LITERATE THOUGHT:

METATHEORIZING IN LITERACY AND DEAFNESS

DISSERTATION

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By

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ABSTRACT

This is a metatheoretical work in literacy and deafness that synthesizes the various models and theories in mainstream literacy and analyzes their potential contributions to understanding and improving the literacy skills of students who are deaf or hard of hearing. Detailed instructional suggestions are provided for practice and further research as well as for metatheorizing in the field.

Using Ritzer's paradigm approach as the metatheorizing tool, this study confirms the persistent pattern in the field of literacy and deafness: many students who are deaf or hard of hearing do not read and write as well as their hearing counterparts. Furthermore, there has been no consensus on the reasons for these reading difficulties or on the appropriate instructional approaches to improve the reading levels of students who are deaf or hard of hearing. By discussing the common ground in the goal of literacy education, which is proposed in this study as *literate thought*, namely, the ability to access and utilize captured information, this study attempts to connect literate thought to a broad concept of literacy which includes all the information that could be captured. Thus, instead of focusing on only print literacy, the reconceptualized literacy validates print literacy, performance literacy, and caption literacy as roughly equal vehicles for the development of literate thought. Such an understanding of literacy will provide

significant contributions to the field of education, especially for traditionally marginalized populations who cannot benefit sufficiently from the conventional reading world.

This study provides two general directions for resolving the predicament of the limited literacy skills of students who are deaf or hard of hearing: 1) finding the source underlying the apparent difficulties and trying to settle the problem, and 2) seeking the ends of being literate and trying to find an alternative means to parallel the route of script literacy. Additionally, this study goes beyond literacy education and provides implications for students with disabilities with respect to accessing general educational curricula such as science and social studies. Accordingly, instructional suggestions in the areas of Visual Phonics, performance literacy, and the integration of performance literacy and inquiry-based science are presented.

Dedicated to Amy and Stone

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FIELD OF STUDY

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CHAPTER 1

INTRODUCTION

In the not too distant past, the primary foci of education were on the acquisition of skills: simple reading, writing, and calculating. At present, in order to productively negotiate the complexities of contemporary plural society, individuals are expected to develop the required intellectual tools and learning strategies to acquire the knowledge that enables them to think critically and creatively about social phenomena, science and technology, mathematics, history and arts. In short, individuals are now educated to become self-sustaining, lifelong learners, who can actively access and utilize information. The attention has shifted from local to national, and a global interest has also increasingly complicated human beings' thoughtful participation in the democratic process. Furthermore, with advanced and powerful technology, information and knowledge are growing at a rapid rate, which is unprecedented in the history of humankind.

Within such a sociohistorical context, Economics Nobel laureate Herbert Simon portrayed the meaning of *knowing* as a shift from being able to remember and repeat information to being able to find and use it (Simon, 1996). The emergence of this transformed goal for education has launched a new line of research on literacy. This new direction in literacy study may have remarkable influence on people, who are deaf or hard of hearing and on other traditionally struggling readers.

Despite a few exceptions, it has been documented since the beginning of the formal testing movement in the early 1900s that many students with hearing impairments do not read and write as well as their hearing peers. It has been reported that the average 18-to-19-year-old deaf student is reading at a level commensurate with the average 8-to-9-year-old hearing student (Paul, 1998; Pintner & Patterson, 1916; Traxler, 2000). In fact, the third- or fourth-grade reading level has been reported as a plateau, or ceiling effect (Paul, 1998; Pintner & Patterson, 1916; Traxler, 2000). This plateau is not only apparent for deaf or hard of hearing students, but also, it exists for other populations, including at-risk students and students in special education programs (Paul, 1998; Pintner & Patterson, 1916; Quigley & Paul, 1986; Traxler, 2000). In addition, compared to the annual growth rate of roughly 1.0 grade level for many hearing students, the rate for many deaf and some hard of hearing students seems to be about 0.3 grade level, and the growth might not progress steadily from year to year (Allen, 1986; Trybus & Karchmer, 1977). Although there have been concerns about the difficulty of measuring reading achievement, for example, artifacts of the tests, overestimating the reading achievement levels, or other factors affecting these phenomena (Davey, LaSasso, & Macready, 1983; Ewoldt, 1987), it has been generally accepted that students who are deaf or hard of hearing are at risk for reading difficulties.

Similar to the problems in the general field of literacy with hearing students (Adams, 1990; Gaffney & Anderson, 2000; Snow, Burns, & Griffin, 1998), there has been no consensus on reasons for these reading difficulties or on the appropriate instructional approaches to improve the reading levels of deaf or hard of hearing students (Musselman, 2000; Paul, 1998, 2001; Schirmer, 2000). Paul (2003) related these debates to two issues in the field. The first is

that the proliferation of reading models and theories provides various, sometimes contradictory, perspectives; while the second is the ongoing debate on whether the reading development of deaf or hard of hearing students is similar to that of hearing students. These two issues have led to disagreements on the validation and use of mainstream literacy models with the deaf population.

This study is a metatheoretical work on literacy and deafness that will synthesize the various models and theories in mainstream literacy and analyze their potential contributions to understanding and improving the literacy skills of students, who are deaf or hard of hearing. Particularly, both the reading processing and knowledge difficulties of students, who are deaf or hard of hearing, are explored in this study.

Purpose of the Study

The field of literacy education, especially reading instruction, has always been an intense *war zone* in schools. Traditionally and continuing into the current era, it has been the battlefield that allows for only one true victor: one best way to teach literacy, particularly reading. The frontline of the war is teaching reading to students who are at risk, including struggling readers, who are deaf or hard of hearing. However, this study proposes that seeking the best way to teach reading is analogous to choosing the best tool– a knife, a screwdriver, or a hammer. In carpentry, the efficiency of tools depends on the mission at hand and the materials with which one is working. Similarly, in education, the efficiency of teaching practices depends on the goal of the educational activity and the students in the classroom. There is no universal reading instructional method that is best for everyone.

In her landmark work, *Learning to Read: The Great Debate* (Chall, 1983a), Jeanne Chall identified the fuse for the battle in reading instruction as the disagreement

on the goals and definitions. For instance, “a critic could always state that although a given method might result in the child’s recognizing words or understanding a passage better than another method, it was not more effective in terms of attaining a goal of reading that he believed to be more important” (Chall, 1983a, p. 94). Furthermore, without a basic agreement on a few essential terminology, such as *literacy* or *reading*, there will never be any peace in the field. “It says too much about some things, too little about others. And if you select judiciously and avoid interpretations, you can make the research ‘prove’ almost anything you want it to” (Chall, 1983a, p. 87). She called on synthesizers and theorists to build a common ground for the field. Several decades have passed; what do we have today? Chall’s mission has yet to be accomplished.

It is time for us to extinguish the smoldering fuse in the battlefield and try to transform the deconstructive, competing forces into constructive, cooperative energy toward peace. Although true peace in the field might be unrealistic, we need to move beyond either-or dichotomies that sparked the war, and the point of departure is a core set of principles that we commonly value. Using paradigm analyses as tools, this study is a comprehensive metatheoretical analysis of the manner in which literacy has been studied and explored in the field with particular emphasis on children and adolescents who are deaf or hard of hearing, as well as on other traditional struggling readers. The goal of this study is to bridge the paradigms within the field of literacy and deafness with the hope of minimizing the destructive interparadigmatic debates. Standing alone, each paradigm is inadequate. In order to fully understand successful literacy practices, each paradigm needs insights from the others. Although the utopia of paradigmatic integration may not

come soon, a number of endeavors proffer hope to people, who are interested in bridging at least some of these differences.

Adherents of different paradigms tend to have different views of the subject matter of literacy and deafness, to espouse different theories, and to use different approaches. Instead of examining the results of all these different works on literacy and deafness, this study categorizes these works and synthesizes them using their underlying paradigms as the tools. This study recognizes and welcomes different paradigms in the field of literacy and deafness that embrace the conflict inherent in our diversity. It is in an effort to divert from the either-or dilemma of searching for the most efficient approach for teaching reading and writing to students, who are deaf or hard of hearing.

Alternatively, by discussing the common ground in the goal of literacy education, which is proposed in this text as *literate thought*, namely, the ability to access and utilize captured information, the intent is to connect literate thought with a broad concept of literacy, which includes all captured information (Paul, 1998, 2001). This reconceptualized literacy could be categorized in terms of the modes of the captured information, that is, script literacy, performance literacy, and caption literacy. Script literacy refers to the capture of information through print or written symbols (i.e., reading and writing). Performance literacy means the capture of information through speech and/or signing; and caption literacy is the combination of the above two with a video background (Paul, 1998, 2001).

Tyner (1998) has attempted to categorize multiliteracies into tool literacies and literacies of representation. Tool literacies are related to the general proliferation of new technology tools in society, including computer literacy, network literacy, and technology

literacy. Literacies of representation address the need to analyze information and to understand how meaning is created; these include information literacy, visual literacy, and media literacy. Accordingly, script literacy, performance literacy, and caption literacy refer to different literacies of representation.

Along such a new line of research on literacy, script literacy skills are not considered the only vehicle for the development of literate thought. That is, the development of literate thought is not dependent on a particular mode of captured information, and speech/sign literacy is justified as an equal vehicle for the development of literate thought. Therefore, instead of being the *ends* of literacy education, reading and writing are considered the *means* of literacy education and equally respected with other means (i.e., speech/sign literacy and caption literacy). Such an understanding of literacy and reading will provide significant contributions to the field, especially for the traditionally marginalized populations who cannot benefit sufficiently from the traditional reading world.

This reconceptualized literacy does not discard or replace traditional literacy (i.e., reading and writing). On the contrary, it is a more complex reformulated framework that incorporates and integrates more than one mode of literacy, allowing individuals more choices to accomplish the goal of literacy education. Furthermore, it is hypothesized that literacy development in an alternative mode (e.g., speech and/or signing) might contribute to the development of script literacy as well.

Importance of the Study

At present, people are living in a society with ever-increasing diversity. Such a reconceptualized concept of literacy validates multiple modes of literacy as mental tools

of developing literate thought. Legitimizing script literacy as the only mode of literacy in school while ostracizing other modes of literacy could be a form of oppression in education. This is especially true for those individuals for whom script literacy is not easily accessible as in the case of students who are deaf or hard of hearing. Reconceptualizing literacy will contribute to the endeavor to build an inclusive society in which all children are valued, respected and given a voice. This would be a significant step toward the building of a larger society in which all people have a voice and can all make contributions to the social good.

Research Questions

1. How has the notion of literacy been conceptualized?
2. How has the notion of literacy been conceptualized in research with students who are deaf or hard of hearing?
3. How should the notion of literacy be conceptualized with students who are deaf or hard of hearing and, possibly, with all other students?

Overview of the Study

Theoretical work has often been criticized as being too abstract and divorced from practice. However, a systematically documented metatheoretical work would transform the alleged abstraction into a concrete process through self-consciously analyzing and discussing the steps entailed in the theorizing. In addition, a thorough discussion of the instructional implications of literate thought in Chapter 6 can support the theoretical work with practical significance. The current study is organized as discussed in the ensuing paragraphs.

Chapter 1 Introduction

Serving as an outline for the entire study, this chapter introduces the readers to the background information on literacy and deafness and forecasts the organization of the current study. It emphasizes the purpose of encouraging people not to be obsessed with defending a particular paradigm and attacking others, but to move toward a utopia of paradigmatic integration.

Chapter 2 A Paradigm Talk: Methodology

This chapter explains how the current study used existing paradigms as tools to synthesize studies in literacy and deafness. Starting with a discussion of several key concepts in the study (metatheory/theory, paradigm and science), Ritzer's paradigm approach will then be introduced as the metatheorizing methodology for the study. Paradigm approach is a method that uses paradigms as tools to investigate the four basic components: an exemplar, an image of the subject matter, theories, as well as methods and instruments. The paradigm approach makes visible both theoretical differences and methodological differences, as well as how methodological differences are tied to theoretical differences. Furthermore, it also shows how theoretical and methodological differences are intimately related to our discipline's history in the work of the exemplars. Finally, it enables us to see how theories, methods, and exemplars are tied to the underlying images of the subject matter (Ritzer, 2001).

To conclude this chapter, a discussion of the definitions for literacy and deafness are presented. Through a critical analysis of Deaf epistemology, it is suggested that the mainstream literacy theory could and should be applicable for students who are deaf or hard of hearing.

Chapter 3 From Exclusion to Inclusion to Chaos: Metatheorizing in Literacy

Chapter 3 begins with a historical review of the theoretical paradigms (paradigm talk) that exist in the field of educational research in general. We proceed from the exclusion era to the inclusion era and then to the chaos era. The sociohistorical forces behind this *paradigm talk* are also investigated. Then we zoom to the field of literacy education. It is argued that the fundamental focus of the paradigm war in literacy education is the question of whether literacy, especially reading, can be studied from a framework that is similar to the one commonly used in the fields of science and medicine. Two potential answers to the question are investigated in detail. It is maintained that people, who study reading within Paradigm A are more likely to understand the reading subjects (i.e., the readers) and the reading objects (i.e., texts) as two separate interactive entities. For example, people who understand literacy through cognitive-processing models (e.g., top-down models, bottom-up models, and interactive models) (Adams, 1990, 1994, 2004; Gough, 1972; LaBerge & Samuels, 1974; McCarthey & Raphael, 1992; Paul, 1998, 2001; Rumelhart, 2004; Samuels, 2004;) or dual coding models (Sadoski & Paivio, 1994, 2004; Sadoski, Paivio & Geotz, 1991) are typically in this camp. On the other hand, people from Paradigm B either reject the notions of science or paradigms, or believe there are so many different sciences and paradigms that those concepts have to be left as faint glimmers. Accordingly, they value reading as a multiparadigmatic domain that is socially constructed and tend to view the texts and the readers as transactional entities that cannot be separated from each other. For example, individuals who explore literacy through sociocognitive models (Ruddell, 1994; Ruddell & Unrau, 2004b), transactional models (Rosenblatt, 1938/1983, 1978, 2004),

transactional sociopsycholinguistic models (Goodman, 1986, 2003; Goodman & Goodman, 1992, 2004), and attitude-influenced models (Mathewson, 1976, 1985, 2004) are usually in this camp. Using the paradigmatic approach, this chapter analyzes the four paradigmatic components in both Paradigm A and Paradigm B.

Chapter 4 Mapping the Field: Metatheorizing in Literacy and Deafness

Utilizing paradigms as tools, this chapter categorizes the studies on the literacy skills of deaf and hard or hearing students according to their positions in the Paradigm A/Paradigm B debate. The foci are what is studied/measured, how it is studied/measured, and why it is studied/measured in certain ways. It is shown that the debates are grounded in different paradigms, making it extremely difficult to reach a consensus. It is challenging —some would argue impossible—to argue that one paradigm is better or worse than another paradigm (Ritzer, 2001).

Chapter 5 A Missing Puzzle: Literate Thought

The discussion on the reviewed literature suggests that for the deaf and hard of hearing population, the traditional goal of literacy, that is, the ability to access and produce script literacy, may be too limiting. Rethinking the definition and goal of literacy, Chapter 5 suggests the additional dimension that technology adds to the concept of literacy and proposes literate thought as a missing puzzle in the field. By connecting the concept of literate thought with the goal of literacy, this chapter broadens the choices for students, who are deaf or hard of hearing to access and utilize captured information.

Chapter 6 No Child Left Behind: Conclusions and Implications

Chapter 6 expands the discussion of literate thought in deafness to include other populations, especially other struggling readers, for example, students with learning

disabilities. Detailed instructional suggestions are provided for practice and further research as well as for metatheorizing in the field. It is emphasized that paradigm flexibility is a more productive solution than paradigm rigidity.

Assumption of the Study

In this study, it is assumed that scholars' practices will always be consistent with their epistemological beliefs. That is, the approach of a study will always reflect the underlying paradigm of the scholars. For example, quantitative experimental research is typically designed by researchers, who are wearing scientific lenses to investigate the literacy phenomena. On the other hand, researchers who believe that literacy is a multiparadigmatic field will be more likely to use discourse analysis or critical analysis to understand the literacy phenomena. Furthermore, the danger of engaging in paradigm talk is to be accused of being influenced by a particular paradigm in the first place. The assumption of this study is that I can maintain an agnostic stance on whether literacy is or should be a science in this study; that is, I can stand back and explore which approach or combination of approaches yields the greatest insights into the field on a case-by-case basis.

CHAPTER 2

A PARADIGM TALK: METHODOLOGY

It has been a persistent general finding in the research and scholarly literature that deaf students fall short of their hearing peers in literacy skills (Paul, 1998; Pintner & Patterson, 1916; Traxler, 2000), and there has been little improvement since the formal identification of the problem in 1916 (Pintner & Patterson, 1916). Ninety-five percent of students with profound hearing impairment graduate with a reading-age of eight or nine years old (Traxler, 2000). Across the communication spectrum, millions of deaf people remain trapped in a literacy ghetto from which there has been little hope of escape. Their deprived literacy status ensures that they will remain within the cycle of dependence, marginality and powerlessness, diminishing their role in citizenship and political processes in the society. Ironically, many educators and professionals have accepted this level of literacy performance of deaf children as the norm. If typical hearing students left school with an average of third grade reading level and the school considers it acceptable, chances are their parents will protest this situation strongly. Why aren't parents of deaf children or deaf children themselves demanding better performance? Because it is *normal*. Illiteracy in deaf individuals is a universal phenomenon. The purpose of this study is to investigate what it means to be literate, particularly for students, who are deaf

or hard of hearing. Is it fair to say that it is normal or acceptable for deaf persons to be illiterate?

Traditional literacy means reading and writing. Reading skills are emphasized in literacy development as in the field of deaf education. Paul (2003) confirms the existence of reading difficulties for students, who are deaf or hard of hearing, and provides two general reasons for these difficulties: one lies in the proliferation and sometimes contradiction of reading models and theories at both the emergent and advanced reading stages; and the other is related to the ongoing debate on whether the reading development of deaf or hard of hearing students is similar to that of hearing students, thereby validating the use of mainstream literacy models in deaf education. This study will dig deeper into these two aspects, especially the first one, while at the same time, providing a revolutionary solution for the reading difficulties of deaf children by reconceptualizing literacy. It uses paradigms as tools to metatheorize mainstream reading models and theories and to connect these mainstream reading models and theories with the practice in deaf education.

This chapter starts with a discussion of several key concepts, such as metatheory/theory, paradigm and science. As the metatheorizing methodology for the study, Ritzer's (2001) paradigm approach is examined in detail. A discussion of related definitions for literacy and deafness concludes the chapter. Through a critical analysis of Deaf epistemology, it is proposed that the mainstream literacy models and theories could and should be applicable for students who are deaf or hard of hearing.

Some Key Concepts

There have been several extensive reviews on education of students, who are deaf or hard or hearing (Bender, 1960; Kretschmer & Kretschmer, 1978; Moores, 1982, 2001; Nelson, 1947; Paul, 1998, 2001; Quigley & Paul, 1990; Rose, McAnally & Quigley, 2004; Schmitt, 1966). What are the general findings? "Many of the 'scientifically based approaches' for teaching children who are deaf are re-creations of past innovations" (Rose, et al., 2004, p. 55). Similar patterns have been identified in the mainstream literacy education as well.

