Change in the Knowledge and Practices of Literacy:
Professional Development for Primary Teachers

by

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A thesis submitted in conformity with the requirements for the degree of Master of Arts
Department of Curriculum, Adaptive Instruction
Ontario Institute for Studies in Education of the
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Master of Arts, 1999

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Abstract

This study assessed the effects of a professional development program focused on specific concepts of literacy and delivered through an approach designed to encourage the implementation of these concepts in the classroom. The focus of the study was on possible changes in teachers' knowledge, beliefs, and practices as a result of their participation in the professional development sessions. The study involved post-treatment interviews about the self-reported knowledge, beliefs, and practices of 9 experimental teachers and 9 grade matched controls. Findings suggest experimental teachers learned the literacy terms/concepts from the sessions. This new knowledge also appeared to impact directly on their practices; experimental teachers differed from the controls in their self-reports of teaching styles, the material their students used in the classroom, and in whether or not their students were kept informed of their progress. Potential ramifications of these outcomes in terms of possible impact on at-risk students are discussed.
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## Table of Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Page Number</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Introduction</strong></td>
<td></td>
</tr>
<tr>
<td>Background of Problem</td>
<td>3</td>
</tr>
<tr>
<td>Professional Development – Purpose/Definition</td>
<td>3</td>
</tr>
<tr>
<td>Teacher Knowledge of Literacy Terms and Concepts</td>
<td>4</td>
</tr>
<tr>
<td>Teacher Beliefs about Teaching and Classroom Practice</td>
<td>9</td>
</tr>
<tr>
<td>Students At-Risk</td>
<td>11</td>
</tr>
<tr>
<td><strong>The Process of Teacher Change</strong></td>
<td></td>
</tr>
<tr>
<td>The Impact of Current Beliefs and New Knowledge On Acquisition</td>
<td>12</td>
</tr>
<tr>
<td>Prerequisites for Change</td>
<td>15</td>
</tr>
<tr>
<td>The Process of Lasting Change</td>
<td>17</td>
</tr>
<tr>
<td>Factors for Maintaining Change</td>
<td>19</td>
</tr>
<tr>
<td>Summary of Prerequisites for Change</td>
<td>20</td>
</tr>
<tr>
<td><strong>Context of Large Scale Professional Development Project</strong></td>
<td>20</td>
</tr>
<tr>
<td><strong>Current Study</strong></td>
<td>24</td>
</tr>
<tr>
<td>Purpose of Current Study</td>
<td>25</td>
</tr>
<tr>
<td><strong>Research Questions</strong></td>
<td>25</td>
</tr>
<tr>
<td><strong>Method</strong></td>
<td></td>
</tr>
<tr>
<td>The Sample</td>
<td>28</td>
</tr>
<tr>
<td>Data Collection Procedures</td>
<td>30</td>
</tr>
<tr>
<td>Method of Data Analysis</td>
<td>32</td>
</tr>
</tbody>
</table>
Results and Discussion

Characteristics of Sample

Preliminary Analysis

Effects of Years of Teaching Experience

Years of Teaching Grouped

Types of Grades Taught

Grade Taught the Longest

Actual Years Teaching

Number of Grades Taught

Time in One Grade

Summary – Demographics of Sample

Current Grade Level Affecting Knowledge

Effects of Time of Training on Knowledge of Literacy Terms

Main Analysis

Results and Discussion

Knowledge of Literacy Terms

Description of Terms

Effects of Teaching Experience on Knowledge Of Literacy Terms

Categorical Variables – Teacher Beliefs and Practices

Analysis of Categorical Variables
<table>
<thead>
<tr>
<th>Section</th>
<th>Page Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Philosophy of Teaching</td>
<td></td>
</tr>
<tr>
<td>Teacher’s Role</td>
<td>63</td>
</tr>
<tr>
<td>Teaching Style</td>
<td>64</td>
</tr>
<tr>
<td>Programme Description</td>
<td>65</td>
</tr>
<tr>
<td>Materials Teachers Read</td>
<td>66</td>
</tr>
<tr>
<td>Student Reading Materials</td>
<td>66</td>
</tr>
<tr>
<td>Motivation of Students</td>
<td>67</td>
</tr>
<tr>
<td>Classroom Practice</td>
<td>67</td>
</tr>
<tr>
<td>Goals and Evaluation Practices</td>
<td>68</td>
</tr>
<tr>
<td>Students At-Risk</td>
<td>69</td>
</tr>
<tr>
<td>Summary – Categorical Variables</td>
<td>70</td>
</tr>
<tr>
<td>Relationships between Teaching Practices and Knowledge of Terms</td>
<td>71</td>
</tr>
<tr>
<td>Limitations of Study</td>
<td>75</td>
</tr>
<tr>
<td>General Discussion</td>
<td>77</td>
</tr>
<tr>
<td>References</td>
<td>81</td>
</tr>
<tr>
<td>Appendix A</td>
<td></td>
</tr>
<tr>
<td>Questions for Teacher Interview</td>
<td>90</td>
</tr>
<tr>
<td>Appendix B</td>
<td></td>
</tr>
<tr>
<td>Division of Interview Questions into Categories and Coding Scales</td>
<td>98</td>
</tr>
<tr>
<td>Appendix C</td>
<td></td>
</tr>
<tr>
<td>Explanation of Bonferroni Correction</td>
<td>102</td>
</tr>
</tbody>
</table>
List of Tables

<table>
<thead>
<tr>
<th>Table</th>
<th>Description</th>
<th>Page Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Table 1-</td>
<td>Breakdown of Number of Teachers Per Grade Per School</td>
<td>28</td>
</tr>
<tr>
<td>Table 2-</td>
<td>Individual Levels of Education of Sample Group</td>
<td>36</td>
</tr>
<tr>
<td>Table 3-</td>
<td>Types of Additional Qualification Courses Taken by Sample Group</td>
<td>37</td>
</tr>
<tr>
<td>Table 4-</td>
<td>Years of Teaching Experience</td>
<td>40</td>
</tr>
<tr>
<td>Table 5-</td>
<td>Results of Analysis of Variance of Literacy Terms by Grade Level</td>
<td>47</td>
</tr>
<tr>
<td>Table 6-</td>
<td>One-Tailed t-Test Means and Standard Deviations across all Literacy Terms</td>
<td>52</td>
</tr>
<tr>
<td>Table 7-</td>
<td>Significance Levels of One-Tailed t-test Mean and Standard Deviations for Literacy Terms</td>
<td>53</td>
</tr>
<tr>
<td>Table 8-</td>
<td>Rankings of Literacy Terms</td>
<td>56</td>
</tr>
<tr>
<td>Table 9-</td>
<td>Correlations Between Actual Years of Teaching and Knowledge of Literacy Concepts</td>
<td>58</td>
</tr>
<tr>
<td>Table 10-</td>
<td>Results of Chi-Square Test for Categorical Variables</td>
<td>62</td>
</tr>
<tr>
<td>Table 11-</td>
<td>Results of Point-Biserial Correlation Literacy Terms Correlated With Two or More Categorical Variables</td>
<td>73</td>
</tr>
<tr>
<td>Table 12-</td>
<td>Results of Point-Biserial Correlations Experimental Teachers</td>
<td>74</td>
</tr>
</tbody>
</table>
### List of Figures

<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
<th>Page Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Figure 1</td>
<td>Guskey's Model of the Process of Teacher Change With Modification</td>
<td>18</td>
</tr>
<tr>
<td>Figure 2</td>
<td>Type of grades the experimental teachers (n=9) and control teachers (n=9) had taught over the course of their careers.</td>
<td>41</td>
</tr>
<tr>
<td>Figure 3</td>
<td>Types of grades experimental teachers (n=9) and control teachers (n=9) had spent the most years teaching over the course of their careers.</td>
<td>42</td>
</tr>
<tr>
<td>Figure 4</td>
<td>Mean of actual years of teaching in the classroom for Experimental teachers (n=9) and control teachers (n=9).</td>
<td>43</td>
</tr>
<tr>
<td>Figure 5</td>
<td>Graph of mean scores of literacy terms 1-9 for experimental teachers (n=9) and control teachers (n=9).</td>
<td>50</td>
</tr>
<tr>
<td>Figure 6</td>
<td>Graph of mean scores of literacy terms 10-19 for experimental teachers (n=9) and control teachers (n=9).</td>
<td>51</td>
</tr>
</tbody>
</table>
Change in the Knowledge and Practices of Literacy:

Professional Development for Primary Teachers

In the primary classroom, the paramount goal is to ensure that students learn to read and write, and primary teachers are generally committed to ensuring that their students meet these goals. In striving to become better teachers, to ensure their skills are current, and to improve reading achievement in their classrooms, teachers regularly engage in professional development. Professional development sessions that focus on expanding and elaborating teachers' knowledge systems are crucial in today's climate of educational reform (Borko & Putman, 1995). There is a particular need for broadening and deepening their knowledge base with respect to literacy acquisition in order to improve student achievement. Adams states that in order “to improve reading achievement, both programs and classroom delivery must be improved” (Adams, 1990).

Integrating new knowledge into teachers' current understandings so as to make improvements to their reading/writing programs can be challenging. In many cases the new knowledge may suggest far-reaching changes to their current practice. In order for teachers to incorporate such potentially fundamental changes into their teaching practices, they must have the “knowledge necessary to implement the changes and the beliefs to support them” (Borko, Flory, & Cumbo, 1993; Lollis, 1996). Professional development sessions often supply knowledge about a curriculum area. In order for a teacher to use this knowledge to its fullest potential, it must not only be integrated into classroom practice but also more deeply into the philosophical aspects of teaching. These philosophical aspects include what teachers believe it means to teach, their understanding
of their role and their teaching style. This integration will ultimately result in lasting improvement in their students' achievement levels.

Professional development sessions “are a systematic attempt to bring about change in the classroom practices of teachers, change in their beliefs and attitudes, and change in the learning outcomes of students” (Guskey, 1986). This change is often measured in terms of improved student outcomes. There is a great deal of research of the effectiveness of the implementation of programs in terms of the student gains made (e.g., Madden, Slavin, Karweit, Dolan & Wasik, 1993). This type of research, known as “process-product” research observes the process teachers engage in but then focuses on the results of students' work to determine “success” (Shulman, 1986b). This model is considered to be “unabashedly empirical” (Shulman, 1986b). Student gains are tangible test scores which are thought to objectively determine the circumstances that made them successful, or not. Such research is extremely important because it asks what the professional development involved and whether the professional development was successful in terms of promoting student gains. What this type of research does not provide is an in-depth analysis of whether teachers have actually learned what was taught about literacy in the professional development sessions. Nor does it determine whether their attitudes and beliefs about literacy acquisition and their literacy practices in the classroom reflect that new knowledge. There is little in the literature which directly examines how change occurs within the teachers themselves. It is change in teacher’s practice which in effect produces improved student outcomes.

The current study evaluated the effects of a professional development course which was designed to give teachers foundation knowledge about literacy concepts. It
was hoped that in addition to increasing knowledge about literacy concepts, it would encourage teachers to implement changes in their classroom practice. It was also expected that aspects of teachers' belief about teaching would be altered. The substance and method of the presentation/organization of the professional development sessions was not being directly assessed; rather, it was the effect which the sessions had on the teachers which was being evaluated. At a basic level, the research assessed what was learned. Were the basic terms and concepts learned? Detailed analysis was undertaken to examine how this learning impacted on the teachers in terms of their actual teaching practice and their beliefs. Several areas of the literature were reviewed to assist in the organization and interpretation of the data: a) Definitions/Purposes of Professional Development, b) Teacher Knowledge of Literacy Terms and Concepts, c) Teacher Beliefs about Teaching and Classroom Practice, d) Students at Risk, and e) The Process of Teacher Change. The current study focused on the change in teachers as the result of exposure to professional development sessions by comparing their knowledge to a group of teachers who had not participated in professional development. The main focus of the research was done on the process of teacher change.

BACKGROUND OF PROBLEM

a) Professional Development - Purpose/Definition.

Throughout the literature, the terms "in-service teacher education", "in-service training", "staff development", "professional development", "teacher development", and "continuing education" are used at times interchangeably (e.g., Hyde & Pink, 1992; Wideen, 1987). For the purposes of this review and in the context of the current study,
the term professional development is used to refer to any general education workshops in which already certified teachers engage and which allows them to further develop their skills. It will not be used to refer to pre-service programs, unless explicitly stated.

The primary goal of professional development is to expand a teacher’s knowledge. Expansion can take the form of “tuning” present skills and/or acquiring new information (Joyce & Showers, 1980). In order to integrate new information, a teacher can either build upon or displace an existing belief system that could potentially have had “strong functional justification” in that teacher’s classroom (Nespor, 1985). It seems reasonable then that the design and purpose of professional development should ensure that it not only provides more and/or new information, but that teachers are able to use this information in the classroom with “strong justification”. Teachers should understand why they are implementing change, believe in the changes they are making, and see the change as positive within the context of their classrooms (Shulman, 1986a).

b) Teacher Knowledge of Literacy Terms and Concepts

Prior to discussing change in teachers, it would be useful to examine what teachers know about literacy and the types of research which is done on teachers’ levels of knowledge of literacy concepts. Literacy has been an intensely studied subject. Theorists and practitioners alike have debated the best way to teach literacy for years (Adams, 1990). A brief survey of the literature quickly reveals a polarization between approaches. In the 1980s, literacy approaches which favored more holistic, comprehension-centered, and integrated approaches became more popular. “The most widely subscribed to of these holistic perspectives is Whole Language” (Teale, 1995). From this perspective, reading and writing are learned best by actually reading and
writing (as opposed to doing exercises or drills in preparation to read and write).

Instruction should also be rich in content. Children’s interests and purpose are of major importance in the process of learning to read and write (Goodman, 1986). The shift away from skills based instruction stemmed from findings in some of the cognitive research which was focused on the role of contextual factors and socio-cultural dimensions where skills teaching was too narrowly conceived. Whole language educators advocated for the use of published children’s literature instead of basal readers and stressed the need for teachers to be decision-makers and researchers as opposed to relying on directions in a reading manual (Teale, 1995).

The type of research done during the time that whole language was the prevalent approach reflects this ideology. An example of this type of research is a study by Hoffman, Roser, Battle, Farest, and Isaacs (1990) which investigated teachers’ understanding of the use of children’s literature for language and literacy growth. In this study, 78 kindergarten, first- and second-grade teachers volunteered to participate. Teachers attended sessions to assist them to enhance their skills and strategies for incorporating literature into their reading/language arts program and were then interviewed to determine the knowledge they had gained as the result of the sessions. The findings of this study suggest that teachers were successful at integrating children’s literature into their reading/writing programs.

The whole language movement which advocated for the abandonment of systematic instruction and the direct training in phonemic awareness sparked debate from advocates of this position. Relevant publications, (especially that of Marilyn Adams’ *Beginning to Read: Thinking and Learning about Print*) supporting decoding and
systematic instruction emerged as a defense. Research in the area of literacy moved towards examining the role of decoding and systematic instruction such as in the research done by Juel (1980).

Currently, generally most teachers are aware that both approaches to literacy instruction exist. The extent of a particular teacher’s knowledge about either approach is likely determined by one of two factors. First, the type of training the teacher received as an in-service teacher might be a source of information about literacy instruction. Second, their current school board might be advocates of certain teaching approaches.

Reviewing the literature in the area of teacher knowledge, it becomes clear that there are two major types of publications. The first, and most prevalent, are discussions and commentary about the conceptual and organizational frameworks teachers have in terms of the types of knowledge that they possess. Understanding what teachers know about their subject matter and how they transmit that knowledge to their students is crucial if attempts are to be made at furthering the training of teachers in the area of literacy.

