for Applied Education Research
I am pleased to inform you of the establishment of a collaborative partnership among the Ministry of Education, the University of Toronto and the University of Western Ontario called the Knowledge Network for Applied Education Research (KNAER).
The KNAER will focus on building, advancing and applying robust evidence of effective practices through conducting research, synthesizing state-of-the-art knowledge from existing bodies of evidence (from Ontario and beyond) and facilitating networks of policy-makers, educators and researchers working collaboratively to apply research-to practice. It will also act as a 'knowledge broker' to facilitate and lead the spread of established and new evidence through networks across Ontario's policy, education and research communities, as well as connecting with national and international networks.
The establishment and operation of the KNAER will support the Ministry's commitment to develop and implement policies, programs, and practices that are evidence-based, research-informed, and connected to provincial education goals.
Systematic identification, widespread dissemination and consistent implementation of effective and promising practices is critical to meeting these commitments to high levels of student achievement, reduced gaps in performance, and increased public confidence in publicly-funded education.

Ministry responsibility for the KNAER will be led by the Education Research and Evaluation Strategy Branch of the French-Language, Aboriginal Learning and Research Division.

Governance of the KNAER in terms of providing strategic direction and approving applied education research and knowledge mobilization initiatives will be carried out through a Planning and Implementation Committee co-chaired by:

• Dr. Raymond Théberge, Assistant Deputy Minister, French-Language, Aboriginal Learning and Research Division, Ministry of Education;
• Dr. Ben Levin (Director, KNAER), Professor and Canada Research Chair in Education Leadership and Policy at the Ontario Institute for Studies in Education, University of Toronto; and
• Dr. Robert B. Macmillan (KNAER Associate Director), Associate Professor and Associate Dean (Graduate Programs and Research) of the University of Western

Ontario.

In order to move forward with the development of a strategic plan to March 31, 2012, the KNAER will be consulting with education stakeholders over the coming weeks. The focus of this consultation will be to solicit both ideas and participation regarding the development and dissemination of advanced knowledge and applied education research to support effective practices at all levels of the education system.

The KNAER will focus particularly on four areas: building and supporting collaborative networks, building research capacity and use in schools, mobilizing existing bodies of knowledge in priority areas, and supporting collaborative applied research in priority areas where the knowledge base needs further development.

The ministry is planning a formal launch of the Knowledge Network for Applied Education Research in January 2011. In the meantime, if you have questions regarding the KNAER, I invite you to contact Raymond Théberge, Assistant Deputy Minister, French-Language, Aboriginal Learning and Research Division or Doris McWhorter, Director (Acting), Education Research and Evaluation Strategy Branch, doris.mcwhorter@ontario or by phone 416-314-3819.

Original Signed
Kevin Costante
Deputy Minister
cc: Minister's office
ADMs
Doris McWhorter, ERESB
Ben Levin, OISE
Robert Macmillan, UWO
Carol Baynon, UWO
Julia O'Sullivan, OISE
Dan Sanai, UWO
Normand Labrie, OISE

VITA

Name: Katherine Davidson

Post-secondary Education and Degrees:

The University of Western Ontario
London, Ontario, Canada
1970-1974 B.Sc. (Occupational Therapy)

The University of Western Ontario
London, Ontario, Canada
1980-1985 M.Ed.

The University of Western Ontario
London, Ontario, Canada
1991-1992 B.Ed.

The University of Western Ontario
London, Ontario, Canada
2006-2011 Ph.D.

Honours and Awards:

Dean's Honour List 1973, 1974, 1985, 1992
W. A. Townsend Award (M.Ed.) 1985
Western Graduate Research Scholarship 2006, 2007, 2008, 2009
Jessica Jean Campbell Coulson Research Award 2008
Centre for Inclusive Education Research Award 2008
Province of Ontario Graduate Scholarship 2008, 2009

Scholarly Contributions:

Publications

Davidson, T. & Davidson, K. (2010). Leamington, Ontario; Bloom or bust. *Canadian Dimension*, 33 (5), 32-34.