> What is particularly striking about educational innovations is that most were considered successes long before they were actually sufficiently tried and tested. Seldom were they presented together with a rationale based on educational theory and research. Nor had they been tried first in small pilot studies before being offered as solutions to serious national educational problems.
>
> Why did so many intended reforms, undertaken with so much hope and enthusiasm, fail to fulfill their promise? And why did many result in even lower student achievement levels than those they replaced? Of even greater importance, why were the same reforms proposed again and again, under new labels, with little recognition that they were similar to practices or policies that had failed in the past? (Chall, 2000, p. 3)

Chall (2000) suggests that holding "a broad view of educational practices and preferences" (p. 5) is to be rational. That is, we need to explore the underline philosophies (e.g., the related paradigms) within each educational practice and preference to look at the big picture. Education is a social and intellectual phenomenon that is, in

turn, affected by a wide range of other social and cognitive phenomena. Therefore, like any other social and ideational entity, education can and should be studied theoretically and empirically. Before proceeding any deeper, we discuss some basic concepts, such as metatheory/theory, paradigm, and science.

Metatheory/theory

According to *The American Heritage® Dictionary of the English Language* (4th ed.), *theory* refers to a set of statements or principles devised to explain a group of facts or phenomena, especially one that has been repeatedly tested or is widely accepted and can be used to make predictions about natural phenomena. The greatest importance of theory is using theoretical ideas to better understand the social and intellectual worlds, such as the literacy development of students who are deaf or hard of hearing. "The fact is that it matters little *where* the theories come from; what counts is whether they make sense and whether they help us understand, explain, and make predictions about the social world" (Ritzer, 2001, p. 14).

Similarly, Thomas (2000) defines theory as "an explanation of how the facts fit together" (p. 4). In terms of child development theories, he argues: "Theory is what makes sense out of facts. Theory gives facts their meaning. Without theory, facts remain a clutter of disorganized specks on the canvas, unconnected spots that form no picture of how and why children grow up as they do" (p. 4). Again, the value of a theory lies in its connection with the empirical world. Accordingly, theorizing about children's literacy development refers to the act of proposing 1) which facts are most important for understanding children's literacy development; and 2) what sorts of relationships among the facts are most significant for producing this understanding. Theorizing on children's

literacy development can serve as a practical guide to understanding their development, since it describes the patterning of different beliefs about what these developments are like and how they should be treated.

The term *model* is used almost synonymously with the term *theory*, although models are typically considered as metaphors that help us visualize and understand research and theories. In this study, the term *model* is considered as interchangeable with theory.

Ritzer (1991, 2001) defines *metatheory* as the process of studying and theorizing about theory. Instead of a process that occurs before theory is developed to lay down its prerequisites, metatheorizing is a process that occurs after theory has been created and takes that theory itself as the object of study. There is a threefold distinction among types of metatheorizing. First, *Mu* entails the study of theory in order to gain a better understanding of it. Second, *Mp* is oriented to studying theory as a prelude to theory development; in other words, the creation of new theory almost always necessitates the systematic study of extant theory. Finally, *Mo* involves the study of theory in order to produce a new overarching theoretical perspective, or a metatheory. The current study is characterized as a Mu type of metatheoretical work that aims at a better understanding of literacy phenomena of students, who are deaf or hard of hearing.

The coexistence of proliferated and sometimes conflicting reading theories has made the field of literacy education increasingly diverse, even chaotic. For the subgroup of students, who are deaf or hard of hearing, the situation is even more complicated. In one way, this is a favorably positive environment in which there is so much more freedom to do many different literacy practices based on these different literacy theories;

but at the same time, it is an extremely challenging environment in which it is almost impossible to get one's mooring because everything seems up for grabs. Organizing these different theories to gain a better understanding of the theoretical and social world, that is, metatheorizing, could offer greater insights into the field. Unfortunately, little metatheoretical study has been done in the field of literacy education for students, who are deaf or hard of hearing. In the current metatheoretical work, paradigms are used as the organizational tools to reveal some insights into the subject. The term *paradigm* is introduced in the following section.

Paradigm

The term *paradigm* first appeared in English in the 15th century, meaning *an example or pattern*, and it still bears this meaning today. For nearly 400 years, *paradigm* has also been applied to the patterns of inflections that are used to sort the verbs, nouns, and other parts of speech of a language into groups that are more easily studied. Since the 1960s, *paradigm* has been used in science to refer to a theoretical framework, as when Nobel Laureate David Baltimore cited the work of two colleagues that really established a new paradigm for our understanding of the causation of cancer. Thereafter, researchers in many different fields, including sociology and literary criticism, often saw themselves as working in or trying to break out of paradigms.

In his milestone work *The Structure of Science Revolutions*, Thomas Kuhn (1962, 1996) argued that the history of science was not gradual and cumulative, but rather punctuated by a series of more or less radical *paradigm shifts*. "What differentiated these various schools was not one or another failure of method – they were all 'scientific' – but what we shall come to call their incommensurable ways of seeing the world and of

practicing science in it" (Kuhn, 1996, p. 4). Thus, the concept of paradigm jumped onto the central stage of the history of science. However, Kuhn was famously obscure in the definition of *paradigm*. He introduced it in the first few pages of *The Structure of Science Revolutions* (Kuhn, 1962), but overhauled the notion in the postscript due to the charges of ambiguity. According to Margaret Masterman (1970), Kuhn used the term in 21 different ways. Although Kuhn tried to clarify some of the confusion in his later work (Kuhn, 2000), he has not provided an overwhelmingly accepted definition of *paradigm*.

One way to understand paradigm is to consider it as a *disciplinary matrix* (Kuhn, 1962, 1996), which has four components: 1) symbolic generalizations (e.g., Newton's laws of motion) which we sometimes call a *theory*; 2) metaphysical presumptions (e.g., atoms as *billiard balls*, light as a wave, or light as particles), which we sometimes call a *theory*; 3) values (e.g., the accuracy of prediction, puzzle solving success, or simplicity); 4) exemplars, that is, textbook or laboratory examples that students learn (e.g., harmonic oscillator or random mating models in population genetics). Kuhn (1962, 1996) emphasized the role of exemplars in understanding paradigms. He believed that exemplars helped introduce the notion of *tacit knowledge* that could not be written down or articulated; that is, people learn by doing science, like the ability to read x-rays, rather than applying rules. Furthermore, he argued that exemplars gave a theory empirical content.

Rizter (2001) advances Kuhn's understanding of paradigm and provides his own version of the definition for paradigm, which is adopted in this study:

> A paradigm is a fundamental image of the subject matter within a science. It serves to define what should be studied, what questions should be asked, how they should be asked, and what rules should be followed in interpreting the answer obtained. A paradigm is the broadest unit of consensus within a science and serves to differentiate one scientific community (or subcommunity) from another. It subsumes, defines, and interrelates the exemplars, theories, and methods, and instruments that exist within it. (p. 60)

Thus, a paradigm has four basic components: 1) an exemplar, or body of work that stands as a model for those who work within the paradigm; 2) an image of the subject matter; 3) theories; and 4) methods and instruments. Paradigms are like lenses, through which you can see the world in different colors; thus, sometimes paradigms are referred to as *worldviews* (Thomas, 2000).

A paradigm is different from a *theory* not only because it includes values and tacit knowledge, but also because it refers essentially to a scientific community, a sociopolitical entity, rather than an item of *knowledge*. “The paradigm defines what scientists should and should not study; the paradigm tells scientists where, and where not, to look for the entities of concern to them; the paradigm tells scientists what they can expect when they find, and examine, the entities of concern to them. Thus the entire scientific craft is determined by the nature of the dominant paradigm” (Ritzer, 2001, p. 59). In short, theories are components of far broader paradigms.

Paradigms are the methodological tools for the whole study; thus, detailed discussions of paradigms appear in the ensuing sections.

Science

The term *science* is one of the words that started simple and became increasingly complicated after intensive usage. The root of the word *science* is the Latin *scientia*, which simply means *knowledge*. *The American Heritage® Dictionary of the English Language* (4th ed.) defines *science* as the observation, identification, description, experimental investigation, and theoretical explanation of phenomena. However, when the term is loaded with value and related to different paradigms, the image of science begins to blur. What is legitimated as scientific becomes an ongoing debate in the academic world.

Popperian Picture of Science

Karl Popper is generally regarded as one of the greatest philosophers of science of the 20th century. He believes (Popper, 1959/1992) that a scientific method should be the deductive testing of theories, which are not themselves the products of any logical operation. In this deductive procedure, conclusions are inferred from a tentative hypothesis. These conclusions are then compared with one another and with other relevant statements to determine whether they falsify or corroborate the hypothesis. Popper believes that there are no *pure* facts available, and all observation-statements are theory-laden; hence, such conclusions are not directly compared with the facts.

For Popper, scientific theories are not inductively inferred from experience, nor are scientific experimentations carried out with a view to verifying or finally establishing the truth of theories. Rather, all knowledge is provisional, conjectural and hypothetical;

that is, we can only provisionally confirm or conclusively refute them, but we can never finally prove our scientific theories. Thus, at any given time, we have to choose between the potentially infinite number of theories, which will explain the set of phenomena under investigation. Faced with this choice, we can only eliminate those theories, which are demonstrably false, and rationally choose between the remaining, unfalsified theories. Therefore, Popper's emphasis is on the importance of a critical spirit to science; that is, critical thinking is the very essence of rationality. He argues that it is only by critical thought that we can eliminate false theories, and determine which of the remaining theories is the best available one that possesses the highest level of explanatory force and predictive power.

Kuhn's Structure of Scientific Revolutions

Kuhn (1962, 1996) rejects the idea that science proceeds approximating closer and closer to reality. He believes that there are two kinds of science. One is referred to as *normal science*, in which science is practiced within a single paradigm; that is, models are constructed as the solutions to puzzles under the guidance of a theory, but the theory itself is not criticized or blamed for failures. Contrasted with normal science, Kuhn proposes what he called *revolutionary science*, in which science transforms from one paradigm to another. Kuhn identified four distinctive characters of revolutionary science: 1) in normal science, the theory is not questioned; whereas in revolutionary science it is; 2) in normal science there is cumulative progress; whereas in revolutionary science there is not; 3) in normal science there is no meaning variance; whereas in revolutionary science there is; 4) in normal science change is incremental and gradual; whereas in

revolutionary science the change is total, and relatively sudden. In the Popperian picture of science, there is no differentiation between normal science and revolutionary science, which becomes one of Kuhn's most distinguishing differences from Popper.

Originally, Kuhn (1962) believed what scientists observe depended on what they believe. That is, no scientists can ever observe something that contradicts their paradigms, and scientists who accept rival paradigms can never observe the same thing. However, such an idea of *incommensurability* has been widely criticized because it made it incomprehensible how scientists working under different paradigms could communicate with each other, let alone adjudicate and resolve their disagreements. In his later work, Kuhn (2000) used the difference between language translation and language learning to respond to these objections. "Just because a foreign language is not translatable into whatever language one already speaks does not mean that one cannot learn it. That is, there is no reason that a single person cannot speak and understand two languages that he or she cannot translate between" (p. 4).

The concept of paradigmatic *commensurability* formulates the foundation of this study; that is, this study is based on the assumption that people from different paradigms can and should communicate with each other, and make an effort to adjudicate and resolve the disagreement. Chapter 3 presents a detailed discussion on how individuals from different paradigms view the field of literacy education differently. The ultimate disagreement is their different understanding of what science is and what scientific-based evidence is. A proposal to bridge these discrepancies is provided to obtain paradigmatic commensurability in the field.

Metatheorizing Tool: the Paradigm Approach

As discussed previously, Ritzer (2001) defines the concept of paradigm in cognitive terms. He believes that at a given point in the history of certain sciences, a single paradigm obtains consensus across the scientific community. These are what Masterman (1970) terms *paradigmatic sciences*, for example, physics, during the era when the Newtonian perspective was preeminent. Nevertheless, most sciences, including literacy, lack a single overarching paradigm, and are called *multiple paradigm sciences* (Masterman, 1970). In these sciences, paradigms are related to the major subcommunities. Such an understanding of paradigm increases significantly our capacity to analyze the basic paradigms and their related subcommunities in literacy.

In all multiple paradigm sciences, each paradigm is competing for hegemony within the discipline as a whole as well as within almost every subarea. Based on Kuhn's (1962, 1996) understanding of science, Ritzer (2001) argues that the acceptance of a particular paradigm is heavily based on political factors instead of "scientific" merits of the paradigm:

> In general, supporters of one paradigm make little efforts to understand the basic tenets of its competitors. Instead, they are likely to launch attacks aimed at discrediting the validity of competing paradigms. The goal is not to understand the other paradigms, but to annihilate supporters of competing paradigms with verbal assaults.

> In these, and many other ways, the emergence of a new paradigm, or the failure of one to emerge, may be attributed to political factors rather than to the relative 'scientific' merits of the paradigms. This is not to deny that the relative 'scientific' merits of a paradigm are important to its success. The point is that a meritorious paradigm cannot gain hegemony without first engaging in, and ultimately winning, the political conflict. Moreover, a less meritorious paradigm can first gain and then maintain hegemony through political means despite its lack of 'scientific' assets. (p. 60)

In Chapter 1, under Purpose of the Study, there is a brief discussion on the current *war* in a multiple paradigm science, the field of literacy education, especially reading instruction. In order to avoid labeling every literacy theory or model as a paradigm, this study synthesizes these literacy theories or models and discusses them in terms of their relationships with two competing paradigms: Paradigm A and Paradigm B. These two paradigms are not identified with particular names to prevent the danger of labeling.

This study uses paradigms as tools (Ritzer, 2001) to investigate the four basic components of a paradigm in literacy education: 1) an exemplar; 2) an image of the subject matter; 3) theories; and 4) methods and instruments. This paradigm approach identifies both theoretical differences and methodological differences between Paradigm A and Paradigm B as well as how methodological differences are tied to theoretical differences. Furthermore, it also shows how theoretical and methodological differences are intimately related to the history of literacy education in the work of the exemplars. Finally, it enables us to see how theories, methods, and exemplars are tied to the underlying images of the subject matter. The conclusion from metatheorizing in literacy

confirms the arguments of Ritzer (2001) and Phillips (1973): “the weight of the evidence points in the direction of the latter interpretation. That is … paradigms rise and fall as a result of political factors” (Ritzer, 2001, p. 60). Chapter 3 details a comprehensive discussion on Paradigm A and Paradigm B in literacy education using this paradigm approach.

Deaf Epistemology and Literacy Theories

In discussing the appropriate instructional approaches to improving the reading levels of deaf or hard of hearing students, Paul (2003) discusses the difficulties in not only the proliferation of various, sometimes contradictory reading models and theories, but also the ongoing debate on whether the reading development of deaf and hard of hearing students is similar to that of hearing students. Individuals who hold a Deaf epistemology typically believe that the reading development of deaf or hard of hearing students is different from that of hearing students because of Deaf students’ different way of looking at the world. Before proceeding further on the reading models and theories, an examination on Deaf epistemology will contribute to understanding the merits of mainstreaming literacy models and theories for deaf or hard of hearing students.

This section starts with a review of the perspectives on deafness: clinical perspective, cultural perspective, and the developmental-interactive perspective. Then the term *Deaf epistemology* is discussed within the cultural perspective. Finally, the influence of Deaf epistemology on using mainstreaming literacy models and theories for deaf or hard of hearing students is analyzed.

Perspectives on Deafness

Beginning as early as 1980 with increased awareness of and acceptance of American Sign Language (ASL) and Deaf culture, it has become clear that one can adopt any one of several different perspectives when interacting with people who are deaf or hard of hearing. Although these perspectives have been given different names or labels by different authors and researchers, the fundamental question they attempt to answer is: What is deafness? People who hold different answers to this question are in different camps of this issue.

Clinical Perspective

The clinical view of deafness has also been called the pathological view or the medical model. It is heavily influenced by Myklebust (1964), who did not recognize the signing behavior of deaf individuals as a true language. Myklebust believed that deaf individuals were qualitatively different from typically-hearing individuals in terms of psychological development and ability. In essence, the clinical view accepts the behaviors and values of people who can hear as *the standard* or *the norm* and then focuses on how deaf individuals deviate from that norm. It believes that deaf people have something wrong with them, something that can and must be *fixed*. The goal is to remedy these deficiencies, with the model being the typically-hearing counterpart (Paul, 1996). The clinical view has been traditionally held by a majority of non-deaf professionals, who interact with deaf individuals only on a professional basis. In a sense, it is argued to be *the outsider's view* - a view that focuses on how deaf people are different from non-deaf people and a view that generally perceives those differences negatively.

Cultural Perspective

On the contrary, the cultural view, also known as the sociocultural view of deafness, is based on the notion that deafness is a natural condition rather than a disability (Baker & Battison, 1980; Lane, 1984, 1988; Lane, Hoffmeister & Bahan, 1996; Neisser, 1983; Stokoe, 1980; Wilcox, 1989). With a capital D, Deaf individuals consider themselves as members of a certain culture with ASL as its preferred and major mode of receptive and expressive communication. The Deaf community is a sociocultural minority group characterized by a distinctive language, cultural behaviors and artifacts, and a network of formal and informal organizations (Reagan, 1994). Considering themselves as linguistic and cultural minorities, Deaf people commonly value DEAF as their identity and culture and wish to see it grow. They never agree that they are *disabled* (Lane, 1996).

Developmental-interactive Perspective

Considering the clinical or cultural perspective only provides one avenue for understanding the subject of deafness, Paul (Paul & Jackson, 1993; Paul, 1996) proposes a third interpretation of the issue: the developmental-interactive perspective. This perspective works from either a clinical perspective or cultural perspective or some combination or integration or a new perspective based on a metaanalysis of these bipolar views to understand deafness. That is, without precluding or favoring a particular perspective, this metatheoretical perspective is focused on understanding (Paul, 1996). Paul believes that a complete understanding of deafness is not possible with either position alone and that there is no God's eye view of deafness.

Paradigmatic Commensurability

From a paradigmatic approach, the clinical perspective and the cultural perspective can be considered as two competing paradigms in the multiparadigm science: deaf study. It is not surprising that people in opposite paradigms attack each other to defeat supporters of competing paradigms. As a metatheoretical perspective, the developmental-interactive perspective emerges from the war zone and attempts to find paradigmatic commensurability within the field by seeking the goal of deaf study: understanding deafness. If it remains trapped in competing paradigms, the field can never achieve a revolutionary advance. Thus, this study adopts the developmental-interactive perspective on deafness; that is, this study takes an overarching theoretical perspective that offers far greater insight into the subject matter, deaf study, than the clinical perspective or the cultural perspective alone. In essence, seeking paradigmatic commensurability is the spirit of the current study.

Deaf Epistemology

Within the cultural perspective of deafness (Baker & Battison, 1980; Lane, 1984, 1988; Lane, et al., 1996; Neisser, 1983; Stokoe, 1980; Wilcox, 1989), or in other words, the culture paradigm of deafness, ASL is considered to serve as: 1) the linguistic mediator; and 2) an identifying facet of cultural identity in constructing the Deaf worldview, that is, Deaf epistemology.

Scholars who believe in a Deaf epistemology (Reagan, 1994) argue that the move toward inclusive education potentially threatens the very heart of the Deaf community, that is, sign language and Deaf culture. Based on the framework established by Branson

and Miller (1993), Reagan (1994) proposes it as an example of *epistemic violence*, where the dominant ideology of equality of access to educational resources actually serves to reproduce structured inequalities. Inclusion efforts are believed to entail the implicit rejection of the epistemological (as well as cultural and linguistic) world of the Deaf. According to Reagan, by adopting the cultural perspective of deafness, the education of deaf children should use instruction through ASL, and the goal is for deaf children to obtain functional bilingualism in ASL and English. He argues that Deaf students should study together in a setting, similar to residential schools, involve Deaf teachers, and put control of their education in the hands of the local Deaf community. The *most enabling environment* is proposed as the appropriate educational placement for Deaf students. It is argued that Deaf individuals seek voluntary segregation not forced integration (Lane, 1996).