Shulman (1986a) proposed that there are three distinct categories of knowledge that teachers possess that must be considered when structuring teacher training. These categories are: subject matter content knowledge, pedagogical content knowledge, and curricular knowledge. To have a firm grasp of the subject matter content knowledge in their area, according to Shulman, teachers must be able to define the “accepted truths” or facts in an area, be able to relay to their students why it is that these facts are worth knowing, as well as how these facts are related to other facts in the subject area. In this
study, literacy terms and concepts was the subject matter content knowledge under examination.

Shulman's pedagogical content knowledge was also the focus of the current study. Pedagogical content knowledge encompasses the "ways of representing and formulating the subject that make it comprehensible to others" (Shulman, 1986a). This type of knowledge is reflected in the way teachers plan their lessons and then transmit their understanding and knowledge to their students. Possessing this type of knowledge also includes having a clear understanding of what makes the learning of aspects of a subject easy or difficult. It is a firm grasp of this knowledge which allows a teacher to determine how a lesson might need to be modified to suite different types of learners.

This more theoretical area of study often can provide a strong foundation upon which to build and implement models of teacher professional development. It is this theoretical area which leads to empirical research of professional development. The empirical research evaluates either the validity of the theoretical model and/or its effectiveness as a method of delivery for professional development. There appear to be three ways of examining professional development. The first examines teachers' knowledge of specific terms and concepts based on research in literacy. The second examines teachers' knowledge based on their skills and experiences in the classroom. The final format examine teachers' knowledge before and after professional development sessions.

An example of the first type of study is one done by Troyer and Yopp (1990) who examined kindergarten teachers' understanding of emergent literacy concepts (phonemic awareness and segmentation). They randomly surveyed 250 teachers from 25 school
districts with a questionnaire about the target terms. Demographic data about the teachers was collected. One of the findings of their study was that less experienced teachers had a greater familiarity with target concepts as did teachers who held masters degrees.

The rational for the type of design above, where subjects are from a specific grade and are asked about their knowledge of a specific subset of literacy concepts (phonemic awareness and segmentation), is likely due to methodological issue surrounding analysis in combination with an attempt to determine the reflection of research on classroom practice. The findings from these types of studies furthers the understanding of literacy instruction by assessing one component of literacy.

Other studies have attempted to be broader in their analysis of subject matter. Pressley, Rankin, and Yokoi (1996), undertook an empirically based study of effective primary reading teachers’ knowledge about the components that need to be included in primary literacy instruction. Initially they asked teachers to indicate 10 practices which they believed to be essential in their teaching of literacy skills for various types of readers. A second questionnaire was used to address each practice cited in the responses to the first questionnaire. One of the broader findings of this study suggests that shifts occur in the type of reading instruction used between kindergarten and grade 2 although there was more similarities than differences found in teachers’ reports. This type of research allows teachers’ knowledge and experiences in the classroom to determine the design of research.

The third and final research format attempts to examine teachers’ knowledge before and then after professional development sessions. An example of this type of research is Miller and Ellsworth’s (1985) evaluation of a program to improve teacher
effectiveness in reading instruction. Their sample consisted of an experimental group of teachers who were exposed to professional development sessions and a control group who were not. To evaluate teachers' knowledge about reading instruction, they administered standardized measures before and after teachers participated in professional development sessions. They found that the teachers in the experimental group were more knowledgeable about reading instruction than the teachers in the control group both prior to and after the in-service sessions.

c) Teacher Beliefs about Teaching and Classroom Practice

As in the area of teachers' knowledge of literacy, there are two major types of publications in the area of teacher beliefs and practice, empirical research studies and discussions about theoretical frameworks. Not only is the literature in this area vast because of the inherent complexity of belief systems, but often in the attempt to capture this complexity, one study will attempt to uncover a series of beliefs related to classroom teaching and practice. An example of this type of research was done by Nespor (1985) who examined teacher beliefs about teachers' roles, their teaching subject, their students, and the schools in which they work. For the purposes of the current paper, only a few examples of the typical types of studies and research findings will be discussed.

Another study with a multiple focus is work done by McLachlan-Smith (1993) who examined teachers' perceptions of their role as teachers, the nature of their curriculum, and how they perceived their students as learners. The most relevant aspect of this research, in relation to the current study, is her findings on the role of the teacher. Teachers in this study perceived their role as either to fill a gap or deficit in their
students' knowledge, provide an environment where students were encouraged to ask questions and experiment, teach skills, or to be an expert/parent educator.

An example of research which attempted to narrow its focus is work done by Duffy and Anderson (1982) who examined conceptions of teachers' reading. Through the use of a propositional questionnaire, they attempted to determine if teachers focused on basal texts, linear skills, integrated whole approach, interest or natural language as the driving force behind their language program. They found that teachers do hold concepts of reading, they often have more than one conception at a time, and that these concepts are not a static set of beliefs. They also found that teachers modify and change their conceptions of reading and reading instruction over time, a teacher's conception of reading seems to be associated with the number of years teaching experience, and that a teacher's reading conception may be related to the grade level taught and to the pupil's ability level.

Gomez Madison and Speaker (1994) undertook similar research to that of Duffy and Anderson (1982) when they examined the role of teachers in creating classroom literacy environments. In contrast to the five conceptions discussed in Duffy and Anderson's (1982) study, Gomez Madison and Speaker found that there were three literacy environments in primary classrooms: skills-based, eclectic, and emergent. However, Duffy and Anderson's findings suggested that teachers often hold more than one conception of reading. Gomez Madison and Speaker's category of "eclectic", if applied to Duffy and Anderson's study would capture the teachers holding multiple conceptions and might in effect reduce the number of concepts found.
With respect to the types of materials that teachers use in the classroom, Gomez Madison and Speaker's (1994) study is an example that illustrates a more qualitative approach. Their findings suggest that teachers' draw upon their beliefs in determining the types of materials they use in the classroom. Skills-based classrooms contained fewer literacy materials, eclectic classrooms contained materials that incorporated skills and themes, and emergent classrooms contained material that contained rich sources of literature.

Pressley, Rankin, and Yokoi's (1996) study illustrates a more quantitative approach to examining the types of materials teachers use in the classroom. They found 73% of exceptional primary teachers reported using outstanding children's literature. Teachers in their study also reported minimal use of controlled vocabulary texts. In general, it was found that teachers classified texts in a traditional way as easy, instruction-level, and frustration-level. Using this method of classification, it was found that the percentage of easy reading decreased with increasing grade level. It was also reported that there was a decrease in the use of frustration-level material with increasing grade and reports of instruction-level reading increasing with grade.

d) Students at Risk

The research in the area of students at risk for reading failure is replete with articles summarizing how to identify students at risk (e.g., Gray, 1988). Another area which does not suffer from a lack of research is in the description of studies about methods for preventing reading difficulties and their effectiveness (i.e., Madden, Slavin, Karweit, Dolan, Wasik, 1993). Articles which summarize these various programs also abound (i.e., Pikulski, 1994; ). What appears to be missing from the literature is research
which examines the type of knowledge teachers possess about students at-risk for reading failure and how they identify them in the classroom.

e) The Process of Teacher Change

The Impact of Current Beliefs and New Knowledge on Acquisition

Teachers’ beliefs about literacy and teaching as a whole are important because of the influence beliefs can have on the integration of new material into programs. Beliefs can also impact on actual teaching. Teachers, whether they are conscious of it or not, make decisions about what to teach and how to teach it based on their theory of what they believe to be effective.

Teaching is theory-driven, affecting the way teachers plan their activities, the types of work they assign, and the types of work their students produce (Clark & Peterson, 1986; Hyde & Pink, 1992; Konopak, Cothern, Jampole, Mitchell, Dean, Holomon, Weems, & Arceneaux, 1990; Gomez Madison & Speaker, 1994; Mills & Clyde, 1991; Watson, Burke, & Harste, 1989). These types of theories are described by Genishi (1992) as “theories of practice” and are those theories about children, development, learning, and assessment that underlie teachers’ curricular decisions and interactions. According to Genishi (1992) these theories are “prescriptive and lead to recommendations about how adults should view development and moreover how they should arrange environments [e.g., classrooms, lessons] for children”. These theories form a part of the teachers’ overall belief systems. Teachers’ beliefs and attitudes about literacy and concepts of literacy determine how they structure their literacy programs.

It seems reasonable that teachers’ programs, in turn, may determine the effectiveness of their teaching of literacy concepts to children. Previous research
indicates that teachers’ thoughts and beliefs are aspects of their instructional effectiveness (Duffy & Ball, 1986; Maxson, 1996). “The diverse instruction paradigms within which teachers function are a direct result of an individual belief system that is influenced by their practical experience, and a need to meet the individual needs of the student” (Maxson, 1996). Instructional effectiveness can be reflected in student outcomes.

Not only can beliefs be linked to teacher effectiveness and, consequently, student outcomes, they can be linked to the teacher change process. “Teacher attitudes and beliefs...are important considerations in understanding classroom practice...beliefs and attitudes...strongly affect what and how they learn and are also targets of change within the process” (Richardson, 1996).

It is important to recognize, especially in the context of the current study that beliefs which teachers hold do not necessarily require a “truth condition” where “a proposition is agreed on as being true by a community of people” (Richardson, 1996). Teachers beliefs about literacy and its acquisition can be extremely individualistic. This needs to be considered as a variable in the determination of the effectiveness of a professional development session on literacy. It is possible that each teacher involved in a professional development session is at a different stage in terms of their understanding of the different areas of the curriculum which might be discussed. As a result, each teacher might learn the material presented at these sessions in varying degrees. This variety in the type of knowledge acquired might reflect itself in the results on standard evaluations of the sessions.
Another characteristic of beliefs seminal to this paper is that in most recent conceptions, the relationship between beliefs and actions is perceived to be interactive. Beliefs are thought to drive actions. In addition, experiences and reflection on action may lead to changes in or clarification of existing beliefs. This characteristic of beliefs and their impact on teacher change and effectiveness will be further discussed in relation to the stages a teacher must theoretically traverse in order to learn, transform, and apply knowledge from professional development sessions.

The way teachers approach professional development sessions, what they learn from them, and how they change, can be strongly influenced by the beliefs and practices which teachers hold about subject matter, learning and teaching (Richardson, 1994). An example of the strong influence beliefs can have is illustrated by Richardson (1994). Teachers were interviewed about their views on reading and learning. From the interview results, Richardson (1994) was later able to accurately predict what the classroom practices of the teachers would be. These practices were later observed in the classrooms of the teachers in the study.

The literature on the role of attitudes and beliefs in learning to teach was reviewed by Richardson (1996). This review explored teaching in several curriculum areas. Nine studies demonstrated that change in beliefs occurred as the result of exposure to professional development (Ball & Rundquist, 1993; Barnett & Sather, 1992; Bos & Anders, 1994; Freeman, 1993; Marx, Blumenfeld, Krajcik, Blunk, Crawford, Kelly, & Meyer, 1994; Wood, Cobb & Yakel 1991; Peterman, 1993; Richardson, 1994; Tobin, 1990). Two of the studies also indicated that change in beliefs had lead to change in practice in the classroom (Bos & Anders, 1994; Richardson, 1994). Furthermore, two
studies (Ball & Rundquist, 1993; Wood, Cobb & Yakel, 1991) indicated that the major changes in the subject of professional development lead to transfer, or changes, in another curriculum area. The above studies demonstrate the power of beliefs and how professional development can effectively change beliefs.

There were two studies that countered this view in Richardson’s review. Both Rich (1990) and Sparks (1988) found that teachers were required to possess beliefs consistent with any new teaching method prior to adapting that method. Professional development sessions would not be effective in changing belief and practice simultaneously.

Rather than studying the beliefs of teachers in general, Pajares (1992) suggested that studies should examine teacher thinking and beliefs about a particular thing because this kind of design can more effectively explore relationships between beliefs, knowledge, planning, decision making, and practice. The current study uses literacy concepts as the particular thing which reflects teachers’ beliefs and practices.

*Prerequisites for Change.* Prior to engaging in professional development, there are some conditions which need to be meet in order to facilitate a positive implementation of new material in the classroom. Hollingsworth’s (1989) work with pre-service teachers and their understanding of reading illustrates some of these conditions. Foremost, a teacher’s ability to have a “balanced managerial repertoire” was essential (Hollingsworth, 1989). They need to be able to balance not only the knowledge they possess about a curriculum area but how to manage the classroom so that this knowledge can be effectively relayed to their students. Teachers need to have a sense of how to organize the classroom and maintain control over students in order to be able to present
any information successfully, regardless of the format of presentation or orientation of the teacher. They need to be able to balance the tasks of teaching, ensuring the students are on task, evaluating, tracking, and reporting. The better balanced these tasks are, the more energy and attention a teacher will have to devote to the implementation of new activities.

In more general terms: "stability and order are necessary for educational change" (Fullan & Stiegelbauer, 1991). A teacher needs to be an effective manager for this to occur.

Whether or not a teacher is an effective manager of the classroom environment may play a large role in the decision to participate in professional development sessions and the effectiveness of those sessions. For example, teachers who are conscious that they are not successfully balancing these managerial skills might not feel they have the time to invest in professional development. Alternately, teachers without solid managerial skills who do participate might have difficulty implementing new activities in their classrooms. They might perceive that it was the professional development sessions which were not effective as opposed to recognizing the role that their managerial skills might play.

Motivation for attending a session, like the degree of managerial skills that a teacher possesses, might also influence how well the concepts from professional development sessions are internalized and actualized. The motivation to be present at a session might strongly influence understanding and retention of the material. A teacher who does not want to be at a session will likely not pay as close attention to what is being presented as one who does want to be present. Some professional development occurs during the school days and, as such, teachers are expected to attend as a part of their job
description. However, the majority of sessions occur outside of regular school hours.

"Most teachers engage in staff development because they want to become better teachers" (Guskey, 1986). Professional development is one way to increase competence and attain professional satisfaction by gaining new skills.

The goal of becoming a better teacher can be actualized in many different ways. Research has found that for the majority of teachers, "becoming better" is synonymous with their students improving their outcomes (Guskey, 1986). Harootunian and Yargar (1980) found that teachers feel that their success as a teacher should manifest itself in terms of student performance. Any change in the teacher, their philosophy or beliefs, which might not be directly and immediately tied to student outcomes were not seen as significant. This view of "effective teachers" is synonymous with the majority of many educational research practices which focus on student outcomes as the ultimate test of the effectiveness of professional development sessions. The missing component in this view is that teachers are the ones driving change. How they do this and under what circumstances warrants exploration. Because of their definition of "becoming better", many teachers feel that professional development sessions should give them practical ideas. "These ideas should directly relate to the day-to-day operation of their classroom" (Guskey, 1986). It is assumed that with these practical ideas, teachers can implement change in the classroom.

*The Process of Lasting Change.* Research has suggested that perhaps simply providing practical ideas for implementation into the classroom might not be adequate for ensuring practical change. Prior knowledge and belief systems can be firmly entrenched before teachers seek professional development. This knowledge and these beliefs act as a
filter which teachers use when presented with new information. A model of the process
of teacher change developed by Guskey (1986) illustrates when, sequentially, practical
ideas, professional development, class change, student change, and beliefs might occur.
The initial step has been added by the present investigator to include prior knowledge and
belief systems.