Davidson, K. (2010). The integration of cognitive and sociocultural theories of literacy development for instruction and research: Why? How? *Alberta Journal of Educational Research*, 56 (3), 246-256.

Presentations

Davidson, K. (2007). The University of Western Ontario Faculty of Education Research Day, London, Ontario. Poster: Concepts About Print: Psychometrics and role in early reading.

Davidson, K. (2008). The University of Western Ontario Faculty of Education Research Day, London, Ontario.
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Poster: The research to practice gap in the identification and instruction of students at risk for reading disabilities: A research proposal.

Davidson, K. (2008). Canadian Society for the Study of Education Conference, University of British Columbia, Vancouver, British Columbia. Round table: A family literacy nights program: Impact on parental attitudes and behaviours – a research proposal.

Davidson, K. (2008).Thinking Qualitatively 2008 Conference, Edmonton, Alberta. Poster: The role of qualitative methods in the study of teachers' perspectives on the research to practice gap in education.

Davidson, K. (2008). International Dyslexia Association Conference, Seattle, Washington. Poster: The neuroscience of reading: Implications for education.

Davidson, K. (2009). Canadian Language and Literacy Research Network Student Networking Conference, Ottawa, Ontario. Round table: The research to practice gap in the identification and instruction of students at risk for reading disabilities: Teachers' perspectives – a research project in progress.

Davidson, K & Nowicki, E. (2009) Canadian Society for the Study of Education Conference, Ottawa. Paper: The gap between reading disabilities research and practice: A knowledge utilization framework.

Davidson, K. (2010). Centre for Inclusive Education Research Hour, Faculty of Education, The University of Western Ontario, London, Ontario. Paper: A pilot study of teachers' views on the research to practice gap in the identification and instruction of students
at risk for reading disabilities.

Davidson, K. (2010). Ontario Ministry of Education Research Symposium, Toronto, Ontario. Poster: A collaborative study of the impact of a summer literacy program for at-risk Grade 1 students.

Davidson, K. (2010). University of Western Ontario Research in Education Symposium, London, Ontario. Round table: Teachers views of themselves as researchers.

Davidson, K. (2010). Ontario Teachers Federation/Ontario Association of Deans of Education Conference, Toronto, Ontario. Paper: What teachers want to know about reading disabilities; Implications for professional development and pre-service programs.

Davidson, K. (2010). Canadian Society for the Study of Education Conference, Montreal, Quebec. Paper: Connecting home and school: The impact of a summer literacy program on the home literacy activities of at-risk Grade 1 students.

Davidson, K. (2010). International Dyslexia Association Annual Conference, Phoenix, Arizona. Paper: The gap between reading disabilities research and practice: Teachers' views on the issues.

Work Experience:

Occupational Therapist
University Hospital, London, Ontario
1974-1977

Occupational Therapy Field Placement Coordinator
The University of Western Ontario, London, Ontario
1977-1978

Occupational Therapist
CPRI, London, Ontario
1979, 1983

Sessional Lecturer
Occupational Therapy, The University of Western Ontario, London, Ontario
1987-1988

Occupational Therapist, School Health Support Services
CPRI, London, Ontario
1986-1990

Research Assistant
Occupational Therapy, The University of Western Ontario
London, Ontario
1990

Special Education Withdrawal Teacher
Middlesex County School Board
1992-1993

Classroom Teacher, Grade 6/7
Middlesex County School Board
1993-1995

Learning Resource Teacher
Middlesex County School Board
1995-1998

Learning Support Teacher
Thames Valley District School Board
1998-2000

Literacy Teacher/Learning Support Teacher
Thames Valley District School Board
2001-2007 (leave of absence 2005-2007)

Teaching Assistant/lecturer
Faculty of Education, The University of Western Ontario
London, Ontario
2007-2008

Research Assistant
Faculty of Education, The University of Western Ontario
London, Ontario
2009

Teaching Assistant
Faculty of Education, The University of Western Ontario
London, Ontario
2009-2010

Limited Duties Instructor
Faculty of Education, The University of Western Ontario
London, Ontario
2010-2011

Researcher
Avon Maitland District School Board
2011