Deaf Epistemology and Literacy Theories

Due to deaf students' difficulty with spoken languages, there have been various arguments for the establishment of programs involving both ASL and English (Ewoldt, 1996; Livingston, 1997; Luetke-Stahlman, 1983; Paul, 1990; Paul, Bernhardt, & Gramley, 1992; Reagan, 1985; Strong, 1988). The Bilingual/Bicultural (Bi-Bi) programs supported by Deaf epistemology are among them. In an educational environment influenced by Deaf epistemology, instruction is delivered through ASL, mostly in a classroom similar to residential schools, and the goal of the program is that the students are truly bilingual and bicultural. Students in these Bi-Bi programs would not only learn the common curriculum of hearing students, but also study the history of Deaf culture and Deaf community.

Unfortunately, very little empirical evidence is available on programs incorporating the use of ASL and English in bilingual situations (Paul, 2001). Most of the recent ASL/English programs are only focused on the development of written English (Akamatsu & Armour, 1987; Marbury & Mackinson-Smyth, 1986; Neuroth-Gimbrone & Logiodice, 1992). The assumption is that it is possible to proceed from ASL to the written form of English, and that the understanding or use of the primary performance form of English, that is, speech and/or signing, is not considered necessary. Based on their interpretations of theoretical models such as Cummins' (1989) and Vygotskty's (1962, 1978), some proponents of ASL/English bilingualism/biculturalism argue that skills acquired in one language (e.g., ASL) could bypass the performance form (i.e., spoken and/or signed) of the target second language and still result in the ability to read and write in the second language. That is, without ever manipulating or having exposure to the performance form of English print, it is still possible for deaf students to use their knowledge of ASL to acquire adequate independent English literacy skills.

Because most of the mainstream literacy models and theories are related to the students' understanding of either the phonology of English or spoken English (a performance form of English), some proponents of ASL/English bilingualism/biculturalism reject the application of mainstream literacy models and theories to Deaf students. They believe that the mainstream or inclusive placements are not applicable for Deaf students; they also believe that the mainstream literacy models and theories are not appropriate to address the literacy development of Deaf students.

However, Paul (2001) believes that these proponents of ASL/English bilingualism/biculturalism have misinterpreted the tenets of Cummins' models (1989).

Cummins' hypothesis that good readers in one language have the potential to become good readers in the second language is based on the condition that these are two spoken languages with written forms. There is little or no evidence of a correlation between proficiency in the performance mode of one language and the proficiency in script literacy of another language, which is the case for the correlation between ASL and English print. Paul argues that the acquisition of adequate independent English literacy skills requires at least an understanding of the alphabetic principle, which is in turn dependent on access to phonology and morphology of English and is facilitated by the use and understanding of the performance form of English.

This study adopts Paul's (2001) perspective that the language transfer should be from ASL to English sign (another form of performance English) to English print, despite the imperfections of English sign systems. In Chapter 6, this study also provides some detailed examples of how to introduce the phonology of English to students who are deaf or hard of hearing, using Visual Phonics. Although we cannot change the fact that English is primarily a phonological language based on the alphabetic principle, we can utilize some modifications and adaptations of the mainstream literacy models and theories to fit our population who are deaf or hard of hearing. In a nutshell, the mainstream literacy models and theories can and should be applied to address the literacy development of students, who are deaf or hard of hearing.

CHAPTER 3

FROM EXCLUSION TO INCLUSION TO CHAOS: METATHEORIZING IN LITERACY

We now live in a historical moment when cultural and educational boundaries are disappearing. As educators, we begin to reconceptualize our ways of viewing the world by a paradigm shift from a simple one to more complex proliferated paradigms, and some will agree that this process of exclusion to inclusion has proceeded into chaos in certain fields, such as literacy education.

This chapter is constructed starting from a review of the theoretical paradigms (paradigm talk) in educational research in general. Through the analysis of complexities of language and the world in current society, it is proposed that recognizing and embracing different paradigms is a way to welcome the conflict inherent in our diversity. Then, the paradigm war in literacy education is discussed in detail. It is argued that the fundamental focus in this paradigm war is the question of whether literacy, especially reading, can be studied from a framework that is similar to the one commonly used in the fields of science and medicine. Two potential answers to the question, that is, Paradigm A and Paradigm B, are investigated in detail, using Ritzer's (2001) paradigmatic approach.

Paradigm Talk in Educational Research

Before we proceed to the paradigm war in literacy education, we begin our paradigm talk in a broader field: educational research. The first step is a discussion of the exclusion era of educational research in which the one single paradigm dominated the field. Secondly, we proceed to the inclusion era of educational research in which two competing paradigms co-exist. Finally, we discuss how a third wave research paradigm further complicates the field and why some people refer to the current situation as the chaos era.

The Exclusion Era

Educational research, like any other social research, was aimed at validating causal relationships between treatments and outcomes. Therefore, producing statistical significance in quantitative studies was the ultimate form of educational research.

During the 1890s, a post-Darwinian conception of science pushed educational research into the direction of specialization and experimentation. Educational research was totally dominated by empirical research, which was called objective science (Lagemann, 2002), that is, time- and context-free generalizations (Nagel, 1986). Edward L. Thorndike, father of the measurement movement, believed that everything exists in terms of amount. He insisted that society should practice scientific *eugenics* and that quality was better than equality. His empirical findings from measurements and testing were essentially what business-minded Americans, who made up the main body of school board superintendents, wanted to hear (Lagemann, 2002).

Basing their work on a positivist philosophy, quantitative purists (Ayer, 1959; Maxwell & Delaney, 2004; Popper, 1959; Schrag, 1992) argue that social scientists

should treat their observations as entities in much the same way that physical scientists treat physical phenomena, in which the observer is separate from the entities that are subject to observation. Accordingly, educational researchers should eliminate their personal biases, remain emotionally indifferent and detached from the objects of study, and examine or empirically justify their stated hypotheses (Johnson & Onwuegbuzie, 2004).

The Inclusion Era

The emergence of qualitative research procedures as methodological alternatives transformed the world. In the 1920s and the 1930s, the work of the Chicago School launched the importance of qualitative inquiry for sociology. Later on, qualitative research was employed in other social and behavioral science disciplines, including education (Denzin & Lincoln, 2000).

Also known as postpositivists, qualitative purists (Guba & Lincoln, 1985; Lincoln & Guba, 2000; Schwandt, 2000; Smith, 1983) believe in multiple-constructed realities; that is, the knower and the known cannot be separated because the subjective knower is the only source of reality (Guba, 1990). Thus, time- and context-free generalizations are either undesirable or impossible.

John Dewey's progressive educational movement, which proposed that pedagogies should be powerful enough to socialize and liberate the potential of all children, accelerated the development of qualitative research to some degree (Lagemann, 2002). John Dewey's program-center wing emphasized understanding the child instead of measuring the child, and he believed that equality is better than quality, which was similar to the core of qualitative research, in which "the word qualitative implies an

emphasis on the qualities of entities and on processes and meanings that are not experimentally examined or measured (if measured at all) in terms of quantity, amount, intensity, or frequency" (Denzin, & Lincoln, 2000, p. 8).

Meanwhile, the introduction of qualitative methods into the field was viewed as more than a methodology shift. As discussed in Chapter 2, educational researchers who hold this view frequently adopted a concept from Thomas Kuhn (1970) that scientific understanding in the physical science is not the result of the progressive accumulation of bits and pieces of information; rather, scientific knowledge and the process of creating such knowledge are grounded in something which Kuhn called paradigms. Guba and Lincoln (1994) broadened the definition of *paradigm* as: "the basic belief system or worldview that guides the investigator, not only in choices of method but in ontologically and epistemologically fundamental ways" (p. 105).

The Kuhnian-inspired paradigm talk has been influential within the field of educational research. The initial paradigm talk was between qualitative and quantitative proponents. Qualitative researchers seek answers to questions that emphasize how social experience is created and given meaning, and stress the value-laden nature of inquiry. On the other hand, quantitative studies claim a value-free inquiry, in which the measurement and analysis of causal relationships between variables are emphasized, instead of the processes (Denzin & Lincoln, 2000).

Thus, inquiry methodology is no longer treated as a set of universally applicable rules or abstractions. The world is no longer a simple place. The co-existence of two competing paradigms has complicated the world.

Ritzer claims: "The choice between competing paradigms is not simply a choice between true and false, but one between conflicting scientific life-forms and organizations. As a result, this choice is, at least, partly driven by social and political forces, such as power, reputation, and general succession" (1991, p. 152). No paradigm has special privileges over another, because knowledge is related to a certain kind of cultural or political environment. Truth and knowledge are not the neutral mirror of reality; instead, they are constructed by the social groups who may hold different beliefs. Then, no belief system, or in other words, no paradigm, has special cognitive privileges or epistemic authorities over another.

Similarly, Foucault (Foucault, 1984) argued that throughout the social body, the judges of normality are everywhere, which is also called dividing practice, meaning the process of distinguishing people on the basis of their perceived normality. Such practices require classification systems which sort out the standards and determine who fits the standards. These norms and standards are based on the knowledge people construct, which as mentioned before, authorize and legitimate the exercising of power. “[T]he knowledge and truth… are the result of power struggles in which they have triumphed over other disciplines and forms of knowledge” (Danaher, Schirato & Webb, 2000, p. 27). If knowledge is changeable, which means that normality is also fluid, then how can paradigmatic *norms* to be credible and legitimistic in educational researches?

The Chaos Era, or Is It?

Although the positivist paradigm and the postpositivist paradigm were still considered incommensurable during the inclusion era, some subgroups within the postpositivist paradigm (e.g., constructivism, critical theory and postmodernism) started

intertwining with each other. Lincoln and Guba (2000) believe: “Methodology is inevitably interwoven with and emerges from the nature of particular disciplines (such as sociology and psychology) and particular perspectives (such as Marxism, feminist theory, and queer theory)… Indeed, the various paradigms are beginning to ‘interbreed’ such that two theorists previously thought to be in irreconcilable conflict may now appear, under a different theoretical rubric, to be informing one another’s arguments” (p. 164). They argue that to some degree, paradigms are commensurable, which means that they can be retrofitted to each other in ways that make possible for the simultaneous practice of both. However, they further argue that although the commensurability within each paradigm and mixed methodologies could make perfect sense, the paradigmatic level of commensurability between positivist and postpositivist worldviews is not possible (Lincoln & Guba, 1985, 2000).

Geertz (1988, 1993) called such a contemporary phenomenon in social inquiry *blurring of genres*. It could also be appropriately labeled paradigm proliferation, which means, “forming a pattern of interference” (Holland, 1999, p. 14). Accordingly, the idea of metaparadigm is used to reference an assortment of different paradigms within one label. For example, Guba and Lincoln (1994)’s transformation of critical theory into a sort of metaparadigm has gained more and more attention within the field.

Such a hybridity of paradigms and approaches reduces linear, structural models and “tame[s] the wild profusion of existing things” (Foucault, 1970, p. xv). According to postpositivists, social inquiry is not a value-free domain, and there are multiple voices inside of the inquiry; the oppression of one paradigm by another could be viewed as the oppression of one set of values by another. The pursuit of knowledge is not innocent;

therefore, we should not validate a monolithic paradigm or approach in our inquiry. Proliferation is an attempt to work against the solidification of the cultural monoliths, or in other words, *racist ideology* (Tyson, 1998). “The great monolithic oppositions that have historically structured our thought are increasingly displaced by greater differentiation out of the shifting forces and fixities of power itself” (Lather, 2000, p. 5).

The Third Wave Paradigm

In recent years, this paradigm proliferation went across the line, so the positivist paradigm and the postpositivist paradigm started interweaving with each other. Moving beyond quantitative purism and qualitative purism to avoid the paradigm war, epistemological and methodological pluralism offers a third paradigm in educational research: mixed methods research (Brewer & Hunter, 1989; Greene, Caracelli, & Graham, 1989; Howe, 1988; Johnson & Onwuegbuzie, 2004; Maxcy, 2003). Mixed methods research is defined as “the class of research where the researcher mixes or combines quantitative and qualitative research techniques, methods, approaches, concepts or language into a single study” (Johnson & Onwuegbuzie, 2004, p. 17). This is a step that goes even further than paradigm proliferation:

> The goal of mixed methods research is not to replace either of these approaches but rather to draw from the strengths and minimize the weakness of both in single research studies and across studies. If you visualize a continuum with qualitative research anchored at one pole and quantitative research anchored at the other, mixed methods research covers the large set of points in the middle area. If one prefers to think categorically, mixed methods research sits in a new third chair,

with qualitative research sitting on the left side and quantitative research sitting on the right side. (Johnson & Onwuegbuzie, 2004, p. 14-15)

While considering the conduct of fully objective and value-free research as a myth, mixed methods researchers also reject the notion of *multiple realities* since they prefer to view them as *multiple perspectives or opinions or beliefs*. Based on the work of classical pragmatists (e.g., Charles Sanders Peirce, William James and John Dewey), mixed methods researchers take a pragmatic and pluralist position to improve communication among researchers from different paradigms as they attempt to advance knowledge (Maxcy, 2003; Murphy, 1990; Watson, 1990). Mixed methods researchers believe that research methods should follow a research question in a way that offers the best chance to obtain useful answers. Such a practical and needs-based approach to educational research method and concept selection tries to bridge the schism between quantitative research and qualitative research, as well as to produce a superior product that contains insights and procedures from both approaches (Johnson & Onwuegbuzie, 2004).

Chaos, or Is It?

In a field dominated by one paradigm, there is virtually no choice. With multiple competing paradigms, there is still pressure to choose one over all of the others. With the proliferated paradigms, and the third wave paradigm on educational research, it starts to be difficult to eschew all of the alternatives and adopt an independent paradigm. Some might consider the field to be in chaos, but is it? We could also consider it as the freedom to adopt any paradigm that *fits* the research question. That is, we are no longer constrained by *any* paradigm.

Conclusion

This study considers epistemological and methodological pluralism as offering great potential for the interweaving of paradigms and for the incorporation of multiple perspectives. It contributes to the understanding that ideology, cultural knowledge, and identity are crucial in the formation of any paradigm.

We all live in "a time of the loss of grand narratives and one best way thinking, a time of multiplicity and competing discourses that do not map tidily onto one another, a time of unevenly legitimated and resourced incommensurabilities regarding the politics of knowing and being known" (Lather, 2000, p. 9), so we should work toward a recognition that we all do our work within such a crisis of authority and legitimating, proliferation and fragmentation of centers, and blurred genres. "The goal is to move educational research in many different directions in the hope that more interesting and useful ways of knowing will emerge" (Lather, 2000, p. 16).

A tree is a useful metaphor for describing the evolution of paradigms in current educational research. Each successive paradigm branches off from its predecessor. As each method of inquiry expands to encompass more diverse techniques, it encourages continued internal development and new growth in other paradigms. Ontology, epistemology and methodology nourish each paradigm. These elements represent the roots that ground each archetype and provide its source of energy and ongoing exploration. Just as a tree continues to develop new branches and grow in height, paradigms mature and intensify over time. Methods of research, contemplation, evaluation, and understanding are revised to reflect new ways of thinking and the construction of knowledge. A combination of multiple paradigms and/or approaches in

one single study is a strategy that adds rigor, breadth, depth, complexity, and richness to any inquiry (Flick, 1998).

Paradigm War in Literacy Education

As one of the most intense *battlegrounds* of the paradigm war in educational research, literacy research has gained tremendous attention in and out of the academic field. The fundamental focus on this paradigm war in literacy education is the question of whether literacy, especially reading, can be studied from a framework that is similar to the one commonly used in the fields of science and medicine. In the current study, people who hold different answers to this question are considered in two different camps: Paradigm A and Paradigm B. Individuals in different paradigms are so emotionally attached to their paradigms that the paradigmatic differences might exist forever. Meanwhile, we have to admit that literacy research might be one of the fields that is influenced the most by political factors, which further complicates the issue.

At first, this section briefly introduces the paradigm war in literacy education, that is, the major conflict between Paradigm A and Paradigm B. Then, using the paradigmatic approach (Ritzer, 2001), this section further analyzes the four paradigmatic components in both Paradigm A and Paradigm B.

Paradigm War in Literacy Education

Following the pattern of its parental field -- educational research -- literacy research is in the throes of an epistemological crisis as well. The history of literacy education in the United States also went through the eras of exclusion, inclusion and chaos, only the situation is even more complicated.

The Exclusion Era

From Colonial times, the earliest method of reading instruction was a straightforward, two-step process: 1) teach the code, and 2) have them read (Adams, 1990). Directly based on the alphabetic principle, teaching the code emphasized the phonemic significance of the letters. For example, the teacher would present key words (e.g., *m* is for *man*), then the students would practice in reading simple syllables, and exercise in spelling. Without any readings specially written or adapted for young minds, children read mainly the Bible as well as some nationalistic and patriotic essays. The complicated nature of the readings resulted in limited levels of reading comprehension for the children.

The Inclusion Era

Beginning from the middle of the nineteenth century, more and more print became available and literature was blossoming in the United States as was also the case in Europe. Furthermore, the resurgence of Jeffersonian ideals connected the fate of a democracy with the wisdom of the majority; that is, a better educated public was considered essential for a more democratic society. It became common public concerns to ask questions like how best to teach reading, how best to encourage the students' desire to learn, as well as how best to prepare the students to focus on meaning and ideas. Additionally, graded series that were designed to match the children's age and achievement levels in linguistic complexity and content replaced previous all-purpose reading books. Education was based on the growing child's nature and needs, so the children could be educated as knowledgeable and intellectually independent individuals (Adams, 1990; Balmuth, 1982; Smith, 1974).

Horace Mann, the secretary of the Massachusetts Board of Education, challenged the phonetic approach in the mid 19th century. Mann denounced the letters of the alphabet as *bloodless, lethargy,* argued that children should be taught whole, meaningful words first, and promoted the *look-say* method that dominated education by the mid 1920's (Balmuth, 1982).

The *dull drill and practice* of letter-to-sound correspondence, that is, phonics, was considered as being incompatible with comprehension instruction. From the 1930s and 1940s, comprehension became the direct emphasis of major beginning reading programs. Words were taught by meanings first; that is, words were recognized holistically by sight. If straight recognition failed, context and pictures were used for word identification. In these meaning-based programs, phonics was only viewed as an auxiliary tool that was introduced to the students gradually, used sparingly, and exercised only in conjunction with the meaning-bearing dimensions of text (Chall, 1983a).

The meaning-based reading instruction was heavily attacked by *Why Johnny Can't Read* (Flesch, 1955), which was initially addressed directly to parents and was on the best-seller list for more than thirty weeks. Flesch argued that written English is alphabetic and thus it is phonetic by definition. He believed that similar to any other alphabetic language, phonic instruction is the only natural way of learning to read. According to Flesch, we should teach children the identifications of the letters and the sounds that each letter represents, and then we can have them write. Only through this way, children could spontaneously obtain the alphabetic nature of print. Flesch's idea was not novel, but his presentation was exceptionally powerful and intensely political. His voice reached the concerned ear of the government, and heated the debate of *phonics*

instruction over *look-say* instruction, which later became the paradigm war between *phonics* versus *whole language*.