Filter of: \( \Rightarrow \) Professional \( \Rightarrow \) Change in \( \Rightarrow \) Change
Prior Development Teacher in in
Knowledge/ Change Student Teachers’
Beliefs/ Classroom Learning Beliefs &
Motivation Practice Learning Outcomes Attitudes

Figure 1. Guskey’s Model of the Process of Teacher Change with Modification

Using this model as a basis for discussion, the arrows represent a flow of
sequential steps. They also illustrate that there is an impetus assisting with the process of
change. Motivation is one impetus which encourages the teacher to move from being in a
state where they are not participating in professional development to a state where they
are.

Another impetus is in their being “aware of a need for improvement through their
analysis of their own observation-profile” (Fullan and Hargreaves, 1992). This
awareness then leads to “making a ....commitment to try new ideas in their classroom the
next day” (Fullan & Hargreaves, 1992). Making a commitment to implement change is
necessary for an open mind prior to attending professional development sessions. Once
teachers decide to attend professional development sessions, the final step prior to
actually changing classroom practice would be to “modify the workshop ideas to work in
their classroom and school” (Fullan & Hargreaves, 1992). Once modified, implementation can take place fully.

According to Guskey’s model teachers would try to implement new strategies prior to firmly grounding them in their belief systems about what “good” teaching is or “strategies that work”. It would be by seeing a new strategy work that they might assimilate its overall conceptual basis into their current teacher belief system. Teachers would initially make actual changes in the classroom prior to making any lasting changes in their belief system. Over time and through positive reinforcement changes might occur in the actual beliefs of teachers. The professional development model utilized here made the assumption that both understanding and evidence of effectiveness would motivate and guide positive classroom change. What is missing from Guskey’s model is a description of how the process of teacher change is not necessarily linear. Instead, as change occurs in teachers’ beliefs and attitudes, often the cycle then begins again. What becomes a new set of beliefs and knowledge about teaching eventually replaces the prior knowledge, over the course of time and over the course of use in the classroom. Teaching is a constantly evolving process, especially as teachers often change grades over the course of their careers.

Factors for Maintaining Change. Once a teacher has implemented a change in practice, in order for that change to become a permanent part of the classroom, there are conditions which need to exist to sustain that change. There has been a great deal of research which has occurred on the role that professional development must play in order to maintain a change. Lollis (1996) states that there is a need for the teachers to have continual support by those initiating change when engaging in professional development
(as opposed to “one-shot” experiences without future follow-up) in order for professional development to be effective and to promote lasting change. Guskey (1986) agrees with Lollis and notes that teachers should also receive regular feedback on student learning progress. Allington (1995) reminds those initiating change that “it is never easily accomplished...comes from within, not afar...there are no quick fixes...there is no best way”. The current study attempts to evaluate one way that change was initiated in the literacy program of a series of elementary schools and examines its effects.

Summary of Prerequisites for Change. In order for change to occur as the result of professional development, there are several criteria which must be met in the mind of the teacher, the classroom and within the professional development sessions themselves. The teacher must be an effective manager in the classroom. The teacher must have an awareness of the need for change in current teaching practice. There must be the motivation to attend sessions and the desire to learn the material presented. The professional development must contain some practical ideas which teachers should be able to implement fairly quickly after the professional development sessions. Once these initial changes are implemented, teachers must be able to see improvement in their students’ success. Finally, the supports should be in place to maintain the changes in the classroom.

Context of Large Scale Professional Development Project

The primary researcher, Dale Willows, approached a board of education to implement a study entitled, “Putting Theory into Practice: An Evaluation of A Teacher Education System for Improving Primary Literacy” (Willows, 1994). The overall purpose of the project was to “assess the implementation and effectiveness of this in-
service teacher education system in improving classroom teaching and raising the literacy level of children in the primary grade” (Willows, 1994). The four main objectives of the project were as follows:

1) to provide in-service training on *The Balanced and Flexible Literacy Diet* system for the primary teachers, resource/support staff and administrators in three schools in [one].... region
2) to monitor the effectiveness of the in-service program through observation and interviews of the participants and to modify the system based on formative evaluation throughout the project
3) to assess the outcomes of the in-service training on curriculum planning and classroom practice through reviews of day plans and observations of teaching in classrooms and,
4) to evaluate the success of the in-service training in terms of improved literacy outcomes, with a special focus on children who are at risk of reading/writing difficulties due to a range of background factors — including linguistic differences and deficits (Willows, 1994)

The framework chosen for the professional development was designed to permit educators to learn about literacy acquisition without the terminology that has fueled early literacy debates and without having to “chose” either a whole language or a skills-based approach to teaching literacy (Liston & Zeichner, 1987). In order to move away from the use of emotion-laden terminology and circular arguments, and to ensure that teachers do not focus on one skill to the exclusion of others, Willows (1994) created a different framework for professional development. She uses the metaphor of a balanced diet to explain the components necessary for achieving literacy. According to this framework, each stage of literacy development has different educational requirements which need to be met in order for students to become competent readers and writers. This metaphor of a balanced diet allows for teachers to become “master teachers” who develop classroom activities which are appropriate to their classroom as opposed to becoming “master
developers” who write instructional scripts for their students to follow and which allow for little decision making and activity creation on the part of the teacher (Duffy & Ball, 1986).

The primary goal of the large scale professional development project was to guide and motivate lasting change in literacy education in the schools involved. The focus for the current study, which was a small component of the large scale professional development project, was to examine three different areas of teaching. The first area was teachers’ understanding of literacy (i.e., actual literacy concepts, the content of literacy programs). The second area was classroom factors or procedural concerns (i.e., classroom management and programming for “at-risk” students). The third area was teachers’ stated beliefs about teaching (i.e., role of the teacher). These areas were examined individually and then as they impacted on each other.

Once the large scale project was approved by the school board, the superintendent of the board asked his principals if there would be any schools interested in participating in the program on a volunteer basis. In order to be in either the experimental condition or the control condition, the principals who were approached to volunteer in the study had to have schools with a large proportion of “at-risk” students in order to be eligible to participate. “At-risk” students were defined as those students whose first language was not English and those with little exposure to literacy in the home.

The principals consulted with their respective schools to determine if the teachers were interested in undertaking the professional development study. There were 3 schools meeting the criteria for the study in which teachers from all of the primary grades (k-3) volunteered to take part in the project. These 3 schools were the “experimental” schools.
In order to have matched control classrooms for all of the primary grades, there were 7 control schools.

In June the year prior to the official start to the professional development program, the primary researcher met with the experimental teachers in order to give them an overview of the professional development study as well as to provide them with reading material to review over the course of the summer. Beginning in September, teams of the primary teachers, resource/support staff and administrators from the experimental schools meet with the OISE research team (the Primary Researcher and graduate students) on a monthly basis throughout the school year. The sessions consisted of

reading and discussion of research-based literature, program planning guided by the Literacy Diet framework, time budgeting to ensure that classroom time is most effectively spent, program implementation with modeling and videos of a full range of classroom practice, monitoring and adjustment of programs based on classroom observations (involving open-ended as well as time-sampling procedures) and interviews (both open-ended and structured) with teachers and administrators, and evaluation of teaching effectiveness and student outcomes. (Willows, 1994)

The monthly professional development sessions began in September. In January, the experimental teachers were interviewed individually in order to monitor and adjust the program. In May, the students' achievement levels in both experimental and control schools were assessed and the teachers and students were observed in the classroom. The final individual interviews were undertaken in May/June.

The control schools did not engage in any professional development sessions related to this particular project. At the end of the year, their classroom teaching practices were observed and their students were assessed. The control teachers also participated in individual interviews.
The current study

For the purpose of this study, the term professional development will be used to describe a series of monthly after-school workshops for practicing teachers and principals and/or vice-principals. This series of workshops was comprehensive and continuous in nature. Those attending did not select which sessions they wished to attend from a series of possibilities. All those participating attended all sessions. These sessions were not viewed as being in place to remediate deficiencies, as is often perceived to be the case by outside observers of professional development sessions (Guskey & Huberman, 1995; Pink & Hyde, 1992; Wideen, 1987). Instead, the focus of sessions was to give teachers knowledge about literacy concepts and to allow them to integrate this knowledge into their current classroom practice pro-actively so that all their students would be successful in developing solid literacy skills.

In order to determine the extent and type of change in teachers as the result of professional development, this empirical study chose a research design where grade-level-matched experimental teachers were compared with control teachers (with no exposure to the professional development). Evaluating the actual impact of professional development is fraught with difficulty. One of the problems with studies on “in-service” often focuses on within group comparison as opposed to the use of controls (e.g., Hoffman, Roser, Battle, Farest & Issaacs, 1990; Borko, Flory, & Cumbo, 1993). If studies using controls were found, there was generally only the use of standardized measures to test student gains over change in teacher understanding (e.g., Anderson, 1992). Another approach often used is the observation of teachers implementing their programs in order to judge the effectiveness of professional development (e.g., Nespor,
Alternately, several studies have chosen a purely qualitative approach based on open-ended or semi-structured interviews. Alternatively, there was a multi-method qualitative approach of two or more of the following: semi-structured interviews, questionnaires, classroom observation, and classroom products (either test scores or other materials) (e.g., Konopak et. al., 1990; Gomez Madison & Speaker, 1994; Rueda & Garcia, 1996; Shafer, 1995). The current study used interviews exclusively. Student gains and classroom observations were aspects of the larger study.

Purpose of the Current Study

The purpose of this study was to examine the impact of the professional development sessions in terms of teacher knowledge, beliefs, and practices. More specifically, evaluation took place of the experimental elementary teachers' knowledge of literacy concepts from their self-reports after the completion of the professional development sessions. An additional objective was to determine how their knowledge of these concepts impacted upon, either directly or indirectly, other aspects of their teaching such as the content of their literacy program, their classroom management, their goals and program evaluation and their understanding of at-risk students.

Research Questions

The overall research question was: In what ways does the understanding of literacy concepts and the stated beliefs and practices of elementary school teachers (in Kindergarten, Grade 1 and Grade 2* ) who have engaged in literacy focused professional development differ from teachers who have not participated in such professional development? Teachers who participated in professional development on literacy are

* Note: Grade 3 teachers were not included because of mandatory provincial testing in all Grade 3 classrooms.
referred to as experimental teachers. Teachers who did not engage in professional development on literacy are referred to as control teachers.

The following 4 specific research questions were addressed:

1) Is the experimental teachers' understanding of literacy concepts different from that of the control teachers understanding of these concepts? Concepts of literacy were discussed during the professional development sessions and were included in the professional development reading of the experimental teachers and, as a result, their ability to define these concepts might be different from the control teachers who had not had a recent opportunity to discuss these concepts. Literacy concepts included: motivation for literacy, concepts of print, world knowledge, language development, listening/thinking skills, sight words, phonemic awareness, letter-sound connections, letter formation, complex letter sounds, spelling, schema development, fluency, text structures, comprehension strategies, writing conventions, composition strategies, and written language structures.

2) Do stated teacher beliefs differ between the experimental and control teachers?

Stated teacher beliefs included areas such as:

i) teaching philosophy (i.e., What do teachers see as the role of the teacher in the classroom?),

ii) teacher efficacy (e.g., How confident do teachers feel they are in affecting students’ motivation? and How successful do they feel when faced with particularly difficult or unmotivated students?) and,

iii) teacher expectations (e.g., Does a child's current achievement level influence the type of programming done for that child?)
Stated beliefs, for example teaching philosophy, could potentially have an impact on the type and degree of understanding a teacher might have in a content area such as literacy.

3) Do experimental teachers set literacy goals and evaluate their students in a similar fashion to control teachers? The professional development sessions that the experimental teachers underwent made explicit and reinforced the specific and detailed literacy concepts that teachers need to promote in their students. It would be expected that the experimental teachers would set more detailed literacy goals for their students in keeping with the professional development sessions. The control teachers who did not have the recent opportunity to review detailed literacy goals might be expected to have broader literacy goals for their students. It would also be expected that the experimental teachers might evaluate their students specifically in terms of the detailed literacy goals to which they had been exposed to through the professional development sessions, whereas the evaluation criteria for the control teachers might not be as specific.

4) Is there a difference between the way experimental teachers define "at-risk" students from the way that control teachers define "at-risk" students? Teachers can generally identify which of their students are experiencing difficulty with reading and writing by comparing individual students to the group as a whole. With the knowledge the experimental teachers acquired, it would be hoped that they would be able to define more precisely the specific skills or literacy concepts with which their students "at-risk" were struggling.
METHOD AND PROCEDURE

The Sample

The entire sample consisted of 18 female teachers in Kindergarten through Grade 2 from 10 different schools within the same school board. All teachers volunteered to participate in the study.

The experimental teachers were a subgroup of 9 teachers. These 9 teachers came from three different schools. From each experimental school there was a teacher in Kindergarten, Grade 1 and Grade 2.

The control teachers were also a subgroup of 9 teachers. These 9 teachers came from seven different schools. There were a total of three teachers each in Kindergarten, Grade 1 and Grade 2 in the control group. See Table 1 for a detailed breakdown of the teachers' grades and schools.

Table 1
Breakdown of Number of Teachers Per Grade Per School

| School    | Grade  |  | Grade  |  | Grade  |
|-----------|--------|  |        |  |        |
|           | Exper. | Control | Exper. | Control | Exper. | Control |
| School 1  | 1      | 1         | School 2 | 1  | 1         |
| School 3  | 1      | 1         | School 4 | 1  | 1         |
| School 5  | 2      |           | School 7 | 1  |           |
| School 6  | 1      |           | School 8 | 2  |           |
| School 9  |        | 1         | School 10| 1  |           |
It was originally hoped that the control group would be taken from three separate schools to match the design of the experimental schools. This design would have also facilitated the organizational aspect of the study. However, as teachers were asked to volunteer to be control teachers, this design did not emerge as feasible.

Another difficulty with the volunteer basis for participation was the inability to control for their years of experience in the classroom or for their levels of education. During the time of the interview, teachers were asked questions to solicit this type of information so that it could be taken into account during the analysis of results. See Appendix A for the full list of questions posed to solicit this demographic data.

In order solve the problems associated with participants who are volunteers, the control group would ideally be obtained from a list of teachers who were awaiting an opportunity to be involved in the professional development study. Otherwise, with the present design, it is possible that the teachers who volunteered for the control group were mostly confident older teachers who are comfortable with their teaching skills and are willing to share their experiences and knowledge. This would result in a non-random control sample who are not truly representative of non-treatment teachers.

At the end of the year, all teachers in the study participated in one-on-one semi-structured interviews which asked for self-reports of their beliefs as teachers, their classroom management, their setting of goals and the evaluation of these goals throughout the year, their understanding of at-risk students, as well as their understanding of some of the terminology and concepts that were the focus of the professional development sessions. The specific questions for the interview can be found in Appendix A.
Data Collection Procedures

Data were collected from the sample of teachers at the end (May/June) of the study using a semi-structured interview to obtain demographic data as well as information about their concepts of literacy and their classroom practices. Those interview questions were based partly on the specific literacy diet components used by Willows (1994) as the focus of the professional development sessions. As well the TIES-II (Ysseldyke & Christenson, 1993) was used to formulate questions as it provides an “empirically-based framework for systematically gathering information on the instructional variables associated with higher academic achievement” (Sumbler, 1996).

All interviews were conducted by the present investigator independent of the in-service and after the in-service sessions had concluded. The interview questions were piloted with a volunteer teacher who had not undergone the in-service but who was from one of the experimental schools.

It was determined that the interview would take one quarter of the school day to complete. With this knowledge, it was planned that as there were three teachers to interviewed at each experimental school, a full day would be required to interview all the teachers per experimental school. Each experimental school was contacted and the teachers at each school determined a day that would be convenient for them to have a supply teacher for the portion of the day when they would be undergoing the interview.

The experimental teachers also determined in what order they would sit for the interview so as to minimize disruptions to their individual schedules. Once they had determined an appropriate day and an interview schedule, the present investigator arranged for a supply
teacher to be present and for the supply teacher to rotate through the experimental
teachers’ classrooms at the appropriate times.

As it was often the case that there was only one control teacher per school, the
control teachers were contacted and requested to find a half-day that would be convenient
for them to attend the interview. Supply teachers need to be hired for a minimum of one
half of a day. For the control school where there were two teacher participants, these
teachers discussed the most appropriate day for their interview and arranged an interview
schedule in the same manner as the experimental teachers.

Once the date for the interview was set, the principals of the schools were
approached to locate a quiet and private space where the interviews could take place. It
was requested that this space have an electrical outlet in the event that the interview
needed to be audio-taped. The teachers were either informed of the space where the
interview was to take place or they met with the present investigator in the staff room
prior to the interview.

At the start of the interview, by way of introduction, the present investigator
reviewed the consent/confidentiality form and discussed with the teachers that the
information they disclosed would not be divulged to any of their colleagues nor to their
principals nor superintendents of the board (See Appendix A for a copy of the consent
form). It was also made clear that the overall principal investigator and workshop leader
(Willows) would not have access to individual teachers’ responses. At this time, it was
explained that provided the teacher was comfortable with the procedure, the interview
would be audio taped for record keeping purposes only. The present investigator would
be the only person to have access to the audio tapes which would be transcribed at a later
date. Prior to any actual interview questions being asked, the teachers were told that they would be asked questions about their beliefs and philosophies as a teacher, their classroom practices, and some questions about literacy. At any time in the interview they were encouraged to ask questions or to ask for clarification if they required it. As well, they were free to refrain from responding to any questions if they were not comfortable with them.

The actual interview was then held, with the present investigator asking the questions outlined in Appendix A. All the teachers appeared to understand the questions which were being asked. None of the questions required an extensive amount of probing or elaboration on the part of the present investigator.

All interviews which were audio-taped were then transcribed. Responses of teachers (11) who requested that their interview not be audio-taped were transcribed point form during the actual interview. A word processing file was created for each teacher and their responses. In the margin, the individual responses were then given the same number as the question used to illicit the response.

Method of Data Analysis

The interviews were then sorted into the individual questions. An envelope was created for each question of the interview. The actual question used to solicit the response was glued to the front of the envelope. Each teacher was randomly assigned a number code. One interview at a time was printed on plain white paper. Once the interview was printed, the responses were cut off the original document one at a time. A code for that teacher was printed on the back of the response in pencil so that the identity
of the response could be traced when needed. Once the response had the teacher's code on it, it was filed in the envelope containing the other teachers' responses to that question. This method ensured that the present investigator coded the responses blind as to the experimental/control status of the respondents.

For analysis purposes, the interview questions were first sorted into two categories. There were 1) knowledge of literacy terms (scale variables) and 2) questions dealing with teacher practices and beliefs (categorical variables). The teachers' knowledge of literacy terms was something which the principle investigator wanted to quantify so that results between the control and the experimental groups compared statistically. As a result, a coding scale could be developed to rate the responses given.

The coding scale ranged from 1 to 5. The scale was developed by randomly selecting three of the literacy concepts and examining the teachers' responses. At this stage of analysis it was discovered that some teachers chose not to respond to the question as they did not know the answer. Some of the teachers also stated outright that they would be guessing what the definition of the term would be and hazard a guess. It was decided that it was important to capture the differences in incorrect responses as they highlighted why the response was incorrect.

For most literacy terms, there was a range of responses reflecting differing degrees of knowledge about the term. There were some responses which contained a great amount of detailed knowledge about the term. This detail also included the teacher's being able to name one or more classroom activities which could be done to develop this literacy concept. Excellent understanding of the literacy concept was reflected in the ability to transfer definitional knowledge into a concrete activity. Good
understanding of a literacy concept was defined as the ability to explain the definition of
the term with sufficient details however, there was often no description of an activity.
Vague understanding of a literacy concept was a teacher’s ability to indicate that they had
heard the term before, but were only able to describe it in very general terms with very
little detail. Vague understanding of a term resulted in the complete inability to describe
how or when this concept would appear in the classroom.

The scale that was developed to rate a teacher’s understanding of a literacy
concept was as follows: 5= excellent understanding, 4= good understanding, 3= vague
understanding, 2= guessed at definition and incorrect, and 1= no idea/skipped. To ensure
a high level of inter-rater reliability, the responses in this category were coded blind twice
to ensure consistent results. The inter-rater reliability for responses was 89% using a
correlation of rating category.

Teachers’ practices and beliefs could not be as easily quantified, and, therefore, a
more qualitative approach was initially undertaken for analysis purposes. Appendix B
outlines which interview questions were classified as either producing responses which
would be analyzed as a scale variable or a categorical variables.

The categorical variables were further divided into four subcategories in order to
facilitate analysis: 1) teaching philosophy/program description, 2) classroom practices, 3)
goals and evaluation practices, and 4) students at risk. A method for coding the
categorical responses to each question was based on the research questions, on an initial
reading of a sample of the interview transcripts, and on Strauss and Corbin’s Grounded
The categorical variables were coded twice. This second coding resulted in the actual codes which were used for analysis. Originally, the categorical variables were going to be analyzed qualitatively. However, due to the fact that several of the teachers did not want their responses audio-taped, the detail of the responses required to do a proper qualitative analysis was not present. In order to analyze the responses quantitatively, a chi-square design was chosen. The chi-square was chosen as it would still allow for the use of grounded theory to generate categories. The categories for the Chi-square analysis were generated according to qualitative methods. The preliminary open coding did not limit the categories generated from the responses. Subsequent analysis allowed for a tighter reconceptualization of how the responses could be classified. Due to the relatively small sample size, the responses were eventually coded as belonging to one of two categories in order to increase the power of the test. Appendix B outlines the criteria for coding the categorical variables.

RESULTS AND DISCUSSION

*Characteristics of the Samples*

Overall, there appeared to be a rough balance in the sample group in terms of their background experience in teaching and up-grading courses. The experimental group tended to have fewer years of teaching experience and to be university graduates who had not engaged in upgrading courses. The control group on average had more actual teaching experience than the experimental group but contained several teachers who did not hold university degrees. However, most of these teachers had taken additional qualification courses. Both groups participate in workshops at the School Board level on a regular basis.
Levels of Education. The experimental group and the control group were quite different in terms of the pattern of their educational experiences. There was a wide variety in terms of the highest level of education that the teachers had formerly attained. Table 2 outlines the individual levels of education of the sample group.

Table 2
Individual Levels of Education of Sample Group

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<th>Level of Education</th>
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</tr>
</tbody>
</table>

Note: Levels of Education:
1 = High School
2 = High School & Teacher’s College
3 = Bachelor of Arts
4 = Bachelor of Education
5 = Bachelor of Arts & Teacher’s College
6 = Bachelor of Arts & Bachelor of Education
7 = Masters of Arts

From the Table 2, it becomes clear that the experimental group had a wider range of levels of education than did the control group. The majority of the experimental group
had minimally obtained a university degree. In contrast, the control group was fairly evenly divided between teachers who had university training and those who had not. Of the 9 control teachers, 4 possessed a high school degree and a certificate from teachers' college. Another 4 teachers held university degrees. The control group also contained the one individual who had attained a masters degree.

**Participation in Workshops.** All teachers from both groups engaged in regular professional development sessions that were hosted by their Boards of Education. The types of workshops which the teachers attended varied. As this study was investigating the area of literacy, the interviewer was interested mainly whether the teachers had attended workshops which focused primarily on literacy or whether the teachers were more interested in workshops on other subjects. All of the experimental teachers had taken workshops which had literacy as a focus. Of the control teachers, seven of nine had also taken workshops with a literacy focus.

**Upgrade Courses.** Not only did all of the teachers in the sample engage in regular professional development sessions at the Board level, many of the teachers had also taken courses set out by the Ministry of Education to upgrade their skills. The control teachers had actually taken more up-grade courses than had the experimental teachers. Table 3 outlines the number of teacher who engaged in Ministry of Education additional qualification (AQ) courses and the type of courses taken.

<table>
<thead>
<tr>
<th>Types of Additional Qualification Courses Taken by Sample Teachers</th>
<th>Control</th>
<th>Experimental</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Courses Take</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>Assorted Courses No Literacy Focus</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Assorted Courses with Literacy Focus</td>
<td>7</td>
<td>4</td>
</tr>
</tbody>
</table>
Effects of Years of Teaching Experience. Prior to examining whether there were actual effects in relation to the Professional Development treatment on any of the measures, it was necessary first to determine the effects that prior experience might play in the experimental and control group outcomes. If the experimental group had significantly more experience than the control group, any differences found could be attributable to experience in the field of teaching as opposed to exposure to professional development. If the control group had more experience than the experimental group and it was found that they outperformed the experimental group in terms of knowledge of terms, the results could be influenced by teaching experience.

The experience level of teachers needs to be calculated taking into account the diversity teachers are exposed to throughout their careers. Teachers often have taught more than one grade. In addition, they often have the opportunity to spend varying lengths of time in particular grades. Seven variables, which will be identified in parenthesis, were created in order to capture the diversity of teachers' experience.

The actual number of years that each teacher has been in the classroom was examined (actualyrs). The number of grades a teacher had taught throughout their career was calculated (numgrs). The type of grades taught throughout their career was also classified as one of the following: 1) Kindergarten Exclusively, 2) Primary Division, Primary Division and Special Education, 3) Primary and Junior Divisions, or 5) Primary/Junior Divisions and High School (grtaught). Finally, it was recorded in which
grade teachers spend the most of their career (grhi) and how long they had spent in that grade (hiys).

Some of the variables used to explore the degree of experience the sample teachers' possessed was more categorical or qualitative in nature while others were quantitative. The categorical variables were analyzed descriptively as due to the nature of the data and the size of the sample, there were too many categories to reliably perform non-parametric tests, such as chi-square, to compare the experimental teachers to the control teachers. Where possible, the quantitative data was analyzed by comparing the means and using two-tailed t-tests. Two-tailed tests were performed as no assumption was made as to the directionality of results. The hypothesis was that there was no difference between the groups in terms of their experience levels. The discussion of the results of the examination of the data of the teachers' experience will take place in the following order; first a discussion of the descriptive data will occur followed by a discussion of the analysis of the quantitative data.

*Years of Teaching Grouped.* Determining the mean of the actual years of teaching is one way to compare these two groups. However, means are greatly affected by extreme scores. In order to gain a clearer and less quantitative view of the teachers' years in the classroom, the teachers were divided into groups based on their years of experience. Teachers were grouped as having 1-5 year, 6-10 years, 11-20 years, or more than 20 years of experience teaching. Table 4 summarizes the groups.
Table 4

*Years of Teaching Experience*

<table>
<thead>
<tr>
<th></th>
<th>Control</th>
<th></th>
<th>Experimental</th>
<th></th>
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<tr>
<td></td>
<td>Number</td>
<td>Percent</td>
<td>Number</td>
<td>Percent</td>
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<tr>
<td>1 - 5 years</td>
<td>0</td>
<td>0%</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>6 - 10 years</td>
<td>1</td>
<td>11%</td>
<td>5</td>
<td>55.6%</td>
</tr>
<tr>
<td>11 - 20 years</td>
<td>2</td>
<td>22.2%</td>
<td>3</td>
<td>33.3%</td>
</tr>
<tr>
<td>20+ years</td>
<td>6</td>
<td>66.7%</td>
<td>1</td>
<td>11.1%</td>
</tr>
</tbody>
</table>

As can be seen in the table, the majority of the experimental group had 6-10 years of teaching experience (55.6%). The majority of the control group (66.7%) had been teaching for over 20 years. These findings illustrate the large difference between the two groups and the possible impact of this difference will be discussed in the Results and Discussion Section.

*Type of Grades Taught.* The types of grades taught (grtaught) by each set of teachers was also examined. A teacher was coded as having taught one of five types of grades: 1) Kindergarten exclusively, 2) Primary Division, 3) Primary Division and Special Education, 4) Primary and Junior Divisions, and 5) Primary/Junior Division and High School. The experimental teachers and the control teachers did not vary widely in terms of the types of grades they had taught. As the graph in Figure 2 demonstrates, there appears to be no major difference between the groups in terms of the types of grades with which they had the most experience. The experimental group had experience mainly within the Primary Division. The control group had slightly more experience within the Junior Division. Figure 2 illustrates the type of experience the sample group possessed.
Figure 2. Type of grades the experimental teachers (n=9) and control teachers (n=9) had taught over the course of their careers.

GRADE TAUGHT THE LONGEST. Analyzing the distribution of grades which the majority of teachers taught for the most years (grhigh) yielded little difference between the groups. The experimental group had spent most of their careers in Grades 1 and Grades 2. The control group had spent most of their time in Kindergarten or Grade 1 but had more teachers who had spent time in the Junior Division. The control group was more diverse in terms of what grade they had spend most of their professional time teaching. Figure 3 clearly illustrates the diversity of the control group.
Figure 3. Type of grades the experimental teachers (n=9) and control teachers (n=9) had spent the most years teaching over the course of their careers.

**Actual Years Teaching.** A difference between the two groups with respect to their experience was found. The experimental group had an average of 12 year of teaching (actualyrs) and the control group had an average of 22 years of teaching (actualyrs). The two groups differed significantly with p = .011. Figure 4 illustrates the difference in actual mean years of teaching experience between the experimental group and the control group.
Figure 4. Mean of actual years of teaching in the classroom for experimental teachers (n=9) and control teachers (n=9).

**Number of Grades Taught.** The number of grades (numgr) which the teachers had taught throughout their careers was recorded. All of the teachers in the sample had taught between one and five grades. Teachers were coded as having taught either 1, 2, 3, 4, or 5 grades. The mean number of grades taught for the experimental group was 3.22. The mean number of grades the control group had taught was 3.89. The two groups did not vary on this variable significantly, p = .288. They had a similar range of experience. Each group had taught between 3 and 4 grades throughout their career.

**Time in One Grade.** The longest time period that individual teachers spend in one grade (hiyrs) varied across the sample. Means are highly influenced by extreme scores, and had a basic mean comparison been done for this variable, this would have been the
case. One teacher had 35 years experience in kindergarten. In order to reduce the effects that this teacher might have on the overall analysis of this variable, the variable was recoded so that a scale was used. Teachers were coded as either having taught 1-5 years, 6-10 years, 11-20 years or over 20 years. The experimental group on average had the experience of 1-5 years in their longest taught grade (mean = 1.78). The control group on average spent 6-10 years (mean = 2.78) in one particular grade. The groups did not vary significantly on this variable (p = .567).

**Summary - Demographics of Sample.** In conclusion, there was a significant difference between the two groups in terms of their levels of experience, but only in the actual years that the two groups had been teaching. The control group had been in the classroom longer, an average of 12 years longer, than the experimental group. However, when experience was examined more closely in terms of the types of grades taught and the number of years spent in each grade, no statistically significant differences were found. Qualitatively, the experimental group tended to have spent most of their teaching years in a primary classroom whereas the control group had more experience across the grade divisions. The experimental group had also taken fewer Additional Qualification courses with literacy as a component than had the control group. Therefore, even though there was no statistically significant difference between the two groups, there was a systematic difference between them, favoring the control group.