Meanwhile, Flesch's book brought some negative influences in the field of reading instruction by oversimplifying the issues. Flesh asserted that if children were taught only the 44 letter-sound correspondences, they would be able to read any word they encountered, and there would be no reading problems. However, the memorization of the alphabet and its letter-to-sound correspondences is far from enough for proficient word recognition, let alone the comprehension of a text. Even people in *the phonics camp* disagreed with some of his arguments. Furthermore, he politicized the debate so seriously that to some degree, he polarized and paralyzed the field:

> Today one cannot promote 'whole language' instruction without having half the crowd perceive it as a thinly veiled push for look-say approaches to word recognition. To some, the very term 'whole language' is translated to mean an uninformed and irresponsible effort to finesse necessary instruction with 'touchy-feely' classroom gratification – and worse. The term 'code-emphasis" is translated by others into an unenlightened commitment to unending drill and practice at the expense of the motivation and higher-order dimensions of text that make reading worthwhile – and worse. (Adams, 1990, pp. 25-26)

What is whole language instruction? Before we proceed deeper in the paradigm war of literacy education, we need to know what exactly are whole language and phonics instruction. Let's start with whole language instruction.

The rationale for whole language is that experienced readers grasp the meaning of entire words all at the same time. Further, when children talk they use complete words

without conscious attention to the individual sounds that make up those words. Thus, whole language believers argue that children should be taught from the beginning to read whole words. Whole language is said to be *literature based* because students are expected to learn these words by *reading* them as their teacher reads stories aloud. After they have *read* them enough times, they will recognize them and be able to read themselves. One of the central beliefs of whole language is that language should be learned from whole to part, with word recognition skills being picked up by the child in the context of actual reading, writing and immersion in a print-rich classroom.

It is a philosophy that has won the backing of influential teacher's organizations, state and local education agencies, and tens of thousands of enthusiastic teachers who are taught this approach in college with the exclusion of phonics, and are dedicated believers of this approach.

What is phonics instruction? In systematic phonics programs, children receive explicit, systematic instruction in a set of pre-specified associations between letters and sounds, and they are taught how to use them to read, typically in texts containing controlled vocabulary. Approaches to phonics instruction vary in many ways; however, a majority of phonics programs use a synthetic approach to teach phonics. This instruction typically begins by teaching children relations between individual letters and pairs of letters, that is, digraphs (e.g., TH, CH, CK, EA) and all 44 phonemes of the language. These correspondences are introduced systematically and sequentially. Children are taught to decode unfamiliar words by sounding out the letters and blending them to pronounce a recognizable word (National Reading Panel, 2000).

Chall's (1967) comprehensive analysis examined both the underlying theory and the classroom realities of meaning-based (whole language) programs and code-based (phonics) programs. She found that early and systematic instruction in phonics seems to lead to better achievement in reading than later and less systematic phonics instruction. Her basic finding has been reaffirmed in virtually every research review conducted since (e.g., Adams, 1990; Anderson, Hiebert, Wilkinson, & Scott, 1985; Balmuth, 1982; Snow et al., 1998). However, the debate has continued until today (Grundin, 1994; Taylor, 1998; Weaver, 1998). Part of the reason for this persisting controversy lies in the fact that reading instruction has become increasingly entangled with politics and ideology (Goodman, 1993; McKenna, Stahl, & Reinking, 1994). Another reason has been the philosophical disagreements about how to teach children to read and confusions about the implications of these varied points of view (National Reading Panel, 2000). Although controversial, "the swings of a pendulum" are one of the most popular metaphors to describe the rise and decline of different reading programs in the United States (Stahl, 1999; Wolfe & Poynor, 2001).

The Chaos Era, or Is It?

At present, the simple image of a pendulum can no longer fully represent the current picture of literacy programs in the United States. As Adams (1990) claims,

> We are witnessing an explosion in both information and technology. Alongside, the social and economic values of reading and writing are multiplying in both number and importance as never before. It is no longer possible to guess, much less dictate, what knowledge and skills will be critical to students in their future.

> Each of them must be prepared with the abilities to acquire, understand, use, and communicate information accurately, efficiently, and independently. (p. 26)

With different labels and updated arguments, the fruitless debate regarding phonics and whole language is still on, although most of the people do not feel comfortable to call the disagreement *phonics versus whole language debate*. With the explosion in literacy models, each literacy theory tries to distinguish itself from phonics camps or whole language camps and seek its own identity. So many different theories under different titles appear within the field, that to some degree, the field of literacy education is in a status of chaos.

When Reid Lyon, the director of National Institute of Child Health and Human Development (NICHD), advocated publicly for a certain perspective on the psychology of reading, specifically how reading is learned, and how best to teach it, and when he made it clear that the NICHD's funding would be awarded only to *valid* and *reliable* science, many people became irritated. What is *science*? What is *valid* or *reliable*? Endless debates have appeared in one of the most prestigious journals in education: *Educational Researcher* (Barone, 2001; Burkhardt & Schoenfeld, 2003; Eisenhart & Towne, 2003; Maxwell, 2003; Mayer, 2001; Olson, 2004; Slavin, 2002, 2004; Strauss, 2001a, 2001b; Stone, 2001; Wainer & Robinson, 2003), especially, a theme issue on *Scientific Research and Education* (November 2002). With so many voices arguing with each other, no wonder educators are lost in these various, sometimes contradictory directions provided by reading models and theories on literacy education, particularly, for students who are deaf or hard of hearing.

Nevertheless, every literacy theory can be categorized as being in either Paradigm A or Paradigm B according to a response to the question of whether literacy, especially reading, can be studied from a framework that is similar to the one commonly used in the fields of science and medicine. Based on the understanding of *science* that we obtained in Chapter 2, this study views literacy education as *a paradigmatic science* in which multiple paradigms exist. There is more political competition than right or wrong justifications in these rival paradigms. Before we accomplish paradigmatic commensurability in the field, we need to obtain an inclusive understanding of the competing paradigms: Paradigm A and Paradigm B. Philosophically, the primary differences between these two Paradigms are as follows:

First, Paradigm A believes in *an objective reality*; while Paradigm B argues that *reality is a social construction of the mind*. Thus, science is a social construct, and there are no immutable laws of cause and effect to be discovered.

Second, Paradigm A believes in the separateness of the researcher and the entity researched; whereas Paradigm B blurs the distinction; that is, instead of being discovered, the research *findings* are created through the transaction between the researcher and the entity researched.

Finally, according to Paradigm A, the notion of *truth* is independent of the researcher; whereas *truth* in Paradigm B does not exist independently of how the researcher constructs reality. Thus, what is researched can only be understood within the context where it has been constructed. Therefore, neither problems nor their solutions can be generalized from one setting to another; that is, generalizations are precluded (Pring, 2004).

Ritzer's (2001) paradigmatic approach is the tool for our analysis to examine the four basic components of a paradigm in literacy education: 1) an exemplar; 2) an image of the subject matter; 3) theories; and 4) methods and instruments.

Paradigm A

Proponents who believe that literacy, especially reading, can be studied from a framework that is similar to the one usually used in the fields of science and medicine are within *Paradigm A.* Typically, individuals who study reading within Paradigm A are more likely to construe the reading subjects (i.e., the readers) and the reading objects (i.e., texts) as two separate interactive entities. For example, people who examined literacy through cognitive-processing models (e.g., top-down models, bottom-up models, and interactive models) (Adams, 1990, 1994, 2004; Gough, 1972; LaBerge & Samuels, 1974; McCarthey & Raphael, 1992; Paul, 1998, 2001; Rumelhart, 2004; Samuels, 2004) or dual coding models (Sadoski & Paivio, 1994, 2004; Sadoski, et al., 1991) are typically in this camp.

Exemplar

The exemplar for Paradigm A is clearly the work of Jeanne Chall (1967, 1983a, 1983b, 1996). It was in the fall of 1959, four years since the publication of Rudolph Flesch's (1955) best-seller, and the debate over the best way to teach children to read was at its bitter peak. Although the most widely-used reading programs in the United States still followed the whole-word, meaning-first, phonics little-and-later approach to beginning reading, an extension of new and rediscovered phonic approaches to beginning reading started to appear. It was then that the National Conference on Research in English invited Jeanne Chall to join a small group of experts on reading instruction to

identify the aspects of reading that were most in need of research. Supported by the Carnegie Corporation, Chall published the results of her project, *Learning to Read: The Great Debate*, in 1967, and updated it in 1983. From her thorough examination on the literature, she found that, for both young readers and pre-readers, familiarity with letters and sensitivity to the phonetic structure of oral language were strong predictors of reading achievement.

Growing out of her seminal research on the effectiveness of different beginning reading approaches (Chall, 1967, 1983a), Chall presented her model of reading development in her later book *Stages of Reading Development* (1983b, 1996). Chall's model of reading development provided age level, skills acquired, and means of developing skills at 6 stages for children's reading development. The assumption is that reading development follows a hierarchical progression, and development at each stage is dependent upon adequate development at the prior stages. Children may progress through the stages at different rates, but even children with special needs appear to follow the same sequence.

Stage 0 (Preschool, up to Age 6). Stage 0 is a Pre-reading Stage that is characterized by children's growth in knowledge and use of spoken language. In this stage, children acquire beginning understandings of the sound structures of words. Most children can name letters in the alphabet and begin to print their name. Although much of their reading may best be described as *pretend reading* -- that is, they pretend to read and retell stories when looking at pages of books -- most children learn to hold the book right-side up and turn the pages (Chall, 1996).

Stage 1 (Grades 1-2). In Stage 1, the Initial Reading and Decoding Stage, children learn the relations between letters and sounds and between printed and spoken words. Children start to be able to read simple text containing phonetically regular words. Direct teaching of decoding accelerates development in Stage 1, particularly for children with limited readiness (Chall, 1996).

Stage 2 (Grades 2-3). In Stage 2, the Confirmation and Fluency Stage, children confirm what was learned in Stage 1 and learn to apply the knowledge obtained in Stage 1 to read words and stories. They are able to combine their knowledge of basic decoding with sight vocabulary and context to read selections. Children read simple, familiar stories with increasing fluency. Through practice, oral reading of stories and passages becomes more fluent and sounds more like talking. Stage 1 and 2 represent a "learning to read stage", and at the end of Stage 2, children recognize most words automatically and read passages with ease and expression. Decoding the words on the page no longer consumes all of their cognitive attention, and their cognitive capacity is freed for information processing. At this moment, children are ready to make the transition from *learning to read* to *reading to learn* (Chall, 1996).

Stage 3 (Grade 4-8 and/or 9). Stage 3 is the start of Reading to Learn stages. Reading is used to learn new ideas and gain knowledge, generally from one viewpoint. Growth in word meanings (vocabulary) and background knowledge are major goals. Most reading is for facts, concepts, or how to do things (Chall, 1996).

Stage 4 (Grade 10-12). Stage 4 is the start of Multiple Viewpoints stages, in which students must deal with more than one viewpoint. Students read widely from a broad range of complex materials, both expository and narrative, with a variety of

viewpoints. Study skills and practice in efficient reading are beneficial at this stage (Chall, 1996).

Stage 5 (College and beyond, Age 18 and above). At the highest stage of reading development, the Construction and Reconstruction Stage, reading is rapid and effective. Readers can read materials in the degree of detail and completeness that is required to serve their purpose, and integrate their own knowledge with that of others. In short, reading is constructive; that is, the reader constructs knowledge and understanding from reading what others have written (Chall, 1996).

Scholars generally consider Chall's (1996) six-stage of reading development model as an endorsement of a code-emphasis approach in beginning reading instruction. And the model is widely reaffirmed by scientifically-based research and research reviews. Chall's 1967 analysis of the research evidence on beginning reading instruction is remarkably similar to that of the National Reading Panel (NRP) report (2000). Her stages mirror the five components identified by NRP: phonemic awareness (in Stage 0 and into Stage 1, if necessary); phonics (emphasized in Stage 1, continued but with less emphasis in the higher stages); fluency (emphasized in Stage 2, continued but with less emphasis in Stage 3); vocabulary (emphasized in Stage 3 and continued through Stages 4 and 5); and text comprehension (emphasized in Stage 3, 4 and 5, with increasing emphasis on higher-order comprehension at the more advanced stages) (Carnine, Silbert, Kame'Enui & Tarver, 2004).

Chall's reading stages model also explains the so-call *Matthew Effect* very well. The *Matthew Effect* analogy (Stanovich, 1988, 2004) is used frequently in reading

development to explain the rich-get-richer and poor-get-poorer effects that a previously existing knowledge base, that is rich and elaborated, can have on further learning. That is,

> Children who begin school with little or no phonemic awareness have difficulty learning letter-sound correspondences and therefore have trouble with word recognition. When word recognition places too many demands on cognitive capacity, less cognitive attention is available for allocation to higher level comprehension processes. Trying to read for meaning without the necessary cognitive resources is not a rewarding experience. Unrewarding early experiences squelch motivation and lead to less involvement, and therefore lack of practice, further delay the development of automatic word recognition. The negative spiral of cumulative disadvantage continues and troublesome emotional side effects begin to be associated with school experiences. The emotional problems, in turn, present yet another hindrance to school achievement. (Carnine, et al., 2004, pp. 14-15)

Image of the subject matter

The basic subject matter of reading development to those who adopt Paradigm A is the understanding that the reading subjects (i.e., the readers) and the reading objects (i.e., text) are two separate interactive entities. Heavily influenced by cognitive psychology, studies along this line of research are focused on human beings' cognitive processes while reading, that is, how information is processed in the brain when the texts are read.

Theories

According to Ruddell and Unrau (2004a), the waves from the ocean of knowledge on cognitive processes begin with bottom-up models, followed by top-down models, and progress to interactive or bottom-up/top-down designs. This progression parallels with the history of beginning reading programs in the United States as discussed previously. There are many other models that exist within Paradigm A besides cognitive-processing models, but only dual coding models are explored in detail in this study.

Cognitive-processing models. The cognitive information processing models claim that with regards to reading and writing, there are similar underlying processes, including various sub-processes. In order to engage in higher level processes associated with the construction of meaning or other higher level thinking activities, readers or writers must master the lower level processes fluently and automatically. The basic assumption is that understanding the reading or writing process will provide some guidelines for teachers to improve the literacy skills of the readers or writers. However, such a thorough understanding has not been accomplished, and it has been debated whether a complete understanding of the reading or writing process is realistic. Additionally, these models have been accused of providing poor implications for instructional practices (McCarthey & Raphael, 1992; Paul, 1998, 2001).

There are three general branches of the cognitive information processing models: bottom-up, top-down and interactive models. Bottom-up, or text-based, models refer to the direction of the process of reading, from the print on the page to the meaning in the reader's head. For example, Gough's (1972) *one second of reading model* described a process that began with low-level sensory representations (letter input) and proceeded

through phonemic and lexical-level representation to deeper structural representation. That is, the process begins at the bottom with the text and proceeds upward through various levels of higher analyses to the top level, which is the meaning in the reader's mind. Thus, the reader must begin with the smallest units of analysis (letters or words) to the next largest (syllables) on to the largest (textual meaning).

In bottom-up models, much of the attention is placed on the identification of letters and words, that is, the decoding process. The use of context clues in a purposeful way is considered as playing a minor role in the process. Within this framework, it is argued that meaning is in the text, and it is the reader's job to extract that meaning through the use of decoding skills. The major implication of bottom-up models is a skills-based approach to instruction. It is argued that the early acquisition and comprehensive mastery of these skills are critical for the development of higher-level reading skills. The assumptions of bottom-up models include that readers read words letter by letter from left to right. However, such a claim is questioned because although experienced readers process all the letters of words, they do not read words letter by letter in a left-to-right way. Another assumption of bottom-up models is that word recognition is mediated by phonological coding. However, critics claim that although readers need to use a phonological coding process for many words, readers can access some words through a visual route, for example, orthographic coding. Additionally, it is argued that although the ability to identify words automatically and effortlessly is crucial, it is not sufficient for reading comprehension (Paul, 2001).

On the contrary, top-down models focus on comprehension with the exclusion of word recognition or word identification skills, for example, story grammars (Stein &

Glenn, 1979), script theory (Schank & Abelson, 1977), hierarchical theories based on text structure (Meyer, 1975; Meyer & Poon, 2004) and schema theory (Anderson, 2004; Bransford, 2004). In essence, according to top-down models, word identification is taken care of through the use of comprehension strategies and skills. The assumption is that meaning is in the reader's head. Thus, as a linear and hierarchical process, the reading process begins at the top with the information in the reader's head and proceeds downward to the bottom, that is, to the words in the text, for lower-level processing. The function of the information in the text is to confirm hypotheses and predictions. It is claimed that an adequate knowledge of the culture and specifically the language in which one is trying to read are important. With regards to implications for instruction, top-down models are related to reading instructions such as whole language and language experience approaches. However, its critics state that this model fails to adequately explain how young children learn to read and fails to describe what skilled readers do in the event of a breakdown in comprehension. Furthermore, some claim that this model relies too heavily on context for comprehension, but context does not accelerate the identification of words or accelerate the derivation of word meanings. Additionally, critics argue that difficulties in the use of context cues during reading for word identification purpose do not necessarily lead to reading comprehension problems (Paul, 2001).

Since the early 1980s, interactive models have been favored in the field to understand the comprehension processes. Interactive models acknowledge that both bottom-up and top-down skills are simultaneously used during literacy instruction. That is, reading is considered as an interactive process involving the text, reader, and the

reading context. The reader's goal is to construct a model of what the text means by using information from the text and the information in his or her head and by considering the context of reading. Such a notion of parallel processing encompasses what is considered a balanced view of literacy. Within this framework, the reader is considered as an active information processor whose goal is to construct a model of what the text means.

Examples of interactive models include Samuels's automatic information processing model (LaBerge & Samuels, 1974; Samuels, 2004), Rumelhart's interactive model (Rumelhart, 2004); Just and Carpenter's model on eye fixations (Just & Carpenter, 1987, 2004), Adams's processor model (Adams, 2004) and Kintsch's Construction-integration model (Kintsch, 1988, 2004).

With respect to the implication for practice, interactive models of literacy emphasize both word identification and comprehension instruction. However, critics argue that the model is vague in its explanations of the initial development of a schema, the contribution of schemata to the understanding of a text, as well as the precise relations between and among schemata. Moreover, it is argued that interactive models do not attend to the variety of word identification strategies or problems associated with comprehension beyond the sentence level (Paul, 2001).

The LaBerge-Samuels (1974) model of automatic information processing in reading is the most widely quoted of all the interactive reading theories (Blanchard, Rottenberg, & Jones, 1989). It attracted the interests of teachers and professionals because it used the concept of *automaticity* to explain why fluent readers are able to decode and understand text with ease while beginning readers have difficulty.