The difference in the experience level between the teacher groups in this study is consistent with previous research as well. For example, in their study, Miller and Ellsworth (1985) developed an in-service professional development program of which a part examined knowledge and attitude towards reading. Their programme was open to all
elementary teachers in three medium-to-small Kansas school districts. Their sample consisted of those who participated in the program as well as "non-participants" who had not taken the course but agreed to undergo pre- and post-measures to serve as controls. They found that those who participated were more likely to be primary division teachers, less experienced teachers in terms of the number of years teaching, tended to hold fewer degrees, and had taken fewer reading courses. The findings of Miller and Ellsworth (19985) and the current study have implications for the way control groups are formed in that voluntary participation in a control group might not parallel the experimental group adequately. Another means of obtaining a control group might need to be secured.

Given the advantage in the amount of teaching experience, any advantage in knowledge of literacy terms by control group teachers might reflect their additional years of experience. On the other hand, if the controls do not outperform the experimental teachers in their knowledge of literacy terms, the question may be raised as to whether time in the classroom alone produces better, more knowledgeable teachers. In their study, Troyer and Yopp (1990) found that less experienced teachers had a greater familiarity with their target component, phonemic awareness. This suggests perhaps that the less experienced teachers were trained differently than their more experienced counterparts. A more detailed discussion of the impact of these potential differences and potential reasons will be discussed after an analysis of the degree of knowledge that these two groups possessed about literacy concepts.

Current Grade Level Affecting Knowledge

A preliminary analysis was performed to determine whether a teacher's current grade level might affect her degree of knowledge about literacy terms. In the context of
the current study, teachers from both the experimental group and control group were asked to explain their understanding of the target literacy terms and to provide an example of an activity they would use to promote the development of that concept in the classroom. The response the teachers gave in this context was not evaluated as a straight definition of a term, but was to reflect the teacher's understanding and application of literacy concepts. Irrespective of treatment group, (experimental or control), it might be expected that as teachers in different grades are responsible for enriching different levels of literacy skills, teachers of certain grades might have more specialized knowledge about the literacy terms most relevant to their particular grade. For example, a kindergarten teacher might be expected to have more knowledge about beginning literacy skills such as concepts of print and a grade two teacher might be expected to have more knowledge about text structures. Therefore, this preliminary analysis was to determine the potential effects of grade-specific prior knowledge on the current understanding of the literacy terms which were the focus on the professional development sessions.

An analysis of variance was used to determine the effects of grade level on knowledge of the different terms. As shown in Table 5, there were no differences in the knowledge of literacy terms of individuals who were currently Kindergarten, Grade 1, or Grade 2 teachers (6 teachers per grade).
Table 5
Results of Analysis of Variance of Literacy Terms by Grade Level

<table>
<thead>
<tr>
<th>Term</th>
<th>F</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motivation for Literacy</td>
<td>.357</td>
<td>.705</td>
</tr>
<tr>
<td>Concepts of Print</td>
<td>.255</td>
<td>.778</td>
</tr>
<tr>
<td>World Knowledge</td>
<td>.637</td>
<td>.542</td>
</tr>
<tr>
<td>Word Knowledge</td>
<td>.176</td>
<td>.840</td>
</tr>
<tr>
<td>Language Development</td>
<td>.507</td>
<td>.612</td>
</tr>
<tr>
<td>Listening/Thinking Skills</td>
<td>.119</td>
<td>.889</td>
</tr>
<tr>
<td>Sight Words</td>
<td>.896</td>
<td>.429</td>
</tr>
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<td>Phonological Awareness</td>
<td>.619</td>
<td>.552</td>
</tr>
<tr>
<td>Letter/Sound</td>
<td>.047</td>
<td>.954</td>
</tr>
<tr>
<td>Letter Formation</td>
<td>.326</td>
<td>.727</td>
</tr>
<tr>
<td>Complex Letter-Sound</td>
<td>.306</td>
<td>.741</td>
</tr>
<tr>
<td>Spelling</td>
<td>.065</td>
<td>.937</td>
</tr>
<tr>
<td>Schema Development</td>
<td>.675</td>
<td>.524</td>
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<tr>
<td>Fluency</td>
<td>.205</td>
<td>.817</td>
</tr>
<tr>
<td>Text Structures</td>
<td>.537</td>
<td>.595</td>
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<tr>
<td>Comprehension Strategies</td>
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<td>.295</td>
</tr>
<tr>
<td>Writing Conventions</td>
<td>1.056</td>
<td>.372</td>
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<td>Composition Strategy</td>
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<td>.205</td>
</tr>
<tr>
<td>Written Language Structures</td>
<td>.066</td>
<td>.936</td>
</tr>
</tbody>
</table>

Thus, for the relatively small sample of teachers involved in this study, there was no evidence of a correspondence between their knowledge of specific literacy terms and the grade level they were currently teaching. This lack of difference might reflect the fact that most teachers had experience with more than one grade level, or that the sample of teachers was too small and variable to reflect such differences, or that, in fact, their teaching experience has not had an impact on their conceptual understanding of literacy terms.
Effects of Time of Training on Knowledge of Literacy Terms

Because the sample group varied widely in their number of years in the classroom, it is likely that some teachers were trained in a much earlier time period than other. Thus, it was important to consider the time when the teachers in the study were trained to become teachers. It is conceivable that the time period when the teachers were in training to become teachers, either at the college or university level, might influence their knowledge of literacy concepts and terms. The teaching curriculum for training teachers is subject to the educational philosophy espoused at the time. For example, it might be argued that teachers who were trained relatively recently, in the past five years, might have been trained to promote literacy following a whole language philosophy, and, as a result, might be more familiar with concepts related to that philosophy. Conversely, teachers who were trained at a time when an initial emphasis on phonics was considered most appropriate, might have received direct exposure to the literacy terms and concepts emphasized in that framework.

To examine the potential influence of the time of training on teachers’ knowledge of literacy terms, the experimental group and control group teachers were subdivided into 2 categories. The variable which captured actual years of teaching in the classroom (actualyr) was used to determine how recently the individual teachers had attended their initial certification course to become a teacher. The two categories were: recent training and older training. The top 9 teachers on this scale were coded as “older training” and the bottom 9 teachers were coded as “recent training”.

Once the teachers were grouped, a Chi-square test was performed to determine whether within the group with recent training and the group with older training, there was
a difference in the teachers’ ability to define literacy terms corresponding to when they were trained. No significant differences were found between the two groups. These findings should be interpreted with caution as the sample size was extremely low and therefore the power of the test is questionable,

The overall conclusion about the relation between the era when teachers were trained and their knowledge of literacy concepts is that it does not appear to matter when the teachers obtained their certification in terms of their ability to define literacy concepts. Thus, experimental/control teacher differences in understanding of literacy concepts could reasonably be attributed to the professional development sessions.

MAIN ANALYSIS

Results and Discussion

Knowledge of Literacy Terms

The first main research question in this research was whether experimental teachers’ understanding of literacy concepts differed from that of the control teachers. If the professional development sessions had an effect on the experimental teachers, it would be expected that the experimental teachers would outperform the control teachers in their ability to define literacy concepts.

*Description of Terms.* Overall knowledge of literacy terms was initially examined across all terms comparing the experimental and the control teachers. The highest possible mean for either group on any term was 5.00. The experimental group outperformed the control group in their overall total scores, with the total mean score across terms being 4.07 for the experimental group and 3.08 for the control group. This finding
would be expected if the experimental group profited from the professional development in which this terminology was employed. Not only was the mean total score higher for the experimental group but, as shown in Figures 5 and 6, the experimental groups mean scores were higher for all but one term. (For "composition strategies", on this term, the experimental group's mean score was 3.56, slightly below that of the control group's mean of 3.89.)

![Graph of mean scores of literacy terms 1-9 for experimental teachers (n=9) and control teachers (n=9).](image)

Figure 5. Graph of mean scores of literacy terms 1-9 for experimental teachers (n=9) and control teachers (n=9).
Figure 6. Graph of mean scores of literacy terms 10 - 19 for experimental teachers (n=9) and control teachers (n=9).
In order to determine whether the overall difference, collapsing across all literacy terms, was statistically significant between experimental and control teachers a t-test was performed. The results, shown in Table 6 indicated that the experimental teachers were much more knowledgeable about the literacy concepts than were the control teachers (p<.0001). One tailed tests were done as it was expected that the experimental teachers would performed better on defining the terms as they had been involved in the professional development sessions. There was a statistically significant difference between the experimental group and the control group as outlined in Table 6.

Table 6
One-Tailed t-Test
Means and Standard Deviations across all Literacy Terms

<table>
<thead>
<tr>
<th></th>
<th>Experimental</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td>77.34</td>
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</tr>
<tr>
<td>SD</td>
<td>5.48</td>
<td>5.7</td>
</tr>
<tr>
<td>p</td>
<td>&lt; .0001</td>
<td></td>
</tr>
</tbody>
</table>

Based on the mean results above, it would appear that the response to the first research question is that experimental teachers had a better overall understanding than the control teachers of the target literacy terms. Examination of teachers’ knowledge of each individual literacy term was also undertaken to determine which concepts were better understood by the experimental teachers. One tailed t-tests were used to compare the means of the two groups on their ability to define individual terms to determine if differences in the means were significant. Table 7 outlines the results. Due to the fact that there were several t-tests being performed simultaneously on the same data set, a
Bonferroni Correction (See Appendix C) was done in order to lower alpha and ensure that the overall chance of making a Type I error remains less than .05. This test is a conservative one which requires larger differences before a result can be declared significant.

Table 7
*Significance Levels of One-Tailed t-Test
Means and Standard Deviations for Literacy Terms*

<table>
<thead>
<tr>
<th>Term</th>
<th>Experimental</th>
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<th>Control</th>
<th></th>
<th></th>
<th>Sig</th>
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<td>SD</td>
<td>X</td>
<td>SD</td>
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<tr>
<td>Motivation for Literacy</td>
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<td>.67</td>
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</tr>
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<td>Concepts of Print</td>
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<td>2.44</td>
<td>.88</td>
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<td>World Knowledge</td>
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<td>3.22</td>
<td>1.09</td>
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<td></td>
</tr>
<tr>
<td>Word Knowledge</td>
<td>3.44</td>
<td>.88</td>
<td>2.22</td>
<td>.44</td>
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<tr>
<td>Language Development</td>
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<td>.83</td>
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<tr>
<td>Sight Words</td>
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<td>.53</td>
<td>3.22</td>
<td>.67</td>
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</tr>
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<td>.33</td>
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<td>.44</td>
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</tr>
<tr>
<td>Complex Letter-Sound</td>
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<td>1.00</td>
<td>3.22</td>
<td>.83</td>
<td></td>
<td>*</td>
</tr>
<tr>
<td>Written Language Structures</td>
<td>3.33</td>
<td>1.73</td>
<td>2.67</td>
<td>1.22</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: Scores potentially range from 1-5 on each item

Note: * p < .05
** p < .01
*** p < .001
Overall, of the 19 terms, the experimental teachers were significantly more knowledgeable about 14 than were the control teachers. For only five terms were there no significant differences between the performance of the experimental and control teachers. These five terms were: world knowledge, language development, complex-letter sounds, comprehension strategies and written language structures.

Six terms were statistically significant between the two groups at the p < .05 level. These terms were: phonological awareness, letter-sound connections, spelling, fluency, text structures, and composition strategies. Three of these terms are focused more on reading and they are: phonological awareness, letter-sound connections, and fluency. A teacher's understanding of the concept of phonological awareness is crucial in terms of beginning reading development. Research has repeatedly demonstrated that a reader needs to have phonological awareness in order to develop good reading skills (Adams, 1994, 1990; Beck & Juel, 1992; Bergeron, 1990; Liberman & Liberman, 1992; Pressley, 1994; Troyer & Yopp, 1990). A teacher with an understanding of the concept of phonological awareness and its role in reading is better prepared to teach reading both to a classroom of beginning readers, and, especially, to those at risk for failure. In conjunction with phonological awareness, letter-sound connections assist beginning readers to make sense of text. Once these two skills are in place, fluency in reading can develop. Once fluency is established, readers can then to focus on learning from texts.

One term was significant at p < .01 level, schema development. When examining the responses given by the experimental group and control group combined, this term was the one with the highest coded responses of “no idea/passed” (n=5). When the identity
of the respondents was further analyzed, all of the “no idea/passed” responses were given by members of the control group.

Seven terms were statistically significant at $p < .001$ level. There terms were: motivation for literacy, concepts of print, word knowledge, listening/thinking skills, sight words, letter formation, and writing conventions. These terms are associated with beginning literacy skills which were the primary focus of the professional development sessions. These beginning literacy skills are the foundation of good reading and writing skills and therefore all teachers should have a sound understanding of this terminology (Adams, 1990; Bradley & Moats, 1997). The professional development sessions appeared to contribute towards developing a further understanding of these terms for the experimental teachers.

In order to clearly compare and contrast the knowledge of the experimental and control teachers’ knowledge of literacy terms, the terms were ranked from the highest mean to the lowest. Table 8 outlines the results of ranking the mean scores of the experimental and control groups’ definitions of the literacy terms.
Table 8

Rankings of Literacy Terms

<table>
<thead>
<tr>
<th>Experimental Term</th>
<th>X</th>
<th>Ranking</th>
<th>Control Term</th>
<th>X</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>4.89</td>
<td>1</td>
<td>Complex Letter-Sound</td>
<td>4.00</td>
</tr>
<tr>
<td>2</td>
<td>4.67</td>
<td>2</td>
<td>Comprehension Strategies</td>
<td>3.89</td>
</tr>
<tr>
<td>3</td>
<td>4.56</td>
<td>3</td>
<td>Listening/Thinking Skills</td>
<td>3.78</td>
</tr>
<tr>
<td>4</td>
<td>4.44</td>
<td>4</td>
<td>Spelling</td>
<td>3.56</td>
</tr>
<tr>
<td>5</td>
<td>4.33</td>
<td>5</td>
<td>Language Development</td>
<td>3.44</td>
</tr>
<tr>
<td>6</td>
<td>4.33</td>
<td>5</td>
<td>Fluency</td>
<td>3.44</td>
</tr>
<tr>
<td>7</td>
<td>4.22</td>
<td>6</td>
<td>World Knowledge</td>
<td>3.22</td>
</tr>
<tr>
<td>8</td>
<td>4.22</td>
<td>6</td>
<td>Sight Words</td>
<td>3.22</td>
</tr>
<tr>
<td>9</td>
<td>4.11</td>
<td>7</td>
<td>Composition Strategies</td>
<td>3.22</td>
</tr>
<tr>
<td>10</td>
<td>4.00</td>
<td>8</td>
<td>Writing Conventions</td>
<td>3.11</td>
</tr>
<tr>
<td>11</td>
<td>3.78</td>
<td>9</td>
<td>Motivation for Literacy</td>
<td>2.78</td>
</tr>
<tr>
<td>12</td>
<td>3.67</td>
<td>10</td>
<td>Written Language Structures</td>
<td>2.67</td>
</tr>
<tr>
<td>13</td>
<td>3.67</td>
<td>10</td>
<td>Concepts of Print</td>
<td>2.44</td>
</tr>
<tr>
<td>14</td>
<td>3.56</td>
<td>11</td>
<td>Phonological Awareness</td>
<td>2.44</td>
</tr>
<tr>
<td>15</td>
<td>3.44</td>
<td>12</td>
<td>Word Knowledge</td>
<td>2.22</td>
</tr>
<tr>
<td>16</td>
<td>3.44</td>
<td>13</td>
<td>Schema Development</td>
<td>2</td>
</tr>
<tr>
<td>17</td>
<td>3.33</td>
<td>13</td>
<td>Text Structures</td>
<td>1.89</td>
</tr>
</tbody>
</table>

One term, letter/sound connection, shared equal ranking between the experimental group and the control group. There were three terms which differed in ranking by one position: listening/thinking skills, spelling, and fluency. These four literacy concepts are foundation concepts in teaching regardless of the philosophy a teacher espouses.

The term which possessed the largest difference in ranking between the experimental and control groups was “comprehension strategies”. There was a 10 place
difference in ranking between the experimental group with a ranking of 12 and the control group with a ranking of 2. An interesting aspect of this result is when looking at the actual means, "comprehension strategies" was the term with the second highest mean for the control group overall (3.89). The ranking of 2 for the experimental group on this term reflected a mean of 3.56. This finding demonstrates the clear difference between the two groups knowledge of literacy terms, with the experimental group being more knowledgeable. A term ranked in the top two terms in a ranking for the control group is one of the lowest ranking terms for the experimental groups, yet the means are close enough that they are not statistically significant.

Summary - Literacy Terms. Overall, the experimental teachers who had participated in the professional development sessions appeared to better understand the target literacy terms than the control teachers who had not participated in the professional development sessions. Experimental teachers were able to provide more accurate definitions and appropriate classroom activities to develop them for 14 of 19 terms (73% of terms). The next section provides an analysis of any impact that a teacher's experience in the classroom might have had on the teachers' knowledge of literacy concepts and their applications.

Effects of Teaching Experience on Knowledge of Literacy Terms. Although the preliminary examination of the experimental and control teachers' background indicated that the control teachers, as a group, had more experience as teacher that finding does not directly assess the relation between teaching experience and understanding of literacy concepts. Examining whether or not the actual number of years that teachers spend in the classroom correlated with their ability to define literacy concepts could indicate the role
that experience might play on a teacher's development. Likewise, the role that professional development might play on a teacher's development might also be examined through this comparison. Do teachers learn literacy concepts directly by spending time in the classroom or do they require direct instruction or specific exposure to concepts in order to further develop their skills and knowledge? Using a Pearson Correlation, the actual number of years teaching was correlated with the teachers knowledge of terms to determine if years of experience in the classroom had any effects on their ability to define literacy concepts. Table 9 outlines the results.

Table 9

Correlations Between Actual Years of Teaching and Knowledge of Literacy Concepts

<table>
<thead>
<tr>
<th>Term</th>
<th>r</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motivation for Literacy</td>
<td>-.31</td>
<td>ns</td>
</tr>
<tr>
<td>Concepts of Print</td>
<td>-.32</td>
<td>ns</td>
</tr>
<tr>
<td>World Knowledge</td>
<td>-.13</td>
<td>ns</td>
</tr>
<tr>
<td>Word Knowledge</td>
<td>-.41</td>
<td>0.09</td>
</tr>
<tr>
<td>Language Development</td>
<td>-.23</td>
<td>ns</td>
</tr>
<tr>
<td>Listening/Thinking Skills</td>
<td>-.52</td>
<td>0.025*</td>
</tr>
<tr>
<td>Sight Words</td>
<td>-.50</td>
<td>0.034*</td>
</tr>
<tr>
<td>Phonological Awareness</td>
<td>-.27</td>
<td>ns</td>
</tr>
<tr>
<td>Letter/Sound</td>
<td>-.42</td>
<td>0.08</td>
</tr>
<tr>
<td>Letter Formation</td>
<td>-.41</td>
<td>0.09</td>
</tr>
<tr>
<td>Complex Letter-Sound</td>
<td>+.10</td>
<td>ns</td>
</tr>
<tr>
<td>Spelling</td>
<td>-.47</td>
<td>0.05</td>
</tr>
<tr>
<td>Schema Development</td>
<td>-.30</td>
<td>ns</td>
</tr>
<tr>
<td>Fluency</td>
<td>-.01</td>
<td>ns</td>
</tr>
<tr>
<td>Text Structures</td>
<td>-.32</td>
<td>ns</td>
</tr>
<tr>
<td>Comprehension Strategies</td>
<td>-.12</td>
<td>ns</td>
</tr>
<tr>
<td>Writing Conventions</td>
<td>-.36</td>
<td>ns</td>
</tr>
<tr>
<td>Composition Strategies</td>
<td>-.58</td>
<td>0.011*</td>
</tr>
<tr>
<td>Written Language Structures</td>
<td>+.06</td>
<td>ns</td>
</tr>
</tbody>
</table>
For only three terms was there a significant correlation between years in the classroom and knowledge of terms: listening/thinking skills, sight words, and composition strategies. It should be noted, however, that the correlations were all negative, indicating that teachers with more years of experience had a lower level of knowledge of specific literacy terms. Conversely, the fewer years of experience that the teachers had, the greater was their knowledge of specific literacy terms.

Even though the majority of these results were not statistically significant, the direction of the relationship is worth noting. For 17 of the 19 correlations, the relationship was inverse, higher numbers of years on the experience dimension were related to lower scores on knowledge of literacy terms. This may have implications for teacher professional development both pre-service and in-service.

These results are consistent with those of Troyer and Yopp (1990) who found in their study on phonemic awareness and Kindergarten teachers that “less experienced teachers indicated greater familiarity with target concepts as did teachers holding master’s degrees”. They attribute their results to the on-going educational problem of a lack of “timely dissemination of research information to teachers” (p.39).

These findings begin to suggest that classroom experience is not in and of itself adequate in terms of developing or maintaining a teacher’s understanding of literacy concepts. As research evolves so must the understanding of teachers. The above analysis confirms that teachers should ideally be exposed to professional development founded on recent research findings on a regular basis throughout their careers. This conclusion is in keeping with the position of Snow, Burns, and Griffin (1998) who indicate that “more
experienced teachers must continue receiving substantive and effective in-service opportunities” (p.284). Otherwise, it is possible, as the negative correlations above suggest, that a teacher’s knowledge base may not be maintained.

**Categorical Variables - Teacher Beliefs and Practices**

Categorical variables were generated to examine the pedagogical practices of the teachers in the sample. The variables were grouped into four general categories: 1) Teaching Philosophy/Programme Description, 2) Classroom Practices, 3) Goals and Evaluation, and 4) Students at Risk.

These four categories of variables were developed in order to address three of the specific research questions in this investigation. Categories one and two were developed in order to address the question: Do stated teacher beliefs differ between the experimental teachers who participated in the professional development and the control teachers who did not? Category three variables were to address the question: Do experimental teachers set literacy goals and evaluate their students in a similar fashion to control teachers? Category four variables addressed the question: Is there a difference between the way experimental teachers define “at-risk” students and the way that control teachers define “at-risk” students?

Nineteen variables were derived from the responses teachers gave on the interview. A full description of the question asked to elicit the answer as well as how the answers were later categorized and scored can be found in Appendix B. The breakdown of variables in each category is outlined below.

The first category Teaching Philosophy/Programme Description encompassed the following variables: Role of the Teacher, Description of Teaching Style, Description of
Programme, Materials the Teachers Read, Materials the Students Read, How Teachers Motivate Students. Initially, this category also contained a variable which was intended to determine if teachers perceived the current level of achievement of a student as a factor in teaching and programming for that student. All teachers indicated that achievement level was a factor in student programming, therefore as a variable this one was not used directly in any part of the analysis.

The second category, Classroom Practices, encompassed the variables: Routine Students Use to Ask for Help, Routine when Students Finished Work, and Procedure if Student Gives Wrong Answer to a Question.


The final category, Students at Risk, had two variables: How Determine if Student At Risk and How Help Students at Risk.

Initially these variables were used to determine whether all teachers follow the same general pedagogical practices. If they did, then a comparison of their knowledge of literacy terms would not necessarily be confounded by different pedagogical practices. If all teachers, experimental and control, held the different pedagogical practices, it may be these different practices which impact on their knowledge of literacy terms as opposed to the condition of being exposed to professional development sessions or not.

Analysis of Categorical Variables. All categorical variables were eventually scored on a dichotomous scale (See Method section for a review of how the categorical
variables were coded.). In order to analyze the results and determine where the responses of the experimental teachers were any different from those of the control teachers a chi-square Test was employed since it allows for the analysis of categorical variables when there are two or more responses or outcomes. Specifically, testing of an hypothesis about the proportion of cases falling into several mutually exclusive groups can be performed. In this circumstance, the interest lies in the proportions of experimental and control teachers' responses to several questions. It was hypothesized that the pattern of responses for the experimental teachers who had been exposed to professional development sessions would be different that control teachers who were not exposed to professional development. Due to the small size of the sample, the power of the chi-square is very low, and, as a result, findings should be interpreted with caution. Table 10 summarizes the findings of the chi-square tests.

Table 10
Results of Chi-Square Test for Categorical Variables

<table>
<thead>
<tr>
<th>Variable Name</th>
<th>Explanation of Variable</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Teaching Philosophy/Program Description</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trole</td>
<td>Role of the Teachers</td>
<td></td>
</tr>
<tr>
<td>tch.style</td>
<td>Description of Teaching Style</td>
<td>0.003 **</td>
</tr>
<tr>
<td>prodes</td>
<td>Description of Program</td>
<td></td>
</tr>
<tr>
<td>you.rd</td>
<td>Materials the Teachers Read</td>
<td></td>
</tr>
<tr>
<td>they.read</td>
<td>Materials the Students Read</td>
<td>0.018 *</td>
</tr>
<tr>
<td>motstudn</td>
<td>How Motivate Students</td>
<td></td>
</tr>
<tr>
<td>(2) Classroom Practice</td>
<td></td>
<td></td>
</tr>
<tr>
<td>help</td>
<td>Routine to Ask for Help</td>
<td>0.058</td>
</tr>
<tr>
<td>finish</td>
<td>Routine if Finished Work</td>
<td></td>
</tr>
<tr>
<td>wrongq</td>
<td>If Student Gives Wrong Answer to a</td>
<td></td>
</tr>
</tbody>
</table>
Question

(3) Goals and Evaluation Practices

<table>
<thead>
<tr>
<th>yrgoals</th>
<th>Year End Goals</th>
<th>ns</th>
</tr>
</thead>
<tbody>
<tr>
<td>howgls</td>
<td>How Achieve Goals</td>
<td>ns</td>
</tr>
<tr>
<td>evalupro</td>
<td>Procedures of Evaluation</td>
<td>ns</td>
</tr>
<tr>
<td>evalrec</td>
<td>Records Kept for Evaluation</td>
<td>ns</td>
</tr>
<tr>
<td>evalrpt</td>
<td>How Report Results</td>
<td>0.058</td>
</tr>
<tr>
<td>promod</td>
<td>How Use Student Progress</td>
<td>ns</td>
</tr>
<tr>
<td>stu.prog</td>
<td>Are Students Informed of Their Progress</td>
<td>0.023 *</td>
</tr>
</tbody>
</table>

(4) Students At Risk

<table>
<thead>
<tr>
<th>risk.id</th>
<th>How Determine if Student At Risk</th>
<th>ns</th>
</tr>
</thead>
<tbody>
<tr>
<td>helprisk</td>
<td>How Help Students at Risk</td>
<td>ns</td>
</tr>
</tbody>
</table>

* p < .05
** p < .01

As shown in Table 10, the overall findings suggest that there were some very subtle differences in the self-reported patterns of the experimental teachers and the control teachers. On 5 of the 19 variables there was some indication that the professional development may have had an impact on teachers’ beliefs and classroom practices. In the following sections each category will be examined separately.

(1) Philosophy of Teaching

Teacher’s Role. Examining the first category, teacher’s self-reports of their philosophies of teaching and the description of their program, there were few differences between the experimental teachers and the control teachers. Fundamentally, both groups of teachers perceived the role of the teacher to be one of imparting knowledge and skills
to their students. The difference in the responses to this question was whether the teachers, in addition to imparting knowledge and skills, perceived themselves to be role models/guides or whether they felt their role was to provide support for their students. Those teachers who felt their role to be that of a guide/role model displayed the types of behavior they wished their students to emulate. The teachers who indicated that they felt it necessary to provide support to their students explained that often the emotional as well as educational facets of their students needed to be considered when planning curriculum. The teachers’ status as experimental or control was not the determining factor as to whether they viewed themselves as role models or as providers of support. Therefore, it appears that the current professional development sessions did not impact on the teacher’s sense of their role as a teacher.

**Teaching Style.** Even if the teachers’ reports of their role appeared to be unaffected by exposure to professional development, how teachers self-described their teaching styles did appear to differ between the two groups. Teachers in the experimental condition were more likely to indicate that their style was a mixture of methodologies and flexible to meet students’ needs. The control teachers were more likely to describe themselves as adhering to a fairly structured, teacher-directed program. There is literature that suggests that teaching style and teaching beliefs might have an impact on what skills teachers focus upon which in turn can reflect what children learn (e.g., Gomez Madison & Speaker, 1994). Gomez Madison and Speaker note how eclectic classrooms, those that are a mixture of methodologies, are often characterized by an approach that incorporates both theme-teaching and skills-teaching, which is how the experimental teachers in the current study describe themselves. Teacher-directed classrooms, as the
controls in the current study characterized themselves, were characterized by skills-based instruction with fewer activity centers. In order for skills-based instruction in literacy to occur, an understanding of the skills (i.e., literacy concepts and terms) students need to become effective readers would be required. Given the type of pattern in the current sample, it might be expected that the control teachers would have been more knowledgeable about literacy terms and concepts as by their self-reports they might be expected to be focusing on skills-based instruction. However, this did not turn out to be the case.

The fact that teaching style was different between the two groups is significant. However, it would be premature to state that the teaching styles of the teachers had changed. Because there was no measure to determine what the experimental teachers' styles were prior to professional development and because the sample size is relatively small, the above finding must be interpreted with caution. Wragg (1982) cited a study by Withall and Fagan which examined teaching style and found that although the teachers made greater use of teacher-prepared material which they had learned to create through in-service, their predominant teaching style had not changed. Further analysis on this variable is warranted prior to conclusions being drawn.

Programme Description. Even though teachers' self reports differed in terms of the way they explained their teaching style, there was no significant difference in how the experimental and groups control described their programs. The experimental teachers were no more likely to report that they were using a phonics component than were the control teachers even when there was a definite phonics component in the professional development sessions. The responses to this question highlight a possible difficulty with
a self-report design for a study. It is conceivable that teachers were reticent to disclose if their practices deviate from any School Board recommended practices.

*Materials Teachers Read.* In keeping with their responses to self-reports about their programs, experimental and control teachers’ self-reports did not differ significantly in terms of the types of materials they read to their students. Regardless of the experimental condition which teachers were exposed to, they reported that they read one of two types of texts. Some indicated that they read books according to the themes they were working on with the children. Alternatively, they mentioned that they model reading books which were at the children’s level. A prediction as to what group a teacher (experimental or control) belonged to could not be made on the basis of her response to this question.

*Student Reading Materials.* There was a significant difference seen in the self-reports of teachers in terms of what types of materials they had their students reading in class. The teachers in the control condition reported that the books their students read were in keeping with the theme under study or were a part of a series which the class had been working with on a regular basis. In contrast, the experimental teachers indicated that they materials their students read, regardless of content, were more likely to be leveled to suit that student’s ability. Research has demonstrated that giving students material appropriate to their reading level facilitates the reading process (Adams & Bruck, 1993; Rosenshie & Stevens, 1984). Of interest, is the observation that even though all teachers felt philosophically that a student’s current achievement level was important for programming for that student, in practice, when the control teachers taught
reading, they were not directly factoring their student's ability into the materials actually used in the classroom.