> Automaticity theory suggests that one possible reason for the students' problem is that the decoding requires so much attention that it interferes with comprehension. Another common problem is seen when skilled readers, often college students, claim that even though they read the text with care, they cannot remember what they have read. Because the students are skilled readers, the decoding of the words on the page can take place with little attention, thus leaving attention free to be directed elsewhere. Automaticity theory suggests that instead of focusing on deriving meaning from the text and understanding and recalling the author's viewpoints, the students' attention perhaps wanders to matters entirely unrelated to the text… it is often helpful to explain that poor recall is due not to a memory deficit but to lack of attention directed on processing the text. (Samuels, 2004, p. 1145)

Dual Coding Models. Based on cognitive information processing theory, Dual Coding Theory (DCT) is a theory of general cognition first developed to explain verbal and nonverbal influences on memory. Rich in explanatory power, DCT has been extended to literacy as a theory of reading comprehension (Sadoski & Paivio, 1994, 2004; Sadoski, et al., 1991), as a theory of written composition (Sadoski, 1992), and as a unified theory of reading and writing (Sadoski & Paivio, 2001).

DCT proposes that there are two separate but interrelated codes (i.e., cognitive subsystems) for processing information, one specialized in the representation and processing of nonverbal objects/events (i.e., imagery), and the other specialized in processing and storing linguistic information (e.g., words, sentences, etc.,). The verbal and visual systems can be activated independently, but there are interconnections

between the two systems that allow dual coding of information. The interconnectedness of the two systems permits cueing from one system to the other, which in turn facilitates the interpretation of our environment. DCT postulates two different types of representational units: *imagens* for mental images and *logogens* for verbal entities. Logogens are organized in terms of associations and hierarchies; that is, information is stored in discrete, sequential units; whereas imagens are organized in terms of part-whole relationships; that is, processing in the visual system is more holistic and based on continuous organizational units.

DCT identifies three kinds of processing: (1) representational, the direct activation of verbal or non-verbal representations; (2) referential, the activation of the verbal system by the nonverbal system or vice-versa; and (3) associative processing, the activation of representations within the same verbal or nonverbal system. A given task may require any or all of the three types of processing. The basic principle of DCT is that information is much easier to retain and retrieve when dual-coded because of the availability of two mental representations instead of one.

As a theory of general cognition, DCT provides a combined account of decoding, comprehension, and response: “the same basic DCT principles apply to grapheme-phoneme correspondences, word meaning, grammar, the construction of mental models of text episodes, and even imaginative responses to text” (Sadoski & Paivio, 2004, p. 1329).

On the other hand, some theorists have challenged the basic principles and assumptions of DCT. For example, with respect to storage of information, some studies have shown that pictures are actually remembered by their meaning rather than their

visual features (Driscoll, 1994). Strongly supported by researchers in Artificial Intelligence, who believe in an abstract representation of knowledge (Molitor, Ballstaedt, & Mandl, 1989), the criticism implies a unitary view, which assumes that visual and verbal information is stored the same way. DCT has also been criticized for not taking into consideration the variable abilities people have for processing information. For instance, Simpson (1994) proposes that age seems to play a role in determining the use of modalities. He argues that younger individuals process information more in the visual modality than the semantic.

Methods and instruments

The typical methods and instruments in literacy research under Paradigm A can be categorized as experimental research studies in which certain hypotheses are *justified*. Within Paradigm A, literacy research is considered as a subset of the social sciences where the advocacy of evidence-based policy and practice is strong. Dominated by empirical enquiries, literacy research within Paradigm A seeks the general laws or conditions which will enable teachers or policy makers to predict outcomes under certain conditions; that is, what will happen if…. The model of randomized controlled tests in medicine is being translated into literacy research. Thus, literacy research seeks to establish empirically the most efficient and effective ways of obtaining particular goals, for instance, how best to teach reading.

Paradigm B

On the contrary, proponents of Paradigm B either reject the notions of science or paradigm, or believe there are so many different sciences and paradigms that those concepts have to be considered as faint glimmers. Accordingly, they value reading as a

multiparadigmatic domain that is socially constructed, and they tend to view the texts and readers as transactional entities that cannot be separated from each other. For example, scholars who explore literacy through transactional models (Rosenblatt, 1938, 1978, 2004), sociocognitive models (Ruddell, 1994; Ruddell & Unrau, 2004b), transactional sociopsycholinguistic models (Goodman, 1986, 2003; Goodman & Goodman, 1992, 2004), and attitude-influenced models (Mathewson, 1976, 1985, 2004) are usually in this camp.

Exemplar

Initially published in 1938, Louise M. Rosenblatt's *Literature as Exploration* has furnished the theoretical basis for much research in literature and has influenced how literature is taught in classrooms in the United States and worldwide. Rosenblatt's reader response theory or transactional theory has also been considered as the exemplar of Paradigm B.

The term *transaction* was first introduced in John Dewey and Arthur F. Bentley's *Knowing and the Known* (1949). They rejected the term *interaction* because it was associated too much with the traditional positivistic paradigm in which each element or unit was considered as being separate and *thing balanced against thing*. The term *transaction* was therefore chosen to imply *unfractured observation* of the whole situation. Thus, the knower, the knowing, and the known are viewed as aspects of *one process*. Each element or unit conditions and is conditioned by the other in a mutually constituted situation (Rosenblatt, 1985, 2004). Adopting Dewey's pragmatist philosophy, Rosenblatt argues:

> The new paradigm requires a break with entrenched habits of thinking. The old stimulus – response, subject – object, individual – social dualisms give way to recognition of transactional relationships. The human being is seen as part of nature, continuously in transaction with an environment – each one conditions the other. The transactional mode of thinking has perhaps been most clearly as simulated in ecology. Human activities and relationships are seen as transactions in which the individual and social elements fuse with cultural and natural elements. (Rosenblatt, 2004, p. 1364-1365)

Rosenblatt's (1938) rejected the New Criticism of the late 1930s through the 1950s which assumed that the texts themselves were central and that teachers should teach the skills of close, concise, attentive analysis while discouraging expression of and attention to differences in students' own individual responses. As the first book in the United States to advance a reader-response theory of literature, *Literature as Exploration* (Rosenblatt, 1938) triggered a paradigm shift in the teaching of literature away from viewing the text as authority to a view that focuses on the reader's relationship with text. It argues that "there are in reality only the potential millions of individual readers of the potential millions of individual literary works… The reading of any work of literature is, of necessity, an individual and unique occurrence, involving the mind and emotions of some particular reader" (Rosenblatt, 1938, p. 32). Rosenblatt insisted that the education of the citizens of a democracy must include attention to the hearts as well as the heads, the souls as well as the minds. In the third edition of her *Literature as Exploration* (1976), she said:

> This book has attempted to reveal how much the experience and study of literature has to offer that is relevant to the crucial needs of personalities involved in the conflicts and stresses of life in our changing society. Indeed, literary experiences might be made the very core of the kind of educational process needed in a democracy.
>
> If we only do justice to the potentialities inherent in literature itself, we can make a vital social contribution. As the student vicariously shares through literature the emotions and aspirations of other human beings, he can gain heightened sensitivity to the needs and problems of others remote from him in temperament, in space, or in social environment; he can develop a greater imaginative capacity to grasp the meaning of abstract laws or political and social theories for actual human lives. Such sensitivity and imagination are part of the indispensable equipment of the citizen of a democracy. (p. 274)

Rosenblatt's (1964) work is primarily concerned with describing readers' processes of engagement and involvement for composing their own *poem*, that is, the reader's construction of a text. While examining responding as an *event*, Rosenblatt writes:

> The special meaning, and more particularly, the submerged associations that these words and images have for the individual reader will largely determine what the work communicates to him. The reader brings to the work personality traits, memories of past events, present needs and preoccupations, a particular mood of the moment, and a particular physical condition. These and many other elements

> in a never-to-be-duplicated combination determine his response to the peculiar contribution of the text. (Rosenblatt, 1938, pp. 30-31)

In short, using the concept of transaction in the analysis of the reading process, Rosenblatt (2004) believes that the reader and the text are two aspects of a total dynamic situation, instead of two fixed entities acting on each other. The *meaning* happens or comes into being during the transaction between reader and text, rather than residing ready-made in the text or in the reader.

Rosenblatt's second major work, *The Reader, The Text, The Poem* (1978), examined more closely a classroom approach and application to this literary transaction. It provided a useful distinction between two opposing modes of experiencing a text—the *efferent* and the *aesthetic*. When responding from the efferent stance (from the Latin *effere*, to carry away), readers are motivated by specific needs to acquire information. They basically just want to understand what the text is saying. On the other hand, when readers are responding in the aesthetic stance, their own unique lived-through experience or engagement with a text is primary. During any one reading experience readers may shift back and forth along a continuum between efferent and aesthetic modes of reading processing. Thus, in adopting an aesthetic stance, a reader may briefly focus on analyzing the techniques interacting in a text. Or, in an efferent stance, a reader may be stimulated to remember a related personal experience. Rosenblatt argues that much of literature instruction employing *correct answer* worksheet, test, and textbook questions requires students to adopt an efferent rather than aesthetic stance. Instead, she focuses on the concept that shared criteria of valid interpretation in a particular social context allow for different interpretations of the same physical text to be acceptable; but at the same time,

some readings may satisfy the criteria more fully than others. Thus, we can be open to alternative readings of *Hamlet,* but we also can consider some readings superior to others according to certain criteria.

Rosenblatt argues that teachers need to help specific human beings—not some generalized fiction called the student—to discover the pleasures and satisfactions of literature. She believes:

> Hence, the teaching of reading and writing at any developmental level should have as its first concern the creation of environments and activities in which students are motivated and encouraged to draw on their own resources to make 'live' meanings. With this as the fundamental criterion, emphasis falls on strengthening the basic processes that we have seen to be shared by reading and writing. The teaching of one can then reinforce linguistic habits and semantic approaches useful in the other. Such teaching, concerned with the ability of the individual to generate meaning, will permit constructive cross-fertilization of the reading and writing (and speech) processes. (Rosenblatt, 2004, p. 1389)

Image of the subject matter

Rather than thinking of reading as involving a separate reader taking in a separate text, proponents of Paradigm B consider the reader and text as two aspects of a total dynamic situation; that is, the text and the readers are transactional entities that cannot be separated from each other. The teachers are no longer viewed as conveyors of ready-made teaching materials or recorders of ready-made test results. Instead, teachers are responsible for facilitating interchange, and helping students to construct their

spontaneous responses as the basis for handling increasingly complex reading transactions (Rosenblatt, 2004).

Theories

Literacy theories from Paradigm B are more proliferated and fragmented than theoe from Paradigm A. Blurred genres are characteristics of literacy theories from Paradigm B. Labeling all these theories is a challenge. This study uses the major models discussed in *Theoretical Models and Processes of Reading* (5th ed.) (Ruddell & Unrau, 2004a) to categorize primary literacy theories from Paradigm B: sociocognitive models (Ruddell & Unrau, 2004b), transactional sociopsycholinguistic models (Goodman & Goodman, 2004), and attitude-influenced models (Mathewson, 2004).

Sociocognitive models. Based on a constructivist tradition of learning and instruction, the sociocognitive model draws from Vygotsky (1962, 1978) and Bakhtin (1981, 1986), from neo-Vygotskians such as Wertsch (1985, 1991), Rogoff (1986, 1990) and Lave (1988), and from literacy researchers such as Huey (1968), Gutierrez (1994), Freedman (Freedman, Simons, Kalnin, Casareno, & the M-Class teams, 1999), Sperling (1996), Smagorinsky (1995, 1999) and Lee (1993, 1995; Lee & Smagorinsky, 2000).

Vygotsky's (1962, 1978) sociohistorical perspective holds that both the social context for learning and the interactions of teachers and learners shape what is understood and what is learned. With regards to literacy, Vygotsky believed that language is a mental tool, an actual mechanism for thinking. Furthermore, learning occurs in shared situations in which language is an important tool for appropriating other mental tools because individuals need to use language for communication, that is, for sharing meanings in a social context. Such a sociocultural perspective on language is

supported by a Marxist psychology, which is focused on an analysis of the objective forms of human historical existence and social practice, instead of focusing only within the circle of subjective experiments or considering only the internal processes of the brain.

Bakhtin's theories (1981, 1986) focus primarily on the concept of *dialogue* and on the notion that language--any form of speech or writing--is always a dialogue. This notion focuses on the social nature of dialogue and the idea of struggle inherent in it. Dialogue consists of three elements: a speaker, a listener/respondent, and a relation between the two. Language (and what language says, e.g., ideas, characters, forms of truth) is always the product of the interactions between (at least) two people. Bakhtin believed that our individual acts of expression, both written and oral, are the result of a difficult internal struggle in which the various voices of our past and present are linked to one another through the social web of language. We acquire language by internalizing the voices of others, and we spend our lives re-externalizing these assimilated forms in a never-ending dialogue with our peers. Additionally, each individual act of language takes shape and becomes meaningful in the space between ourselves and our audience and is highly dependent on our often unconscious choice of stable, yet transparent genres of both speech and text.

Within the sociocognitive model, reading is conceptualized as a meaning construction process in the instructional context of the classroom (Ruddell & Unrau, 2004b). That is, the classroom is a learning environment in which the teacher engages the readers in active comprehension through confronting and solving authentic problems in a social context. This environment “includes a meaning negotiation process that accounts

for text, task, source of authority, and sociocultural meanings" (Ruddell & Unrau, 2004b, p. 1497). Working from such a constructivist tradition, teachers are interested in giving students the opportunity to address the problem at hand (for example, improving student performance in literacy) calling upon the *voices* they have already acquired to gain new voices, to hone their ability to sift through these multiple sources in creating ideas and arguments, and to enter into forms of discourse and investigation that help them move ahead. However, critics argue that the formula for sociocognitive model is too abstract to be implemented in classrooms. Teachers need specific concrete guidance in using the model for their instruction.

Transactional sociopsycholinguistic models. Transactional sociopsycholinguistic model is an alternative term for *Reading Miscue Analysis*, which is a major whole language test designed to assess the strategies that children use in their reading.

Kenneth Goodman's 1967 paper, *Reading: A Psycholinguistic Guessing Game*, has been widely accepted as one of the first in the whole language canon, which has fostered the current revival of whole language movement and continues to guide and legitimize whole language instruction in the classrooms. Kenneth Goodman (1979) coined the use of the word *miscue* to avoid the negative connotation and history of the term *error*. Reflecting the view that a departure from the text is not necessarily erroneous, *miscue* refers to "unexpected responses cued by readers' linguistic or conceptual cognitive structures" (Goodman & Goodman, 2004, p. 621). Readers' miscues include substitutions of one written word with another, additions, omissions, and alterations to the word sequence.

When analyzing miscues, teachers are less interested in traditional quantitative measures such as reading accuracy or reading rate; instead, in the Reading Miscue Inventory (RMI) (Goodman & Burke, 1972), a student's incorrect response, when compared to the written word, may display a dialect variation, an intonation shift, graphic similarity, sound similarity, grammatical similarity, syntactic acceptability, semantic acceptability, meaning change, and self-correction with semantic acceptability to the text. This qualitative approach to analyzing miscues is considered to provide more fine-grained and relevant information than did other approaches to reading assessment. The philosophy of miscue analysis is that this qualitative analysis can help teachers better monitor a child's progress along the path to reading success, and identify the strengths and needs of students. Depending on the prevalence and type of miscue, teachers may decide whether any intervention is required and also its focus (Goodman, 1986, 2003; Goodman & Burke, 1972; Goodman & Goodman, 1992, 2004). Goodman and Goodman (2004) write:

> We started with the assumption that everything that happens during reading is caused, that a person’s unexpected responses are produced in the same way and from the same knowledge, experience, and intellectual processes as expected responses. Reading aloud involves continues oral responses by the reader, which allows for comparisons between expected and observed responses. Such comparisons reveal the reader’s knowledge, experience, and intellectual processes. Oral readers are engaged in comprehending written language while they produce oral responses. Because an oral response is generated while meaning is being constructed, it not only is a form of linguistic performance but also

provides a powerful means of examining readers' process and underlying competence. (p. 621)

Transactional sociopsycholinguistic model is predicated upon the whole language conception of reading, which is a controversial philosophy in the field. Some believe that misreadings are interpreted in a way that fits Goodman's guessing-game formulation and that this qualitative analysis of reading errors is largely irrelevant to instructional planning (Vellutino, 1991). Furthermore, critics argue that decoding ability predicts children's capacity for word identification and comprehension. Measures of semantic and syntactic ability as assessed in the RMI are not strongly correlated with word identification or passage comprehension (Vellutino, 1991).

Attitude-influenced models. From research and theory on affective dimensions of reading, Mathewson (1976, 1985, 2004) designed an engagement model which is also called the attitude-influenced model. G. W. Allport (1966) called attitude "the most distinctive and indispensable concept in contemporary American social psychology" (p. 15). He identified three important elements of attitude: 1) attitudes are private; 2) attitudes are formed and organized through experience; that is, we are not born with our attitudes; we acquire them via the socialization process; and 3) an attitude is not passive, but rather it exerts a dynamic or directive influence on behavior (Allport, 1935). Working on attitude influence on reading, Mathewson developed theoretical models (1976, 1985, and 2004) to serve as heuristic devices for generating predictions and guiding practice in reading. The philosophy of the attitude-influenced model is that "good self-concepts and acceptance of external motivators could promote positive emotional states during reading" (Mathewson, 2004, p. 1450).

Mathewson (2004) provides ten implications for instruction derived from the attitude-influenced model: 1) foster cornerstone concepts underlying attitude toward reading; 2) persuade students that various content, genres, and authors are worth reading; 3) establish classroom settings and norms that support favorable reading intentions and values; 4) use minimum external incentive to justify reading; 5) encourage students to read materials that stimulate satisfying feelings and ideas; 6) develop action readiness for reading; 7) help students read texts of suitable difficulty; 8) teach students abilities that underlie successful reading; 9) apply the model to early learning of reading; and 10) develop favorable attitudes toward content to stimulate content area reading (Mathewson, 2004).

However, the attitude-influenced model could never be the whole picture for reading:

> The development of the new model of attitude influence upon reading and learning to read is one step in the lone and difficult effort to clarify the roles of affect and cognition in reading. The model is not and cannot be only affective because cognition and affect are indissolubly linked in reading as they are in all other human endeavors. One major purpose of the model is therefore to bring affect back from the epiphenomenal realm to which much contemporary reading research has consigned it and to reestablish its dynamic interrelationships with cognition. (Mathewson, 2004, p. 1458)

Methods and instruments

Methods and instruments used in Paradigm B typically disagree with quantitative experimental research designs that ignore the complex transactions which take place

between the reader and the text. Proponents of Paradigm B argue that with so many components in simultaneous operation, isolating single variables for testing overlooks other essential sources of influence. Thus, only qualitative methods and instruments (e.g., discourse analysis and critical analysis) can provide opportunities for researchers to collect data on many aspects of participants to determine whether complex predictions of the model can be verified.

There are some values that are considered as prominent in the methods and instruments within Paradigm B. First, being able and willing to engage everyone in the dialogue is vital in both conducting research and in assessing knowledge claims. Advocates of Paradigm B argue that within the context of a politics of diversity and a vision of social justice, the goal of conducting educational research should be acting *with* others, not *on* or *for*. The assumption is that every voice has its value and everyone should be respected. Secondly, concrete cultural and historical experiences within everyday life are the main source of research questions and for the methodologies engaged. *Researching back* (Tuhiwai Smith, 1999) to the community, which involves making sense for the researched, should be the essential concern for the researchers. Furthermore, in order to interpret the complexity of human cultural thought and action that we study in educational research, we need to understand the cultural and historical context within which the thought and action are created:

> Qualitative research is a situated activity that locates the observer in the world. It consists of a set of interpretive, material practices that make the world visible. These practices transform the world. They turn the world into a series of representations, including field notes, interviews, conversations, photographs,

> recordings, and memos to the self. At this level, qualitative research involves an interpretive, naturalistic approach to the world. This means that qualitative researchers study things in their natural settings, attempting to make sense of, or to interpret, phenomena in terms of the meanings people bring to them. (Denzin & Lincoln, 2000, p. 3)

Conclusion

The history of literacy research follows the steps of its parental field -- educational research -- going through the exclusion era, inclusion era, and chaos era. In an era with only one dominating paradigm, there is practically no choice. Even with multiple competing paradigms, it is still difficult to choose one over all of the others. Only with epistemological and methodological pluralism can we interweave different paradigms and incorporate multiple perspectives. Recognizing and embracing different paradigms is a way to welcome the conflict inherent in our diversity that not only honors our own set of perspectives and practices in research as truth, but also tries to honor the truth that is created and negotiated in and between us. We should move out of frameworks of competitive paradigms and situate our efforts within contemporary knowledge, regardless of paradigmatic and methodological persuasions, including what Lather termed the *postparadigmatic diaspora* (Lather, 1991). In short, let the question determine the research approach, leave paradigm commitments behind, and look at purposes. The so-called *chaos* era of literacy education could be considered as providing the freedom to adopt any paradigm that *fits* the research question. That is, we are no longer constrained by a specific paradigm.

CHAPTER 4

MAPPING THE FIELD: METATHEORIZING IN LITERACY AND DEAFNESS

If the field of literacy education is divided by different paradigms in terms of their different beliefs about the literacy process, then how does this affect the field of literacy education in deafness? When we zoom in, we find that this field is even more alienated. The disagreement is not only about the literacy process, but also about the validity of mainstream literacy models for deaf education. In order to categorize the literature on the literacy skills of deaf and hard of hearing students, this chapter utilizes paradigms as the tools for analyzing the research on literacy and deafness according to their positions in the Paradigm A/Paradigm B debate. The foci are what is studied/measured, how it is studied/measured, and why it is studied/measured in certain ways. Since reading and writing, particularly reading, is still the heart of literacy education and most of the literacy research is reading research, this chapter has its primary focus on reading research for students who are deaf or hard of hearing.

This chapter starts with a general discussion of reading research on deafness. It then analyzes reading research studies on deafness based on the different paradigms

regarding the reading process; that is, whether reading is a reader-text interaction process or a reader-text transaction process. It is concluded that the debates are grounded in different paradigms, making it extremely difficult to reach a consensus. It is difficult—some would argue impossible—to argue that one paradigm is better or worse than another paradigm (Ritzer, 2001).

Reading Research on Deafness

Before we begin the discussion of reading research on deafness, let's look at what is research, what is reading research in general, and why it is valuable. We can then investigate what we have done in reading research on deafness and what we can do to contribute to the field.

What is Research?

There are two general types of research: primary research, also known as empirical research, and secondary research. Empirical research tends to fall into three basic types of studies: description, correlation, and experimental, although it is also possible to combine these types in various ways. The common ground in empirical research is that it all requires careful collection and analysis of empirical data (Shanahan, 2002). Secondary research is typically research reviews that can be quantitative meta-analysis or qualitative description of the primary research.

In terms of empirical research, Shanahan (2002) makes a distinction among *research related*, *research based* and *research proven* instructional designs. A research related instructional design means that the ideas have been drawn from descriptive or correlational research, and that the instructional design is related to that research. A research based instructional design suggests that programs similar to this one – although

not necessarily this particular version of it -- have worked successfully in experimental studies, and that this program was designed on the basis of that research. Finally, a research proven instructional design refers to a specific program or procedure that has been tested successfully in experimental research, which would be the highest standard of research support. Shanahan (2002) concludes:

> My point is not that one type of research is better than another. We need all three, but each is based on a different logic, and we need to make certain that the decisions that we based on research are consistent with the logic of the actual studies. If you want to adopt some instructional method or material because you think it will improve achievement or student interest, then you are best served by experimental data. (p. 13)

At the same time, there is a need to synthesize the body of knowledge in a way which can be useful for teachers, administrators, and politicians. We need to build up sufficient, coherent bodies of knowledge to serve as guidelines for professional practice in teaching.

In the United States, the annual cost of both federal and state funding on educational research is over a billion dollars. However, extensive criticisms have emerged from policy-makers, classroom teachers, and even the educational research community itself. Pring (2004) summarizes the criticisms as: 1) research does not provide the answers to the questions policy-makers ask in order to decide between alternative policies; 2) research does not help professional practice for the classroom teachers; 3) research is fragmented; that is, research addressing similar questions often start from different positions or use different samples, thus, they cannot create a coherent and

reliable basis for practice or policy; and 4) research is often tendentious or politically motivated – and excludes those who do not share similar ideological underpinnings.

From our discussion on the paradigm war in the field of educational research, these criticisms are not surprising. Furthermore, the situation in reading research is even more complicated.

The Field of Reading Research

Inheriting the limitations of educational research, the field of reading research adds its own character:

> These books and articles might represent bright, thoughtful insights about teaching and learning, but they are based on lived experience rather than formal research…. However, it is essential to remember that research requires data that are collected in some formal and describable manner, and that this means studies can bring us to a deeper understanding. That is, we can analyze how the studies were done and can consider whether the researcher used biased procedures or drew implications that did not follow closely enough from the actual results. Such analysis is not possible when an article is based on experience and insight alone…. Research is valuable because it offers more than results. It provides grounds for thinking more deeply about what is being studied. (Shanahan, 2002, p. 13-15)

On one side, high quality empirical research is limited in the field of reading research; on the other side, some people are so naïve about the findings in reading research that they believe a positive finding for a classroom intervention study is automatically transferable for others. Instructional research is different from the study of

medicines or surgeries, primarily because a technique that works under certain circumstances might not work under others. “The true meaning of a positive finding for a classroom intervention study is not that it *will* work for you, only that it *could* work, and under particular conditions it has done so for others” (Shanahan, 2002, p. 20).

The Field of Reading Research on Deafness

If we say the field of reading research is one of the weaker links in educational research, then the field of reading research on deafness is one of the weaker spots on this weaker link. Besides the difficulties we discussed in educational research and reading research, reading research on deafness also suffers from the fact that there are fewer participants in the studies and fewer resources from the research community in the investigation. There is an extensive literature on the reading difficulties of students who are deaf or hard of hearing (Allen, 1986; deVilliers, 1991; King & Quigley, 1985; Paul, 1998; Quigley & Paul, 1986; Trybus & Karchmer, 1977); however, high quality intervention research on effective reading instruction for students who are deaf or hard of hearing is limited. This chapter explores what has been done in the field of reading research on deafness and attempts to provide directions for future research in the field.

Providing an update on the conclusion of King and Quigley (1985), Rose, McAnally and Quigley (2004) summarize four major issues that influence the acquisition of reading skills in students who are deaf or hard of hearing: 1) the lack of an internalized language base when starting the task of learning to read; 2) the lack of an instructional approach that does not include an auditory element, particularly replacement strategies in the development of decoding skills; 3) the lack of prior knowledge and the ability to apply it to the reading task to aid in the comprehension of text; and 4) actual impediments

to reading created by ineffective instructional strategies. Paul (1998, 2001, 2003) systematically categorizes the risk factors for successful reading into text-based factors, reader-based factors, task-based factors, and context-based factors. As a branch of reading research, reading research on deafness is heavily influenced by the Paradigm A/Paradigm B debates in literacy. Generally speaking, proponents of Paradigm A consider the reading process directly connected with reader-based factors and text-based factors whereas proponents of Paradigm B tend to relate the reading process primarily to task-based factors and context-based factors. The following sections will discuss the reading research studies on deafness based on their relationship with either Paradigm A or Paradigm B.

Reading Research on Deafness from Paradigm A

Understanding reading as both a language process and a cognitive process, reading research on deafness from Paradigm A emphasizes the importance of extensive growth in language variables such as vocabulary, morphology, and syntax, and other variables such as knowledge of topics and culture, for students who are deaf or hard of hearing (Paul, 2003). Focusing on text-based factors and reader-based factors influencing the reading process, Paul (2003) argues that the reading difficulties of deaf and hard of hearing students could be categorized as difficulties with both processing and knowledge.

> In general, 'processing' refers to the method of decoding (e.g., pronouncing, signing) of linguistic information in print, such words, and connected-discourse items such as syntactic structures and figurative language. The knowledge domain (e.g., knowledge of the structure of English, topic or world knowledge) is mentally represented and is necessary for comprehension and interpretation of

> decoded items. As an example, it is possible for a reader to pronounce or sign a word (processing) a word, but not know its meaning (knowledge). Conversely, it is possible for readers to know a meaning of a word, but not be able to identify its written counterpart. (p. 98)

In short, most of the reading research on deafness within Paradigm A is related to processing issues (i.e., text-based factors) and knowledge issues (i.e., knowledge-based factors) in reading. That is, similar to the general reading research from Paradigm A (Adams, 1990; Snow et al., 1998), reading research on deafness from Paradigm A focus on the reciprocal relationship between processing print and comprehending/interpreting the message.

Text-based Factors

Research on processing difficulties of students who are deaf or hard of hearing is typically focused on the form (i.e., text-based factors) in the reading process, that is, processing print at the sub-word level (i.e., letters, phonemes or syllabus), word level, and sentence/passage level. The reading research on deafness in sub-word level processing is limited and since sub-word level processing is highly associated with the phonological awareness and phonemic awareness of the reader, we will discuss them later under the heading of working memory and phonological coding in reader-based factors. There has been extensive research on word level processing -- for example, word identification and vocabulary knowledge -- and sentence/passage level processing -- for example, syntax and figurative language. The following sections synthesize the research on these two different levels of processing print.

Processing Print at the Word Level

A substantial body of research has shown that skilled readers depend heavily upon their processing of individual words; in fact, differences in abilities at the sub-word level and word level processing are suggested as the best discriminators between good and poor readers, in research conducted with hearing individuals (Biemiller, 1977; Graesser, Hoffman, & Clark, 1980; McConkie & Rayner, 1976; McConkie & Zola, 1979; Rayner, McConkie, & Zola, 1980), as well as in research with deaf individuals (Brown & Brewer, 1996; Fischler, 1985; Garrison, Long, & Dowaliby, 1997; Kelly, 1993, 1995, 1996; LaSasso & Davey, 1987). However, it is highly controversial what kinds of patterns or units skilled readers use in the word recognition process. That is, it is unclear whether skilled readers use whole words or sub-word level units such as phonemes, syllables, or letters as the units of perception in word identification. It is not surprising that this controversy is directly related with the phonics versus whole language *reading war* discussed previously. Further discussion on perceptual units will appear in the working memory section in reader-based factors.

Vellutino (1982) analyzed a century of research on this issue and identified three interacting factors related to the perceptual unit: 1) the context in which the word is encountered (top-down processing); 2) the features of the word itself (bottom-up processing); and 3) the skills of the reader. It is generally accepted that skilled readers have a thorough knowledge of letter-sound correspondence (phonics), and they can use it when required. However, they do not typically need to use this knowledge in identifying words because word processing is largely an unconscious activity in skilled reading, which is in contrast with conscious awareness such as application of prior knowledge

during reading (McConkie & Rayner, 1976; McConkie & Zola, 1979; Rayner, et al., 1980).

Nevertheless, for beginning readers and struggling readers, including many readers who are deaf or hard of hearing, word processing is not necessarily an unconscious and automatic process (King & Quigley, 1985). Reading research on deafness in word processing has been focused on word identification and vocabulary knowledge.

Word identification. Word identification, or in other words, word recognition, word attack, word analysis, decoding, or single-word reading, implies that with or without knowing the meaning of the word, the reader can identify the word, typically via pronunciation (Adams, 1990; Oakhill & Cain, 2000; Paul, 2003).

There is little research on students who are deaf or hard of hearing regarding word identification skills and strategies, partially because of the difficulties in evaluating word identification skills in deaf students, especially those who communicate without accompanying speech. For these students, word identification involves more than identifying a word, because they typically need to know the meaning of the word to sign a word; while at the same time, it is also not sufficient to use fingerspelling a word as an evidence of identification either. Cueing a word in cued speech/language, or Visual Phonics, is considered the closest analogy to word identification; however, very little research has been done in this field (Fleetwood & Metzger, 1998, Paul, 2003).

In the limited research done on word identification for deaf readers, most of the studies are focused on using fingerspelling or signing as alternative representative codes for English phonemes, morphemes, and words. There have been only two major research

studies on the topic of fingerspelling. Hirsh-Pasek's (1987) study was designed to investigate whether deaf readers attended to fingerspelling in a similar way as hearing readers attend to phonemes. Although it argued against the hypothesis that deaf students regularly decoded sight words into fingerspelling, it showed that deaf students identified more sight words when encouraged to decode into fingerspelling. However, Mayberry and Waters (1987) challenged the conclusion that fingerspelling is used by deaf individuals to encode a word. By comparing the speed and accuracy of recognizing words in print versus in fingerspelling for deaf children and adolescents, they found that participants outperformed in both categories when the words were presented in print.

In a representative work on using sign-based codes in word identification, Siedlecki and colleagues (Siedlecki, Votaw, Bonvillian, & Jordan, 1990) engaged 31 deaf college students and 31 hearing college students in a manual interference task to recall 192 words that fell into four categories: high imagery/unsignable, low-imagery/signable, high-imagery/signable, low-imagery/unsignable. The results that signable words were recalled more frequently by the deaf subjects were interpreted as evidence that skilled deaf readers use sign-based codes.

Wauters and colleagues (Wauters, Knoors, Vervloed, & Aarnoutse, 2001) conducted a study in the Netherlands with 14 deaf students with an age range from six to ten. They showed the participants two lists of words taken from spoken Dutch words that should be known to hearing children by age six. One list of words was presented solely in speech, and the other in speech and Sign Language of the Netherlands. Students' word identification was significantly higher if the words were taught through the combination of speech and sign.

Three research studies with deaf preschoolers confirmed the beneficial effects in word identification of sign-based codes, particularly through sign print (i.e., graphic representation of the sign, or sign language picture). Andrews and Mason (1986) presented a prereading model based on a 9-month longitudinal study of 45 deaf preschool children from state residential schools. They contended that reading can be initiated by giving deaf children opportunities to match their internalized manual language (i.e., ASL signs) to printed words. By observing a deaf child from two years old to six years old, Maxwell (1984) found that the way the child matches her own signs to the sign print was similar to the way that hearing children match speech to orthography. Rottenberg (2001) observed a deaf boy in his preschool deaf class for nine months and interviewed his parents. The observation and the interview data indicated that the deaf boy went through several levels as he learned to read, in much the same way as hearing children: (a) focusing on pictures and illustrations in books, (b) reading familiar words in context, (c) focusing on sign print, (d) relating sign print to written English, and (e) reading written English independently.

Gaustad and her colleagues (Gaustad, 2000; Gaustad, Kelly, Payne, & Lylak, 2002) introduced morphographic analysis as a word identification strategy for deaf readers. The rationale was that although the phonological connection to print establishes an obstruction for deaf readers, the morphological structure of English is visible in its orthography; thus, the deaf reader has the opportunity to access meaningful word elements directly through vision. Gaustad et al. (2002) conducted their research with 70 deaf adolescents and 58 hearing adolescents and found that although the deaf participants

had the necessary segmentation and semantic analysis skills for morphographic decoding, their mastery levels were significantly below those of the hearing participants.

In short, this line of reading research on deafness is focused on comparing deaf students with hearing students and analyzing how deaf students, particularly those without accompanying speech, use either fingerspelling, sign-based or morphographic codes to circumvent the necessity to use letter-sound relationships (phonics) to identify words. However, the available body of research is too limited. Furthermore, very few new studies follow the path of previous studies and most of these studies are narrative in nature; thus, it is almost impossible to draw any conclusions on the effectiveness of using these alternative codes.

Nevertheless, a pattern that does appear in this literature shows that deaf children's word identification process is qualitatively similar to that of hearing children. A detailed discussion on phonological coding for deaf readers will appear in the reader-based factors section.

Vocabulary knowledge. Vocabulary knowledge also refers to lexical knowledge, word knowledge or word comprehension. Due to the difficulty of assessing word identification, the term is used interchangeably with *word identification*, particularly in the field of deafness. This text purposefully distinguishes these two terms to emphasize the comprehension feature of vocabulary knowledge. As discussed previously, extensive research on both deaf and hearing students has confirmed the strong correlation between word processing skills and reading achievement scores (Biemiller, 1977; Brown & Brewer, 1996; Fischler, 1985; Garrison et al., 1997; Graesser et al., 1980; Kelly, 1993, 1995, 1996; LaSasso & Davey, 1987; McConkie & Rayner, 1976; McConkie & Zola,

1979; Rayner, et al., 1980). As the most important part of word processing skills, vocabulary knowledge is closely tied with comprehension, although the rationale for its importance is still controversial (see the discussion on the reading war in Chapter 3).

Extensive studies from the research body on teaching vocabulary knowledge to deaf students are focused on comparing the vocabulary knowledge of students who are deaf or hard of hearing with that of hearing counterparts (MacGinitie, 1969; Paul, 1984; Paul & Gustafson, 1991; Paul, Stallman, & O'Rourke, 1990; Walter, 1978). Not surprisingly, the general finding of this line of research shows that the vocabulary knowledge of students who are deaf or hard of hearing is quantitatively reduced compared with their hearing peers, and the gap increased as the frequent usage of the words decreases, particularly for multimeaning words.

Another line of research on vocabulary knowledge of students who are deaf or hard of hearing is on investigating the factors influencing the difficulties of a word, for example, multiplicity of meanings (Paul, 1984; Paul & Gustafson, 1991), word frequency (Walter, 1978), and context surrounding the word (Ahn, 1996; de Villiers & Pomerantz, 1992; MacGinitie, 1969; Nolen & Wilbur, 1985; Robbins & Hatcher, 1981). Also, there have been some research studies of general vocabulary knowledge of deaf readers (Fischler, 1985; Silverman-Dresner & Guilfoyle, 1972).

Intervention studies on vocabulary knowledge for students who are deaf or hard of hearing are limited. Some of them are simply a description of a particular instructional program without any comparative group or not enough information regarding the intervention. For example, Johnson and Roberson's (1988) experiment reported the

number of words added to the deaf children's vocabulary after the language experience intervention without any comparative data to evaluate the significance of the intervention.

From the available research on vocabulary learning of students who are deaf or hard of hearing, an observable pattern is the positive benefits of matching print words with signs and/or sign print (Schimmel, Edwards, & Prickett, 1999; Soderbergh, 1985; Suzuki & Notoya, 1984). Also, in Koskinen and colleagues' (Koskinen, Wilson, & Jensema, 1986) intervention research, high school deaf students aged 13 to 15 showed greater retention of sight vocabulary in lessons using closed-captioned television than in lessons using traditional reading materials.

In essence, studies of vocabulary knowledge of students who are deaf or hard of hearing are mainly comparative studies on the quantitative differences between deaf readers and their hearing peers in terms of word knowledge, and correlation studies on factors influencing the difficulties of a word for deaf readers. There are very few high quality intervention studies on improving deaf students' vocabulary knowledge through instruction. However, the use of matching print with signs and/or sign print as well as the addition of video background to the print show some promise.