**Motivation of Students.** Teachers' self-reports as to how they motivated students did vary in terms of method of motivation. Teachers indicated that they either used the actual content of their class to maintain motivation or they viewed external factors such as positive reinforcement for performance, teacher reactions to the content, and rewarding appropriate behavior as the two differing ways to motivate their students. One could not determine whether or not a teacher had been exposed to the professional development sessions based on their response to this question.

(2) **Classroom Practice**

Self-reported responses as to the types of routines maintained in the classroom for dealing with students who had finished their work, statistically, revealed no differences between the experimental and the control teachers. Nor was there a difference between the experimental and control teachers in how they navigated in classroom situations where students gave a wrong response to a question asked. It should be noted that the variable "Routine to Ask for Help" did approach significance (p = .058). No solid conclusions can be made on this initial statistic. What this statistic does indicate is that perhaps change is slow and a follow-up study might reveal that change in the experimental teachers classroom practice might have begun at the time of the current study but that stated differences occurred longer after exposure to professional development. These results are in keeping with little difference noted between experimental teachers and control teachers in terms of their overall, broad, description of their program.
(3) Goals and Evaluation Practices

One of the specific research questions asked by the present investigation was to determine if the experimental teachers would change how they set goals and evaluate their students in the area of literacy as the result of professional development. It would be expected that the experimental teachers would set more detailed literacy goals for their students in keeping with the professional development sessions. It would also be expected that the experimental teachers evaluated their students specifically in terms of the detailed literacy goals that they had been exposed to through the professional development sessions. It was hypothesized that the evaluation criteria used by the control teachers might not be as specific.

The statistical analysis undertaken to determine whether or not this was the case did not reveal any differences between the experimental and control groups on any of the variables devised to assess this dimension. One possible interpretation of finding was that the teachers in the experimental group did not internalize the new information gained through professional development and subsequently did not apply it. However, based on the analysis done on their understanding of the literacy concepts of the professional development this is not the case. The variable, “How Report Results”, supports the idea that the experimental teachers did internalize the content of the professional development sessions and were, at the time of the current study, in the process of fully internalizing this content. This variable approached significance (p=.058) possibly suggesting that implementation of the new material was in the process of occurring, yet, was at the point, at the time of the current study, that there was no statistically significant changes to note.
An alternate suggestion might be that teachers have specific Board of Education and in-school requirements that they must meet when setting goals and evaluating students. It is possible that the way the school board requests that teachers set goals and evaluate their students will not directly reflect the information learned throughout the professional development sessions. However, the fact that it was the variable, “How Report Results”, which approached significance might begin to suggest that change might be able to be successfully initiated by teachers and that teachers can suggest changes that will be accepted in-school in terms of their evaluation practices.

Experimental teachers also varied significantly from the control teachers in the way they kept their students informed of their progress. The experimental teachers tended to include their students more in the evaluation process. They reported that their students received regular feedback throughout the term as opposed to only when official reports were due. The teachers in the control group reported that they tended to keep students informed of their progress mainly when reports were officially requested by the School Board.

(4) Students at Risk

The final research question was; Is there a difference between the way experimental teachers define “at-risk” students and the way that control teachers define “at-risk” students? This question can be answered through examining the results of the final two variables explored. Between the experimental group and the control group, there were no actual differences found as to how teachers determined a student was at risk nor how they assisted at risk students. Results for these variables must be interpreted with caution. The sample size was very low and due to the nature of the responses given
by the teachers, these two variables' responses were coded as belonging to one of three categories as opposed to one of two categories like the previous variables. The reason for this was that the complexity of the responses which teachers gave could not be captured in two categories. As a consequence, the results may not have been strong enough in order to accurately reflect the true understanding of the teachers in either condition.

Summary - Categorical Variables. Overall, on the surface it does not appear that the professional development sessions had a substantial and immediate impact on the teachers' belief systems, setting of goals and evaluation of students, nor on teachers' ability to define "at-risk" students. However, in many regards, change is not likely to have taken place at the time that the interviews took place. The interviews occurred immediately after the termination of the professional development sessions. The categories that were being examined are foundation components of teaching. What a teacher believes philosophically can take several years to firmly establish. The goals that teachers possess for their students are in part School Board-driven and are partially belief-driven as teachers often have goals for their students which might not be directly mandated by the Board or which are more explicit. Often, a teacher uses years of experience and observation to determine what behaviors the "at-risk" student exhibits. The fact that there was an indication of minor change (on 5 of the 19 variables) could indicate that the professional development sessions were successful as teachers were beginning to challenge their existing views and to start thinking about change. To accurately determine the effects of change in this area, a follow-up interview in six to twelve months' time could more accurately establish the extent of change. As Guskey's
(1986) model of teacher change indicates, change in classroom practice precedes change in beliefs.

*Possible Relationships Between Teaching Practices and Knowledge of Terms*

Further analysis was done to determine if any relationship existed between how teachers actually taught and viewed their programs (categorical variables) and their knowledge of literacy terms (the interval variables). The general question being examined was: Does increased knowledge about a specific area like literacy affect other classroom practices which might be related, such as evaluation procedures and programming? The answer to this question could address why it is that different teachers, all exposed to the same professional development sessions might be better able to define different literacy concepts. For example, are teachers who perceive their role as imparting skills to their students, more likely to be able to define specific literacy concepts like "phonemic awareness"? Alternately, are teachers who view their role as a role model able to better define more general concepts like "language development"?

To obtain the answers to these questions, a point biserial correlation was used because it allows for an examination of relationships between dichotomous variables and interval variables. Due to the nature of this type of correlation, the direction of the relationship as either positive or negative can not be determined. The use of dichotomous variables cause this to be the case. However, this analysis does allow for the determination of the existence of a relationship. If a relationship is established, further study into the basis for the relationship can be undertaken.
The first point-biserial correlation which was computed used the entire sample size and, therefore included experimental and control teachers. Literacy terms and categorical variables which had no significant results were omitted from the table. There were 8 of a possible 19, or 42%, of the categorical variables which showed no relationship to any literacy terms. The literacy terms which showed no relationship to any dichotomous variables were: word knowledge, language development, letter-sound connection, spelling and written language structures. There were 11 of a possible 19, or 57%, of the categorical variables which showed some degree relationship to at least one literacy term.

In order to analyze the results more conservatively, due to the small sample size and due to the fact that the direction of the relationship could not be determined, it was decided to examine only those literacy terms which had a relationship to two or more categorical variables. This would minimize the existence of chance relationships. Examining only those literacy terms that were found to be related to two or more categorical variables was a conservative analysis. It could possibly provide a starting point if further research was initiated to determine more accurately, the relationship between knowledge of literacy terms and teaching practice. Results can be found in Table 11.
Table 11
Results of Point-Biserial Correlation
Literacy Terms Correlated with Two or More Categorical Variables

<table>
<thead>
<tr>
<th>Literacy Terms Correlated with Two or More Categorical Variables</th>
<th>Teach Role</th>
<th>Teach Style</th>
<th>Prog Descrip</th>
<th>Mot. Stud</th>
<th>Eval Recs</th>
<th>Eval Report</th>
<th>Help Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motivation for Literacy</td>
<td>.55</td>
<td>.53</td>
<td>.49</td>
<td></td>
<td></td>
<td></td>
<td>.51</td>
</tr>
<tr>
<td>World Knowledge</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.54</td>
</tr>
<tr>
<td>Complex Letter-Sound</td>
<td></td>
<td></td>
<td></td>
<td>.51</td>
<td>.52</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Text Structures</td>
<td></td>
<td>.47</td>
<td>.53</td>
<td>.49</td>
<td></td>
<td></td>
<td>.50</td>
</tr>
<tr>
<td>Comprehension Strategies</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.53</td>
<td>.65</td>
</tr>
<tr>
<td>Composition Strategies</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Strategies</td>
<td></td>
<td></td>
<td>.53</td>
<td>.48</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

p<.05

Note: As the direction (positive or negative) of the relationship cannot be determined due to the nature of the test, the + and - signs have been omitted.

It is interesting to note that all of the terms above are ones that reflect more general skills. It is more likely that both the experimental teachers and the control teachers would come in regular contact with these skills throughout the courses of their careers. The only solid statement which can be made about the above results, as the direction of the relationship is unknown, is that knowledge about a particular curriculum area like literacy does appear to impact actual classroom practice in some way. Further study is required prior to being able to make a statement such as: a teacher’s self-reported knowledge about how texts are structured will cause them to actively use this information when planning their program and teaching their students. They might be more likely to use this knowledge when choosing texts to read. They might also use this
information to guide their students' understanding about how texts are structured by making this knowledge explicit. The above results suggest that further study is necessary to determine what the impact is of a teachers' degree of knowledge on their teaching practices.

As the focus of this study was on the impact of professional development, a point-biserial correlation was done which separated the experimental teachers and the control teachers. It was reported previously that as a group, there was a significant difference between the experimental and the control group in terms of their understanding of literacy terms, with the experimental teachers demonstrating a higher degree of knowledge. The results of the second point-biserial correlation were the following: for the control teachers, there was absolutely no relationships between any literacy terms and any teaching practices (categorical variables). The experimental group did not follow the same pattern. Their results are presented in Table 12.

Table 12
Results of Point-Biserial Correlations
Experimental Teachers

<table>
<thead>
<tr>
<th></th>
<th>Help</th>
<th>Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>D1 Motivation for Literacy</td>
<td>.78</td>
<td></td>
</tr>
<tr>
<td>D15 Text Structures</td>
<td>.74</td>
<td></td>
</tr>
<tr>
<td>D16 Comprehension Strategies</td>
<td>.78</td>
<td></td>
</tr>
</tbody>
</table>

p< 0.05

Note: As the direction (positive or negative) of the relationship cannot be determined due to the nature of the test, the + and - signs have been omitted.
Overall, it appears that the self-report of the teachers in the experimental condition with respect to their definitions of literacy concepts correlated with their self-reports of how they assisted at-risk students. Further study is necessary to validate the possible inference that teachers in the experimental condition, as the result of their better understanding of literacy concepts might, be better equipped to assist students who are at risk of literacy failure.

LIMITATIONS OF THE STUDY

There were several methodological limitations which presented themselves throughout the course of the present study. Sample size was the major issue. Ideally, the sample size would have been larger to ensure the generalizability of results.

Repeating the follow-up interviews each time a series of professional development sessions are held and collating all the data would improve the reliability of results.

The selection of teachers for the control group can also be viewed as potentially problematic. Attempts were made to ensure that the control group was a random as possible and thus volunteers were solicited. Examining the teacher background of the control group, however, it is evident that this group might not accurately reflect the general population of teachers. Instead, this group tended to be older, more experienced, teachers who were likely comfortable enough with their teaching to share their experiences. For a more representative group, the control teachers might have been gathered from a potential list of teachers who were interested in undergoing the intensive professional development sessions next time it took place.
The current study used differences between the experimental and control groups as indicating change as a reflection of the professional development. However, for this case to be made more valid, it would have been necessary to interview the experimental teachers prior to the sessions and determine that their responses were the same as the control teachers. This would have made the conclusion stronger that it was the professional development sessions themselves which resulted in change. Alternately, it can be proposed that potentially it was the experimental group’s prior knowledge which had a larger impact on the difference between the two groups. This was the case in a study by Miller and Ellsworth (1985) who found that prior to in-service courses, “teachers who chose to participate demonstrated significantly higher levels of knowledge of reading instruction”. This factor needs to be controlled for in future study.

Initially, a qualitative approach was taken in formulating the teacher interview and scoring the results. One way to overcome the obstacle of having to move from a qualitative design to a quantitative design would have been to insist that teachers allow their interviews to be audio-taped. However, the quality of the responses might be compromised in this situation. Teachers might be reticent to disclose as fully as they might without the tape-recorder present. An alternate approach might be to have the teachers write their response to the questions as opposed to responding orally.

At times, change is slow. As a result, it is possible that at the time of the interviews, the experimental teachers might not have completely processed the new information sufficiently to implement change in the classroom or to change beliefs. A follow-up study done several months after the professional development sessions had
been completed would indicate more clearly permanent change and its extent. Linking this study to student outcomes is another potential area for further research.

If this study were to be undertaken again, it would be interesting to control not only for experience levels of the teachers but for those characteristics which are considered as prerequisites for change. Asking the teachers questions which would target an in-depth explanation of their management skills would facilitate and evaluation of how the management skills of teachers can impact on their acquisition of information and or new skills.

The interim results of this study demonstrate that there might be some significant gains which can be made in teachers' understanding of target concepts, in their stated beliefs as teachers, as well as in their practice in the classroom as the result of professional development in literacy. In order for changes to take place, professional development should encompass opportunities to learn about both theory and application. Teachers were presented with a comprehensive, integrated and balanced model for understanding the overall development of literacy. This model appeared to be effective in guiding teachers as to how to translate theory into practice.

GENERAL DISCUSSION

The over-arching goal of any professional development is to expand teachers' knowledge. The specific goal for the professional development sessions under evaluation was to determine in what ways the understanding of literacy concepts and the stated beliefs and practices of elementary school teachers (in Kindergarten, Grade 1 and Grade 2) who had engaged in literacy-focused professional development differ from teachers who had not participated in such professional development.
Generally, there was strong evidence indicating that the experimental teachers had a greater understanding of literacy terms and concepts than did the control teachers. The experimental teachers were able to provide a more detailed self-report of the target literacy concepts and to provide suggestions of appropriate classroom activities to reinforce those concepts. Additionally, the degree of specific knowledge about target concepts was greater significantly among teachers who underwent professional develop than among those who did not. According to Shulman’s categories of content knowledge, the experimental teachers had a higher degree of subject matter content knowledge than did the control group.

Demonstrating that professional development might in fact affect teachers’ knowledge of literacy terms and concepts was not the only outcome of the current study. The sample demographics of the current study together with the finding that experimental and control teachers differed in their knowledge of literacy terms appear to suggest that experience in the classroom alone may not necessarily increase and/or maintain teachers’ knowledge of literacy concepts. In fact, findings may suggest that the opposite is true. It is possible that teachers may be less able to articulate their understanding of literacy concepts if they are not exposed to regular professional development. The reasons that this was the case requires further exploration. It is possible that without regular exposure to professional development sessions, teachers are unable to ensure that their knowledge is current with respect to new practices or understandings in particular curriculum areas. Alternately, professional develop sessions might allow teachers to actively use and evaluate their knowledge which allows them to keep it recent for use in practice.
Do stated teacher beliefs and practices differ between the experimental and control teachers? The beliefs and practices of the two groups did not differ except on 3 of the 17 variables explored. The experimental teachers defined their teaching style differently than did the controls. The experimental teacher’s viewed their style as being more eclectic and less structured than did the control teachers. With respect to teaching practice, the only difference to emerge was that the experimental teachers tended to use leveled texts for student readings as opposed to the control group who used theme-based texts. Experimental teachers also varied significantly from the control teachers in the way they kept their students informed of their progress. The experimental teachers tended to include their students more in the evaluation process. They ensured that their students received regular feedback throughout the term as opposed to only when official reports were due.

The specific question the current study addressed about literacy goals found that the experimental teachers did not set literacy goals and evaluate their students significantly differently from the control teachers. The focus of the professional development sessions was on literacy concepts, not directly on setting goals and evaluating students. It is reasonable to suggest that it would take the experimental teachers time to implement new goals and evaluation practices and this was the reason why the experimental teachers did not differ from the control teachers in this respect. Follow up research could ascertain whether or not this was the case.