Processing Print at the Sentence/Passage Level

Depending upon well-developed word level processing skills, fluency is considered the bridge between vocabulary and comprehension, in reading research for hearing students (National Reading Panel, 2000). However, in the field of deafness, surprisingly few studies (Limbrick et al, 1992; Kelly, 1995) have addressed the issue of fluency. On the contrary, most of the studies on processing print at the sentence/passage level for students who are deaf or hard of hearing are related to the students' knowledge

of syntax and figurative language, which is not a major research thrust for studies on students with typical language development.

Syntax. *Syntax* also refers to word order or sentence organization. Undoubtedly, syntax has been one of the most researched areas in literacy and deafness due to the obvious difficulty of students who are deaf or hard of hearing with English syntax. The field is heavily influenced by Chomsky's (1957, 1965, 1975, 1988) belief that syntax is critical in describing the grammar of a language and especially in comprehending the mind of the language user.

Quigley and his associates (Quigley, Power, & Steinkamp, 1977; Quigley, Smith, & Wilbur, 1974; Quigley, Wilbur, & Montanelli, 1974, 1976) have conducted extensive studies comparing the syntactic knowledge of students who are deaf or hard of hearing with that of their hearing peers. The results demonstrated quantitative delays of students who are deaf or hard of hearing in comprehending assorted syntactic structures, while at the same time, the findings showed the qualitative similarities of students with and without hearing impairments in terms of the stages proceeded through, the errors made, and the strategies used in comprehending these syntactic structures. Other research studies have focused on the knowledge of particular syntactic structures in students who are deaf or hard of hearing (Kelly, 1998; Lillo-Martin, Hanson, & Smith, 1992; Wilbur & Goodhart, 1985; Wilbur, Goodhart, & Fuller, 1989). Based on these studies, *Reading Milestones* (Quigley, McAnally, King, & Rose, 1991) was specifically developed for the developmental sequence of deaf readers. Unfortunately, there has been no experimental research assessing the effectiveness of the series with deaf readers.

The importance of syntactic knowledge in isolation for deaf readers' reading comprehension has been emphasized in Quigley and his colleagues' research; although some argued for the significance of other factors for a better understanding of deaf readers' English syntactic knowledge, for example, the context information (McGill-Franzen & Gormley, 1980; McKnight, 1989; Nolen & Wilbur, 1985), deaf readers' top-down comprehension of the text (Ewoldt, 1981), text coherence (Israelite & Helfrich, 1988), semantic issues (Miller, 2000; Stoefen-Fisher, 1987-1988; Yurkowski & Ewoldt, 1986), deaf readers' difficulties in lower level phonological processing (Lillo-Martin, Hanson, & Smith, 1991, 1992) and pictorial symbols (Diebold & Waldron, 1988).

In short, although the limited syntactic competence of students who are deaf or hard of hearing is not the whole picture to account for their overall reading comprehension ability, the importance of syntax should not be underestimated. As reviewed in the current study, most of the studies in this area are still in a stage of debate, and the importance of syntactic knowledge for reading comprehension has yet to be determined. What appears to be lacking in the field are intervention studies that will contribute to the improvement of syntactic knowledge of students who are deaf or hard of hearing, which is directly related to their language development.

Figurative language. Another language issue that is closely connected with the overall reading abilities of students who are deaf or hard of hearing is figurative language, which includes simile (*She smiles like a flower*), metaphor (*The tree is an umbrella*) and idiomatic expressions (*I ran into an old friend yesterday*). Similar to the research on students who learn English as a second language (Bernhardt, 1991), research on students who are deaf or hard of hearing (King & Quigley, 1985; Paul, 1998, 2003)

has demonstrated that, besides vocabulary and syntax, figurative language is another area that many deaf students experience difficulties, although it is almost impossible to isolate the effects of limited vocabulary and syntactic knowledge.

Comparing students who are deaf or hard of hearing with their hearing peers, research in this field (Conley, 1976; Payne & Quigley, 1987) reiterates the long-standing findings: the performance of deaf readers on comprehension of figurative language is quantitatively reduced and barely varies across ages. Furthermore, research shows that deaf students' comprehension of figurative language is closely connected with their reading comprehension (Fruchter, Wilbur, & Fraser, 1984; Orlando & Shulman, 1989).

Similar to the studies of syntactic knowledge of students who are deaf or hard of hearing, many research studies on the figurative language knowledge of deaf students have investigated the students' performance when other language variables, for example, the vocabulary and syntax (Iran-Nejad, Ortony, & Rittenhouse, 1981), were controlled. Also, from a top-down framework, some argued the importance of a holistic understanding of the text in deaf students' comprehension of idioms (Wilbur, Fraser, & Fruchter, 1981).

Again, even though many deaf students' limited understanding of figurative language cannot fully explain their poor overall reading achievement, it is generally accepted that their figurative language knowledge is closely related to their reading comprehension. As with many areas in the field of literacy and deafness, there has not been any innovative intervention study on improving deaf students' figurative language knowledge.

Generally speaking, the research on the effects of text-based factors on the reading ability of students who are deaf or hard of hearing has reiterated the importance of processing information at the word level and the sentence/passage level for the overall comprehension of the text. Most of the studies that have been done in the field are focused on either comparing deaf students with their hearing peers in each language variable or correlating each language variable with overall reading comprehension skill. The foci of the studies are mainly to understand deaf students' reading ability. Very few studies have intended to conduct intervention research to improve deaf students' reading ability.

Reader-based Factors

Compared to the text-based factors, reader-based factors on the reading ability of students who are deaf or hard of hearing are less studied; however, they are an emergent field of study. As discussed earlier in the chapter, one of the most heated areas is to identify the perceptual units in working memory processes; that is, it is highly controversial whether skilled readers use whole words or sub-world level units such as phonemes, syllables, or letters as the units of perception in their working memory processes. Particularly, the roles of phonological awareness and phonemic awareness are topics of growing interest in the field. Other interesting topics concerning reader-based factors on the reading ability of students who are deaf or hard of hearing include prior knowledge and metacognition. The following section will be divided into three subsections to discuss working memory and phonological coding, prior knowledge, and metacognition.

Working Memory and Phonological Coding

Working memory refers to a limited-capacity mental system responsible for the temporary storage and processing of information necessary to handle tasks that require comprehension, learning, and reasoning (Baddeley, 1990). Working memory is a storage and processing system for modality-specific information. It has been heavily debated how deaf readers cognitively code printed words in their working memory. There are five types of internal coding strategies that are used by deaf individuals: sign, dactylic (i.e., fingerspelling), phonological based, visual (i.e., orthographic), and multiple (i.e., the combinations of the above) (see the review in Paul, 2001). Although controversial, phonological based coding strategies used by deaf readers have received substantial interest in the field.

Phonology and related terms. In English, as in any other alphabetic language, the printed symbols, that is, letters or graphemes, systematically represent the component sounds of the language (Adams, 1990; Snow, et. al, 1998). The awareness that words are composed of letters that are related to phonemic segments (e.g., phonemes) from spoken language, or in other words, the awareness that written spellings systematically represent spoken words, is referred as the knowledge of alphabetic principle. The difficulty in understanding and using the alphabetic principle at the outset of reading acquisition is considered as the first potential stumbling block that is "known to throw children off course on the journey to skilled reading" (Snow, et. al, 1998, p. 4). It is not surprising that students who are deaf or hard of hearing are at risk for not acquiring sufficient knowledge of alphabetic principle to access print because of the limited access to and instruction focused on the phonological aspects of the English language. This section introduces

some basic concepts on phonology, and then the research on sub-word level reading for students who are deaf or hard of hearing is discussed.

The term *phonology* refers to the sound structure of speech. Particularly, it is related with the perception, representation, and production of speech sounds. Thus, the phonological aspects of language include its prosodic dimensions (e.g., intonation, stress, and timing) and its articulatory units (e.g., words, syllables, and phonemes) (Snow et al., 1998). As the building blocks of English, phonemes are the smallest meaningful speech units; that is, phonemes are the units of sound that are represented by the letters of an alphabet. Phonemic awareness is the awareness that every spoken word can be conceived as a sequence of phonemes. An awareness of phonemes is vital to understanding the logic of the alphabetic principle as well as phonics and spelling. As a more inclusive term than *phonemic awareness*, *phonological awareness* refers to the general ability to attend to the sounds of language as distinct from its meaning (Snow et al., 1998). Phonemic awareness and phonological awareness have been widely recognized as the means to enhance decoding skills among hearing readers (Adams, 1990, Chall, 1996, National Reading Panel, 2000, Snow et al., 1998).

Phonological coding of deaf readers. Although it has been widely recognized that phonology plays a vital role in enhancing word identification skills among hearing readers (see the review in Nielsen & Lueke-Stahlman, 2002), the capability of deaf readers to use phonology in word identification has yet to be confidently established. Many studies in this area have been focused on determining whether phonological based coding strategies have been used by deaf readers. Conrad's (1979) seminal work validated the use of phonological coding in deaf readers. Using words that sound similar

but look different and words that look similar but sound different, he explored whether deaf participants who were 15 or 16 years old used *internal speech* (i.e., phonological-based codes) or visual (i.e., orthographic) codes in word identification. He found: “degree of deafness in itself is not a major factor in reading comprehension. What seems to be much more important, apart from intelligence, is whether or not the child has acquired the use of internal speech. Internal speech shows as a highly confounding factor in reading performance, as it does in short-term memory” (Conrad, 1979, p. 157).

Kelly (1993) investigated whether deaf readers use phonological coding in recalling of function words and inflections. As a part of the experiment, 17 high school deaf students in a Total Communication environment, in which signing and speech were used simultaneously, were asked to determine whether strings of letters that were either phonologically and orthographically similar or orthographically similar only constituted real English words. The results that participants had faster reaction time for word pairs that were phonologically and orthographically similar indicated deaf readers’ access to phonological information. Furthermore, the skilled deaf readers showed better ability to access phonological information than did the average deaf readers.

Phonological decoding skills have been observed among severely and profoundly deaf children in France as well. 26 eight- to thirteen-year-old French students with severe or profound hearing lost participated in the study conducted by Transler, Gombert and Leybaert (2001). By detecting phonological similarities between three written pseudowords, participants, especially those who had the most effective speech showed evidence for phonological assembly during silent reading.

Miller (2002) suggested the causal link between phonological coding and the modal nature of a reader's primary language. Three groups of participants from Israel were in this study: 1) 27 prelingually deaf students with a mean grade of 6.9, who were raised by hearing parents and communicated orally both at home and at school, 2) 22 prelingually deaf students also with a mean grade of 6.9 whose preferred means of communication was Israeli Sign Language, and most of whom were children of deaf parents, and 3) 39 hearing students with a mean grade of 6.5. Results showed that both the hearing participants and the oral deaf students visually presented the target words phonologically; however, such a pattern did not appear in the participants who were native signers.

Hanson and her colleagues conducted a series of research on the different coding strategies of readers with profound hearing loss and unintelligible speech, for whom ASL was their first language. For example, they compared the use of speech (i.e., phonological) coding and fingerspelling coding for 16 deaf beginning readers (Hanson, Liberman, & Shankweiler, 1984), the use of phonological coding and orthographical coding for 14 deaf college students and 14 hearing college students (Hanson & Wilkenfeld, 1985), the use of phonological coding and sign coding for 14 college deaf students who used ASL and 16 college hearing students (Hanson, Goodell, & Perfetti, 1991). The findings confirmed that similar to their hearing peers, many deaf readers learned to utilize phonological coding in word identification. Particularly, in the study conducted by Hanson and Fowler (1987), college age deaf and hearing students were presented with pairs of words that were orthographically similar, but not all phonologically similar, to determine which pairs rhymed. Both deaf and hearing

participants identified rhyming words faster than non-rhyming words, although the deaf participants made quantitatively less accurate decisions.

One interesting experiment was conducted by Leybaert and Lechat (2001) to determine whether traces left by auditory stimuli are more salient than those left by the visual stimuli encountered in Cued Speech. By investigating how the participants' used phonological components of Cued Speech (i.e., mouth shape, hand shape, and hand placement) in the recalling task, the researchers concluded that the trace left by the visual information in Cued Speech seemed to be less persistent than the trace left by the auditory information. In another study, Leybaert (2000) engaged three groups of students, ages 6-14, who were matched for general spelling level: 1) 30 hearing students, 2) 28 deaf students exposed to Cued Speech early and intensely at home (CS-Home), and 3) 28 deaf students exposed to Cued Speech later and at school only (CS-School). Results indicated that most of the spelling productions of hearing participants as well as CS-home participants were phonologically accurate whereas CS-school participants who had less specified phonological representations produced less phonologically accurate spellings. Then the researcher concluded that the acquisition of orthographic representations of high precision depends on fully specified phonological representations.

LaSasso, Crain, and Leybaert (2003) compared the rhyme-generation ability of three groups of students: 1) 10 hearing students, ages 19-21; 2) 10 prelingually severe to profound deaf students with Cued Speech background, ages 16-24; and 3) 10 prelingually severe to profound deaf students without Cued Speech background, ages 17-26. The results showed that hearing participants and deaf students with Cued Speech background relied more on phonology and the deaf students without Cued Speech background more

on spelling to generate rhyme. The implication of the study was that deaf readers could use Cued Speech to develop phonological abilities.

Several other studies have also compared deaf students with their hearing peers in their sensitivity to phonology. For example, Sutcliffe, Dowker, and Campbell (1999) compared the spelling strategies of 20 nine- to ten- year-old hearing students who were English language learners and 17 nine- to twelve-year-old deaf students who communicated with signed English. Johnson, Padak, and Barton (1994) compared the spelling strategies of 86 six- to thirteen-year-old oral deaf students with those of hearing students found in previous studies. The general findings indicated that the spelling strategies of deaf students were phonologically similar to those of hearing students, although their strategies requiring phonological awareness were limited. Dyer and colleagues (Dyer, MacSweeney, Szczerbinski, Green, & Campbell, 2003) engaged 49 deaf students and 81 hearing students in the United Kingdom to investigate two cognitive factors correlated with reading delay in hearing students: phonological awareness and decoding (PAD) and Rapid Automated Naming (RAN) of visual materials, which refers to the ability to name (by speech or signing) a sequence of written or pictured items quickly. The results indicated that PAD is a factor for reading achievement of both hearing and deaf students whereas RAN seems to be an indirect factor in deaf students' reading achievement.

Lueke-Stahlman and Nielsen (2003) explored the correlation of phonemic awareness, English language knowledge, and reading ability among deaf students. 31 deaf students, ages 7.9-17.9, participated in the study. Two groups of students were compared in the study: one group with 22 students who had been exposed to Signing

Exact English (SEE) for 5 years or more and another group with 8 students who had been exposed to SEE for less than 2 years. Reading ability was measured by a passage comprehension task. Phonemic awareness was measured by a task to substitute one phoneme for another to create new words. Participants' performance on 15 language and literacy measures was analyzed. Participants in the Longer Exposure Group outperformed their counterparts on all measures. Results also indicated that students with higher reading ability also were more able: 1) to provide synonyms, antonyms, and analogies of reading words and phrases; 2) to read more listed words; and 3) to use phonemic awareness skills.

However, Izzo (2002)'s research challenged the correlation between phonemic awareness and reading ability with deaf students. 29 elementary students who had prelingually severe to profound hearing loss participated in the study. Reading ability was measured by a retelling task and phonemic awareness was measured by a word-to-word matching task. The results indicated that although reading ability was significantly related with language ability, it was not correlated to phonemic awareness.

In essence, although a few studies have specifically documented the limited phonological processing of students who are deaf or hard of hearing (Schaper & Reitsma, 1993; Transler, Leybaert, & Gombert, 1999), substantial research has suggested that deaf readers, particularly more skilled readers, have access to phonological information. Even though deaf readers' phonological coding skills are generally lower than those of their hearing counterparts, their phonological awareness development follows the same track as the development of hearing readers. Furthermore, there is growing concurrence that phonology plays an essential role in reading comprehension and that the ability to process

phonological information during reading distinguishes skilled deaf readers from average deaf readers:

> Much of this research is predicated on the theory that phonological coding is most efficiently stored in working memory. To comprehend text, working memory must be able to hold several words long enough to process complete sentences. If the reader is using a coding strategy that puts so much demand on working memory that few words can be retained while processing the meaning of a sentence, then comprehension will suffer. (Schirmer & Williams, 2003, p. 114)

In fact, Leybaert (1993) suggested that it is the failure to appropriately address the phonological components of reading instruction for deaf individuals that directly causes their reading problems. In Schirmer & McGough's (2005) comprehension review of reading instruction for students who are deaf or hard of hearing, they indicated, "It is noteworthy that the researchers do not consider the probability that many of the deaf participants in these studies were taught to attend to phonological features of words through phonemic awareness activities, auditory discrimination activities, or phonic analysis instruction, and that differences in capabilities may be accounted for by differences in instruction" (p. 89). A new study (Trezek & Malmgren, 2005), which investigated the effectiveness of a treatment package that includes the use of Visual Phonics, is the first effort in the field to assess the effectiveness of directly teaching phonological skills to students who are deaf or hard of hearing. A detailed discussion on the study will appear in Chapter 6 under the heading of Visual Phonics.

Prior Knowledge

Prior knowledge is typically categorized as: 1) passage-specific prior knowledge which refers to knowledge about the language elements or text information; and 2) topic-specific prior knowledge which reflects information that is either not explicitly in the text or cannot be inferred from the existing text information (Paul, 2001, 2003). It appears that many deaf readers either do not have adequate prior knowledge, do not apply it during reading, or do not have the opportunities to use or develop this skill. So far, there is no comprehensive model to understand the role of prior knowledge and reading comprehension for deaf readers (Paul, 2003).

Wilson's (1979) study investigated the abilities of both deaf students and hearing students to answer text-explicit and inferential questions. Both groups of students showed difficulties in answering inferential questions. Jackson and colleagues (Jackson, Paul, & Smith, 1997) were interested in the contribution of prior knowledge to the students' ability to answer text-explicit and two levels of inferential questions. Participants were 51 twelve- to twenty-year-old deaf adolescents. Results showed that participants' recall of information was positively promoted by detailed and additional probes in the pretest.

A few studies have attempted to explore whether particular strategies could assist the activation of students' prior knowledge. For example, the study conducted by Andrews and colleagues (Andrews, Winograd, & DeVille, 1994) found that the retelling performance of deaf readers who used ASL summaries before reading exceeded their performance on stories without ASL summaries and exceeded the performance of the hearing readers who received no summary treatment. On the other hand, Schirmer and Winter's (1993) study found no support for the use of thematic organizers to sufficiently activate prior knowledge for deaf readers to comprehend narrative text.

In summary, studies on prior knowledge with deaf readers have confirmed the conclusion of Schirmer and McGough's (2005) study that building and activating prior knowledge directly influences reading comprehension, although no instructional strategies show conclusive effectiveness.

Metacognition

Metacognition includes "knowledge about cognition and regulation of cognition" (Baker & Brown, 1984, p. 353). Brown (1975) asserts that metacognition is knowing about knowing and knowing how to know. It is also important to know when and why to use a particular strategy (Cross & Paris, 1988).

> In the domain of reading, metacognitive knowledge refers to knowledge about oneself as a reader as well as knowledge about topics, language (both primary, i.e., speaking and/or signing and secondary, i.e., written language), text structures, literacy tasks, and even of teacher's expectations and literacy instructional styles. The knowledge aspects of metacognition overlap with those associated with the prior knowledge domain. Metacognitive-control refers to self-regulatory or self-monitoring strategies that individuals use during literacy and literacy-related tasks. (Paul, 2003, p. 102)

During the preschool years, metalingustic insights about the language domains (e.g. phonology, morphology, syntax, semantics and pragmatics) emerge and continue to develop throughout childhood and adolescence. Metalingustically, children can use language for thought and for communication, which involves the ability to play with the language, talk about it, analyze it, and make judgments about acceptable versus incorrect forms. Metacognition is a critical area, and its absence is noticeable in children who have

language difficulties or who have not developed a high level of skill in the use of their language (Paul, 2001).