Upon initial analysis, no difference was found between how experimental teachers define “at-risk” students from the way that control teachers define “at-risk” students. However, when further analysis was done to determine if there was any relationship
between the ability to explain literacy concepts and the ability to define “at-risk” students, it was found that a potential relationship exists. Further research is required prior to any conclusive statements are made about the degree and the type of relationship.

In conclusion, the above study demonstrates that professional development sessions on literacy concepts can provide teachers with information they can and do use in their classrooms. There were significant differences found between groups of teachers who participated in professional development and those who did not. The differences occurred primarily in the degree of knowledge about the target concepts, literacy terms. It was also found that this knowledge had begun to impact on other aspect of teaching such as characteristics of teachers’ beliefs about teaching in terms of their roles, the types of materials they used as well as how they kept their students informed of their progress. Preliminary results also suggest that at-risk students might benefit from teachers who have exposure to current research in the field of literacy. Results also imply that professional development should be an on-going aspect of teachers’ careers regardless of the degree of experience they have within the classroom. Long-term study of the effects of professional development will give researchers, as well as those implementing educational change, a better sense of its impact so that the goal of “better teachers” and “better students” can be attained.
REFERENCES


Appendices

Appendix A  Questions for Teacher Interview

Appendix B  Division of Interview Questions into Categories and Coding Scales

Appendix C  Explanation of Bonferroni Correction
Appendix A

Questions for Teacher Interview

COVER SHEET
TEACHER QUESTIONNAIRE

The information on this TEACHER QUESTIONNAIRE as well as on the TEACHER INTERVIEW form will remain strictly confidential; it will not be shared with your colleagues or principal. Your name and school will be removed from all data, and will be replaced by code numbers. The data will then be grouped with all the data collected from teachers in other schools as well. Only Dr. Willows and her research assistant will have access to the data on these forms for purposes of identifying general trends regarding changes in teachers' literacy programmes in response to Dr. Willows' in-service workshops.

Signed: __________________________  Date: __________________________
Dale Willows, Ph.D.
C. Psych, OISE-UT.

Signed: __________________________  Date: __________________________
Karen Sumbler, M.A.
Doctoral Candidate, OISE-UT.

Signed: __________________________  Date: __________________________
Maureen Barnes
TEACHER'S COPY
(remove this sheet and give it to the teacher)

COVER SHEET
TEACHER QUESTIONNAIRE

The information on this TEACHER QUESTIONNAIRE as well as on the TEACHER INTERVIEW form will remain strictly confidential; it will not be shared with your colleagues or principal. Your name and school will be removed from all data, and will be replaced by code numbers. The data will then be grouped with all the data collected from teachers in other schools as well. Only Dr. Willows and her research assistant will have access to the data on these forms for purposes of identifying general trends regarding changes in teachers' literacy programmes in response to Dr. Willows' in-service workshops.

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C. Psych, OISE-UT.

Signed: ____________________________  Date: ____________________________
Karen Sumbler, M.A.
Doctoral Candidate, OISE-UT.

Signed: ____________________________  Date: ____________________________
Maureen Barnes
TEACHER QUESTIONNAIRE

Name: ____________________________________________________________
School: ___________________________ Date: __________________________
Current Grade: ____________________________

EDUCATION
SECONDARY SCHOOL:
Highest grade completed ____________________________

POST SECONDARY:
Degree(s) ____________________________ Areas of Specialty (Major) ____________________________

CONTINUING EDUCATION
Courses Taken:
Other (e.g., workshops, seminars etc.):

TEACHING EXPERIENCE:
1. Number of years teaching: ____________________________

2. Grades taught (and number of years per grade):
3. Subjects taught (if other than full primary curriculum):
4. Other teaching/education related experience/positions:

A) TEACHER VARIABLES

TEACHING PHILOSOPHY

1a. What do you feel is the role of the teacher in the classroom?

TEACHER EFFICACY
2a How strong an influence do you feel a teacher can have on her/his students' performance? (use the following scale)

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>none, really</td>
<td>a little</td>
<td>moderate</td>
<td>fairly strong</td>
<td>very strong</td>
<td></td>
</tr>
</tbody>
</table>

2b Please explain why you rated the above question as you did. For example, if you feel a teacher has little influence on a child's performance, tell me why you feel this way. If you feel a teacher can have fairly strong influence, tell me in what way.

3a How much do you agree or disagree with the following statement. (use the following scale)

"If I really try hard, I can get through to even the most difficult or unmotivated students"

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>strongly disagree</td>
<td>somewhat disagree</td>
<td>unsure</td>
<td>somewhat agree</td>
<td>strongly agree</td>
<td></td>
</tr>
</tbody>
</table>

TEACHER EXPECTATIONS

4a Does a child's current achievement level influence how you teach that child? If so, in what way?

B CLASSROOM MANAGEMENT

RULES AND ROUTINES

1a Do you have general rules for the class? If so, what are they?
2a What are the children supposed to do if they need help?
3a What are the children supposed to if they are finished their in-class work (i.e., if they are finished but others are still working)?

ENGAGEMENT/BEHAVIOUR

Many teachers handle situations differently depending on the class configuration at the time... that is, whether the whole class is involved (as in presenting a lesson) or whether the teacher is working with small groups or an individual child. I would like you to answer the following questions with respect to each of these conditions.

4a How do you handle disruptive behaviour?

i) Whole Class:
ii) Small Groups:
iii) One-on-one:
5a What do you do when a child (or children) is (are) off-task?

i) Whole Class:
ii) Small Groups:
iii) One-on-one:

C. LITERACY PROGRAMME

PROGRAMME CONTENT
This part of the interview involves your specific literacy programme. FIRST, I will ask you to give a brief summary of your programme, - to give a one- or two-sentence general description. A little later, I will ask you to be very specific.

1a In one or two sentences, how would you describe your literacy programme?

2a Using Dr. Willows' Literacy Diet framework, what "stage of literacy" do you feel best describes most of the children in your class.

Stage 0: Emergent Literacy
Stage 1: Decoding/Encoding
Stage 2: Confirmation and Fluency
Stage 3: Literacy For Growth

2b At what stage were most of these children when this school year began?

3

Experimental Question:

Now I am going to go through each of the Literacy Diet "Nutritional" Components and would like you to give me your understanding of what they are. Also,... I would like you to give me an example of how you programme for each; that is, what kind of activity (or activities) you use for each of the components. I realize some of these components may not be pertinent to the level of children you are currently teaching, however, I would like you to mention what you think may be a good "nutritious" type of activity for those components which you may not be currently stressing.

Control Question:

Now I am going to go through some literacy terms found in the research on literacy and would like you to give me your understanding of what they are. Also,... I would like you to give me an example of how you might programme for each; that is, what kind of activity (or activities) you use for each of the components. I realize some of these terms may not be pertinent to the level of children you are currently teaching, however, I would like you to mention what you think may be a good activity for those components which you may not be currently stressing.
How would you describe:

a) **Motivation For Literacy** And what type of activity would you use to for developing this component?

b) **Concepts Of Print:** Activity?
c) **World Knowledge:** Activity?
c) **Word Knowledge:** Activity?
d) **Language Development:** Activity?
e) **Listening/Thinking Skills:** Activity?
f) **Sight Words:** Activity?
g) **Phonemic Awareness:** Activity?
h) **Letter-Sound Connections:** Activity?
i) **Letter Formation:** Activity?
j) **Complex Letter-Sounds:** Activity?
k) **Spelling:** Activity?
l) **Schema Development:** Activity?
m) And under "Real Reading", there are the sub-components of:

   i) **Fluency:** Activity?

   ii) **Text Structures** Activity?

   iii) **Comprehension Strategies** Activity?

n) Under "Real Writing" there are:

   i) **Writing Conventions** Activity?

   ii) **Composition Strategies** Activity?

   iii) **Written Language Structures** Activity?

4. Now, I would like you to describe your literacy programme in detail.
6a Which activities and materials have you found most helpful in teaching and reinforcing these components? Please be specific.

7a What kinds of reading materials do you use when you read to the children, and what kind of materials do you have the children read?

9a How would you describe your "teaching style"?

10a When asking children questions during a lesson, what do you do when a child gives a wrong answer?

11a For each new lesson, is there opportunity for:
   i) review ... if so, how much time (percentage of the day) is spent on this
   ii) supervised practice (of new skill/info learned)?
       amount of time
   iii) independent practice (for fluency and automaticity)?
       amount of time
   homework? (if so, amount of time)

12a Generally, how do you motivate your students?

GOALS AND PROGRESS EVALUATION

13a What year-end goals have you set for your students?
14. How do you plan to achieve these goals? Please list the steps you plan to take.

I would like to ask you about how you evaluate/monitor the progress of your students.

15a How do you assess/monitor the reading and writing skills of your students on a day-to-day basis. (Be sure the following is addressed in the teacher's response)

What kinds of:
   i) procedures
   ii) records
   iii) reporting

16a How do you use this "student-progress information"? That it, what are the consequences on programming of the information you gather?
Are your students kept informed about their progress? If so, how?

**AT-RISK STUDENTS**

18a How do you determine whether or not a student may be "at risk" (or disabled) with regard to reading and writing?

19a What do you do to help those students who are experiencing difficulty?
Appendix B

Division of Interview Questions into Categories and Coding Scales

Section 1 - Literacy Terms

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coding Scale</th>
</tr>
</thead>
<tbody>
<tr>
<td>d1mot</td>
<td>1 = no idea/skipped, 2 = guessed at definition and incorrect, 3 = vague understanding, 4 = good understanding, 5 = excellent understanding (good definition in addition to an activity).</td>
</tr>
</tbody>
</table>

Interview Question

3 Now I am going to go through each of the Literacy Diet "Nutritional" Components and would like you to give me your understanding of what they are. Also,... I would like you to give me an example of how you programme for each; that is, what kind of activity (or activities) you use for each of the components. I realize some of these components may not be pertinent to the level of children you are currently teaching, however, I would like you to mention what you think may be a good "nutritious" type of activity for those components which you may not be currently stressing. How would you describe:

a) **Motivation For Literacy**: And what type of activity would you use to for developing this component?

b) **Concepts Of Print**: Activity?

c) **World Knowledge**: Activity?

d) **Word Knowledge**: Activity?

e) **Language Development**: Activity?

f) **Listening/Thinking Skills**: Activity?

g) **Sight Words**: Activity?

h) **Phonemic Awareness**: Activity?

i) **Letter-Sound Connections**: Activity?

j) **Letter Formation**: Activity?

k) **Complex Letter-Sounds**: Activity?

l) **Spelling**: Activity?
n) And under "Real Reading", there are the sub-components of:
   i) Fluency Activity?
   ii) Text Structures Activity?
   iii) Comprehension Strategies Activity?

o) Under "Real Writing" there are:
   i) Writing Conventions Activity?
   ii) Composition Strategies Activity?
   iii) Written Language Structures Activity?

---

## Section 2 - Categorical Variables - Beliefs and Practices

<table>
<thead>
<tr>
<th>Variable Name</th>
<th>Coding Scheme</th>
<th>Actual Interview Question</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teaching Philosophy/Programme Description</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trole</td>
<td>1=guide/facilitator/role model</td>
<td>la. What do you feel is the role of the teacher in the classroom?</td>
</tr>
<tr>
<td></td>
<td>2=encouragement/support</td>
<td></td>
</tr>
<tr>
<td></td>
<td>*note: all respondents saw skills as a component of role</td>
<td></td>
</tr>
<tr>
<td>tch style</td>
<td>1=flexible/mixed methods</td>
<td>9a How would you describe your &quot;teaching style&quot;?</td>
</tr>
<tr>
<td></td>
<td>2=structured</td>
<td></td>
</tr>
<tr>
<td>progdes2</td>
<td>1= whole lg./integrated/focus on reading</td>
<td>1a In one or two sentences, how would you describe your literacy programme?</td>
</tr>
<tr>
<td></td>
<td>2= phonics component</td>
<td></td>
</tr>
<tr>
<td>achlwhy</td>
<td>0=start @ level 1= prog. for individually</td>
<td>If so, in what way?</td>
</tr>
<tr>
<td>you.rd2</td>
<td>1= variety/theme</td>
<td>7a What kinds of reading materials do you use when you read to the children</td>
</tr>
<tr>
<td></td>
<td>2= mention that bks @ child’s level</td>
<td></td>
</tr>
<tr>
<td>thy.read2</td>
<td>1= theme/series</td>
<td>What kind of materials do you have the children read?</td>
</tr>
<tr>
<td></td>
<td>2= leveled</td>
<td></td>
</tr>
</tbody>
</table>
12a Generally, how do you motivate your students?

**Classroom Practice**

help2  
1= go to teacher  
2= use variety of resources in classroom  

2a What are the children supposed to do if they need help?

finish2  
1= play/activity  
2= work  

3a What are the children supposed to do if they are finished their in-class work (i.e., if they are finished but others are still working)?

wrongq2  
1= acknowledge & do not indicated  
2= indicate wrong - correct  

10a When asking children questions during a lesson, what do you do when a child gives a wrong answer?

**Goals and Evaluation Practices**

yrgoals2  
1= general  
2= specific skills  

13a What year-end goals have you set for your students?

howgls2  
1= variety of activities  
2= constant assess and eval  
3= review and practice more of the same  

14. How do you plan to achieve these goals? Please list the steps you plan to take.

15a How do you assess/monitor the reading and writing skills of your students on a day-to-day basis. (Be sure the following is addressed in the teacher's response)

What kinds of:

evalupro2  
1= observations  
2= test scores plus other methods  

i) procedures

evalrec2  
1= anectdotals/work samples  
2= test scores  

ii) records

evalrprt2  
1= standard (report cards/interviews  

iii) reporting
2 = 1 plus regular contact with parents

| progmod2 | 1 = modify programme | 2 = other |

| stu.prog | 0 = no | 1 = yes |

| Students at Risk |

| risk.id2 | 1 = test results | 2 = compare with group | 3 = specific difficulties noted |

| helprisk2 | 1 = extra work | 2 = individualize/modify | 3 = multiple approaches |

16a How do you use this "student-progress information"? That it, what are the consequences on programming of the information you gather?

17 Are your students kept informed about their progress? If so, how?

18a How do you determine whether or not a student may be "at risk" (or disabled) with regard to reading and writing?

19a What do you do to help those students who are experiencing difficulty?
Appendix C

Bonferroni Correction

In order to lower alpha, a Bonferroni Correction was done which requires us to divide the current/test alpha of 0.05 by the number of t-tests being performed. The term were divided into 5 subgroups listed below. The 5 subgroups were formed based on conceptual categories often found in reading literature. Group 1 was Pre-reading Skills and consisted of the terms motivation for literacy, concepts of print, world knowledge, language development, listening/thinking skills. This group’s alpha was $0.05/5 = 0.01$. Group 2 was Early Reading Skills and consisted of word knowledge, sight words, phonological awareness, letter-sound connections, complex letter sounds. This group’s alpha was $0.05/5 = 0.0$. Group 3 was Real Reading and consisted of fluency, text structures, comprehension strategies. This group’s alpha was $0.05/3 = 0.017$. Group 4 was Early Writing and consisted of letter formation, spelling, schema development. This group’s alpha was of $0.05/3 = 0.017$. Group 5 was Real Writing and consisted of writing conventions, composition strategies, written language structures. This group’s alpha was $0.05/3 = 0.017$. Using this revised alpha the only terms affected are: 1) phonological awareness which is significant with alpha at 0.05 but not at 0.01 and 2) writing conventions which is significant at 0.05 level but not at 0.017.