Because metacognition is related to so many different areas of reading comprehension, the research on metacognition with deaf readers has proceeded in several directions. One line of research has been focused on deaf readers' knowledge of text structure through retelling. Griffith and Ripich (1988) were interested in whether the retellings of deaf readers were consistent with story structure elements. The participants were 11 six- to fifteen-year-old deaf students in a Total Communication program. The results confirmed the ability of deaf students to use story structure in organizing their retellings. By assessing deaf students' retelling performance, Donin, Doehring, and Browns (1991) investigated whether any particular structure supported significantly better comprehension than others, and the findings did not support this hypothesis. In a case study conducted by Luetke-Stahlman and colleagues (Luetke-Stahlman, Griffiths, & Montgomery, 1998), a seven-year-old deaf child produced longer retellings with increasing targeted story structure components when the teacher emphasized the targeted text structures during the 28-week intervention period. Another line of research on deaf readers' knowledge of text structure has been assessed by the students' written product (Akamatsu, 1988; Cambra, 1994; Schirmer, 1993; Schirmer & Bond, 1990).

The study conduced by Pakulski and Kaderavek (2001) not only confirmed the narrative ability (story retelling) of deaf readers, but also suggested the effectiveness of role-play in improving deaf readers' retelling skills. The participants were 14 students who were deaf or hard of hearing and who communicated orally. After repeated readings of two stories and role-playing of one of the stories, the participants' narrative products

were evaluated. The findings indicated that the participants were able to accomplish the story retelling task, and that the sophistication and complexity of their retelling improved with role-play.

Comprehension monitoring (i.e., metacognitive-control) is one important component of metacognitive skill, which includes: 1) knowing when you comprehend, 2) knowing what you comprehend, 3) knowing the necessary knowledge to comprehend, and 4) knowing how to use strategies to improve comprehension (National Reading Panel, 2000). Research studies conducted with deaf readers have been focused on assessing the students' comprehension monitoring skills through various approaches. For example, Davey (1987) documented better comprehension with the look-back technique for both deaf readers and hearing readers, but the results also indicated that deaf readers were not aware of their better performance using the look-back technique.

Several studies have tried to assess deaf readers' comprehension monitoring skills using direct approaches, such as think-aloud or interviews. For example, comparing the comprehension monitoring strategies of deaf and hearing readers, Andrews and Mason (1991) asked the participants to *think-aloud* when filling in the blank words or phrases in passages. Similar strategies were found to be used by both groups, although the strategies used by deaf participants differed from those of the hearing participants by frequency and type. Both Ewoldt (1986) and Strassman (1992) interviewed deaf students to investigate their comprehension monitoring strategies directly.

In sum, a strong positive relationship between metacognitive skill and reading comprehension ability has been supported by research with both deaf readers and hearing readers. However, compared to their hearing peers, deaf readers generally demonstrate

less metacognitive awareness. The research on metacognition skills of deaf readers has been mostly assessment studies; therefore, there is a significant need for more instructional efforts in this area.

Conclusion

Reading research studies from Paradigm A in the field of deafness proffers the reading process as an interaction process between the reader and the text; therefore, these researchers are interested in either reader-based factors or text-based factors that influence the process. This study synthesizes the literature of reading research on deafness and text-based factors and categorizes the studies into two levels of processing print: word level processing, which includes word identification and vocabulary knowledge, and sentence/passage level processing, which includes syntax and figurative language. The literature of reading research on deafness and reader-based factors has been categorized into three broad areas: working memory and phonological coding, prior knowledge, and metacognition. The foci of the current study are what is studied/measured in the field, how it is studied/measured, and why it is studied/measured in certain ways. The purpose of the investigation is to identify the common patterns in the field of reading research on deafness within Paradigm A to see what has been done in the field and to identify the departure point for further exploration.

One of the emerging patterns across reading research on deafness from Paradigm A is that these studies have tried to divide the reading process into individual interactive pieces and attempted to investigate each component of the reading process independently, which makes it possible for this study to categorize these research studies. The underlying assumption is that it is possible to separate the influence of text-based factors

and of reader-based factors in the reading process as well as to detach each individual interactive component under these two broad categories. Another fundamental hypothesis is that if deaf readers can gain skills in each individual interactive component related with reading comprehension ability, the accumulated reading comprehension ability will be improved as well.

A further pattern emerging from reading research on deafness from Paradigm A is that many studies are interested in comparing the reading comprehension skills of students who are deaf or hard of hearing with those of hearing students. The general finding is that the reading development of students who are deaf or hard of hearing is qualitatively similar to that of hearing students, although quantitatively delayed. The underlying hypothesis is that children's reading development goes through similar stages in spite of the individual differences.

It is striking that despite the persistent documentation of the limited reading achievement of students, who are deaf or hard of hearing, there are relatively few instructional efforts in the field to explore the effectiveness of interventions in improving the reading ability of students who are deaf or hard of hearing. Most of the studies done in the field are interested in assessing the reading ability in different subcategories of students who are deaf or hard of hearing. There is an urgent need for high quality intervention studies that provide practical guidelines for instruction in the classrooms.

Reading Research on Deafness from Paradigm B

Reading research studies on deafness from Paradigm B consider the reading process as a total dynamic situation in which the deaf reader and the text are two transactional entities that cannot be separated from each other. Deaf readers bring to the

reading process their deaf identity and it makes the reading process unique. Some scholars also argue for a Deaf Epistemology (see the review in Chapter 2) that advocates the distinctive reading process for readers who are deaf or hard of hearing. Research in this area is disjointed, and the majority of publications are theoretical papers. Experimental research is rare in this area because a value-free generalization of social phenomena (in this case, the reading process) contradicts with the philosophy of Paradigm B (see the discussion in Paradigm Talk in Educational Research, Chapter 3). The available empirical research studies are mainly program descriptions of reading models. One of the most representative reading models is the Whole Language/Deaf Bicultural Bilingual (Bi-Bi) program. The following section will introduce the Whole Language/Bi-Bi program as well as its primary characters, and then several controversial issues are discussed.

Whole Language/Bi-Bi Program

Whole language is a philosophy of education (see the discussion in The Paradigm War in Literacy Education, Chapter 3). It is advocated and expanded by the work of Goodman and Goodman (Goodman, 1967, 1979, 2003; Goodman, & Goodman, 1992), and advanced by the work of Smith (1974). It emphasizes the *whole to part* process of natural language learning in reading instruction. Ewoldt (1981, 1985, 1986, 1987, 1991, 1996) has introduced the whole language approach for deaf education programs. A national survey of 798 programs for deaf students (LaSasso & Mobley, 1997) showed that more than 80 percent of the deaf education programs in the United States incorporated a whole language approach, although a review of literature that appeared in

American Annals of the Deaf from 1996 to 2000 (Moores & Miller, 2001) suggested the apparent trend in deaf education away from whole language in recent years.

Bi-Bi education is a philosophy as well (Mahshie, 1995). It is based on the linguistic interdependence principle established by Cummins (1981, 1984, 1986, 1989). Cummins believes that proficiency in a first language (L1) could be considered as positive support for the learning of a second language (L2), and positive transfer occurs when there is adequate exposure to L2 and motivation to learn it. That is, the conceptual and background knowledge acquired through L1 can facilitate the acquisition of literacy and subject matter content in L2. The Deaf Bi-Bi program used Cummins' theory to support the assumption that positive transfer to L2 (i.e., written English) could occur when deaf students achieved high levels of proficiency in L1 (i.e., ASL). As discussed in Chapter 2, Cummins' assumption is that the positive transfer to the written form of L2 is based on the opportunity of the learner to acquire the literate proficiency of the written mode of L1. Although Paul (2001) argues that it is almost impossible to have a positive transfer from proficiency on the performance mode of one language (e.g., ASL) to proficiency in print literacy of another language (e.g., written English), proponents of the Bi-Bi programs believe that as long as the situation of the deaf learner could be addressed and taken into account when applying the linguistic interdependence model, the validity of the model for deaf learners should not be questioned (Mayer & Akamatsu, 2003).

The Whole Language/Bi-Bi programs combine the tenets of both whole language and Bi-Bi philosophy. It is essentially a language approach that emphasizes ASL as a language of instruction to teach reading and writing from a top-down framework. The following section is divided into three subcategories to discuss the primary characters of

the Whole Language/Bi-Bi program: language approach and multicultural experience, empowerment, and community values.

Language Approach and Multicultural Experience

The underlying philosophy of the Whole Language/Bi-Bi programs is to establish an authentic curriculum by integrating Deaf persons' own perspectives. Although 90 percent of deaf individuals are born to hearing parents and English is the language used by their families, the grammar and vocabulary of English is not fully accessible to them. In spite of a few exceptions of deaf or hard of hearing students who acquire English as L1 and learn ASL as L2 for communication with deaf individuals (Grushkin, 1998; Nover & Andrews, 1998; Nover, Andrews, Everhardt, & Bradford, 2002), ASL is acquired by Deaf individuals naturally through socialization; thus, it is a primary and preferred language for them (Mounty, 1986). With full access to a complete language such as ASL, Deaf students can translate their personal experiences, observations, and perspectives into modes of communication and share them with others. The interaction is as *natural* as what hearing children enjoy in a holistic classroom. Furthermore, deaf bilinguals can use their translation skills and metalinguistic awareness in L1 to learn L2, particularly if they have a reading teacher with fluent ASL (Shantie & Hoffmeister, 2000).

The assumption is that, as a social activity, language is best learned when children interact with their peers in a meaningful environment. Accordingly, engagement in meaningful interactions can promote the appreciation and enjoyment of written English for Deaf students (Mason & Ewoldt, 1996). The traditional English as a Second Language (ESL) approaches emphasize drilling of the form of English (e.g., syntax) whereas the Whole Language/Bi-Bi approaches use children's literature, the "authentic

texts", to construct meaning through pleasurable, natural communication (e.g., through ASL or written English) (Cerra, Watts-Taffe, & Rose, 1997). Furthermore, in contrast with a predetermined curriculum with a sequence of skills, the objectives of the program come from the students' abilities as revealed from their strengths or weaknesses in the reading process (Malik, 1996).

Empowerment

Whole Language/Bi-Bi programs build on the recognition of Deaf and hearing cultures as distinguishable phenomena and on reciprocal respect for the similarities and differences between the sociocultural experiences and values of Deaf and hearing individuals. The emphasis is on a two-way teaching/learning process; that is, teachers learning from children and vice versa. In such a program, Deaf students can be proud to be part of the wholesome educational processes (Mason & Ewoldt, 1996). "It is very important that children feel that they are seen, listened to, understood, and appreciated by the teacher. In order to be truly equal children need to have self-confidence and self-respect, and these qualities are almost impossible for children to develop in a strict and authoritarian comparable with school system" (Wedell, 1994, p. 131).

Vygotsky's concept of *Zone of Proximal Development* (1962) is often used to describe the continuum of a child's actual developmental level and his or her potential performance level. Advocates of the Whole Language/Bi-Bi approaches claim that with proper adult guidance, the model will assist Deaf children's self-esteem as well:

> The zone is where the opportunity to boost or inflate a child's self-image is possible. When you offer both multicultural literature and useful application of reading comprehension instruction (such as breaking the text into small reading

> sections, building background knowledge, doing postreading activities, and having a reason or purpose for reading), students develop a positive attitude toward reading and take information away from the text after reading is finished. Thus, readers start at the beginning of the continuum and gradually move toward the end by taking knowledge with them that can be applied in their daily lives and used to heighten self-esteem. (Qualls-Mitchell, 2002, p. 80)

Community Values

Whole Language/Bi-Bi programs encourage the Deaf students to bring their life experience outside of the classroom into their school curriculum by using their own native language. Therefore, it connects school curriculum with their real-life community values. The program values students' community values and helps deaf students appreciate that they are different rather than deficient, and that they have personal and social experiences and values comparable with hearing people (Mason & Ewoldt, 1996).

Controversial Issues in Whole Language/Bi-Bi Program

The field of deaf education is widely divided on the merits of Whole Language/Bi-Bi programs. There are several principles of the program that are still controversial in the field. For example, although the Whole Language/Bi-Bi models have many values, some scholars challenge the implicit way of teaching English. Dolman (1992) suggested that deaf children often need a more direct approach to acquire English literacy.

The most controversial topic in the field is still whether proficiency in L1, especially one without written form, is sufficient for proficiency in L2 literacy (Mayer,

1999; Musselman, 2000; Nelson, 1998; Singleton, Rivers, Morgan, & Wiles, 2001). Mayer and Akamatsu (2003) concluded:

> Whole-language proponents suggest that meaningful exposure and interaction in L2 print can make up for the lack of proficiency in a primary, oral form of the L2, while advocates of grammar-translation or contrastive approaches suggest that the L1 can be used to systematically teach L2 literacy by discussing, comparing, and contrasting the two languages. Neither of these two approaches incorporates an explicit discussion of the role that L2 language proficiency plays in the L2 literacy learning process.
>
> In acknowledging this as a concern, researchers have posited compensatory strategies that serve to either stand in for L2 oral proficiencies (contact sign, mouthing, or mouthing in conjunction with speech, fingerspelling, or sign), or to bypass it and focus on sign-based strategies that bridge from L1 to L2 literacy (glossing and fingerspelling). These strategies have the potential to be exploited in either a whole-language or directed approach as a means to address the concern of providing access and a bridge to L2. This potential needs to be investigated with respect to how, and how well, these strategies mediate the literacy learning process, particularly with respect to how they might operate in concert to support the process of learning to read and write. (p. 144)

Conclusion

Literacy research studies on deafness have gone in two different directions: 1) researchers in Paradigm A are typically interested in either text-based factors or reader-based factors influencing the reading process of students who are deaf or hard of hearing,

and 2) researchers in Paradigm B are generally interested in how the unique identity of Deaf readers transacts with the text and influences the reading process; particularly, they are interested in the role of ASL in the reading process. Research studies in Paradigm A have persistently reported that the reading development of students who are deaf or hard of hearing is qualitatively similar to that of their hearing peers, albeit quantitatively delayed in all measurements. There is a great need to study the effectiveness of interventions to address the reading difficulties of students who are deaf or hard of hearing. Research in Paradigm B has been mainly theoretical studies or program descriptions, partly because their paradigmatic belief tends to the rejection of the validity of experimental research. Instead of looking at individual factors influencing the reading process, research in Paradigm B has emphasized the *whole to parts* approach to investigate phenomena and focused on the influence of Deaf readers' distinctive language (i.e., ASL) and their own culture.

In sum, the debates on the best ways of teaching literacy for students who are d/Deaf or hard of hearing are grounded in different paradigms, making it extremely difficult to reach a consensus. Despite the dichotomy, the consensus in all literacy research with students who are deaf or hard of hearing is that many of them cannot read and write as well as their hearing counterparts. Working from this commonality, the current study provides a way to *think outside of the box* and answers the following questions: What is the goal of literacy education? Is reading and writing the only means to the end? How can students who are deaf or hard of hearing circumvent the reading and writing difficulty and still accomplish the goal of literacy education? Chapter 5 provides perspectives on the aforementioned inquiries.

CHAPTER 5

A MISSING PUZZLE: LITERATE THOUGHT

By reconceptualizing literacy, this chapter broadens the concept of literacy from a focus on print literacy to encompass all the information that can be captured, which includes print literacy, performance literacy, and caption literacy. It is proposed that literate thought, which is the ability to access and utilize captured information, is the fundamental goal of literacy education. Furthermore, it is hypothesized that literate thought is mode independent, or in other words, literate thought can be developed through different modes of literacy in a roughly similar way. Such an innovative way of interpreting literacy considers the omnipresent campaign for standardized reading skills for all students as oppression for some of the students who are deaf or hard of hearing as well as other poor readers. It is suggested that performance literacy might be one alternative vehicle for some students who are deaf or hard of hearing and other poor readers to develop their literate thought and obtain a higher level of critical thinking skills. The justification of performance literacy also contributes to the equity and diversity issue in education.

This chapter starts with the definition and discussion of literacy and literate thought. Traditional literacy is introduced first, and then the additional dimension that technology adds to the concept of literacy in this information age is discussed. Considred the goal of literacy education, the concept of literate thought is introduced later. The next step is to investigate the modes of literacy and the concept of literate thought. This chapter argues that different modes of literacy could be roughly equal vehicles to the objective of literacy education. The chapter intends to provide information that justifies the use of performance literacy in literacy instruction for students who are deaf or hard of hearing as well as for other struggling readers.

Literacy and Literate Thought

What is literacy? What is the value of being literate? Clanchy's (1993) historical study *From Memory to Written Record: England 1066-1307* reported that the written records introduced in medieval English were used mainly as legal and business records to measure ownership, business transactions, census, and so on. Eventually, complex systems were developed to serve as a mechanism of social control at that time. Although the social control feature of written records still exists today, the emergence of new media, such as newspapers, radio, videos, televisions, computers and the like, complicates the situation.

In Tyner's (1998) *Literacy in a Digital World*, the concept of literacy is refined to accommodate the information age:

> In this book, I investigate a third way to use literacy as a source of social power and that is the ability to decode information in a variety of forms, analogous to the reading of print, but also applicable to audio, graphics, and the moving image, a

> process that Paolo Friere and Donaldo Macedo (1987) call ‘reading the world.’ If citizens can also manipulate and understand the processes to create messages and distribute them, that is, ‘writing the world,’ then literacy practices accrue maximum benefit to the individual. It would be false to say that this vision of literacy would automatically translate into an equal distribution of social power. It is obvious that those who control both the channels of distribution and the skillful production of compatible content have access to the most favorable opportunities to influence social policy through sustained creative effort. Nonetheless, a sophisticated and powerful vision of literacy shows potential to enable each person to at least join the debate by skillfully negotiating within the existing power structure, as well as outside it. And this is why it is urgent that everyone has access to literacy in its most powerful forms. (p. 4)

Thus, in order to maximally benefit from literacy, individuals in the information age need to have access to the information (i.e., the ability to decode information in various forms) and know how to utilize the information (i.e., manipulate and understand the processes to create messages and distribute them).

Traditional Literacy

Literacy is traditionally interpreted as involving typographic (type or print) and chirographic (handwritten) materials, and there is a common naïve belief in the magical transformative power of simply learning to read and write. Writing is also conventionally considered as an instrument of precision and power. The rise of such a popular literacy notion is typically connected with a democratic and rational society as well as economic growth and industrial development; whereas any deterioration in literacy will pose

problems for a democratic and progressive society. This superficial perception of literacy leads to the notion that illiteracy is a social problem analogous with poverty, malnutrition and disease and people who cannot read are pathetic and disadvantaged (Olson, 1994).

The traditional perception of literacy mistakenly identifies the means of communication with the knowledge that is communicated:

> Knowledge can be communicated in a number of ways – by speech, writing, graphs, diagrams, audio tapes, video. The role of the school is not to displace children's pre-school perceptions and beliefs but to explicate and elaborate them, activities that depend as much or more on speech as on writing. Emphasis on the means may detract from the importance of the content being communicated. Furthermore it overlooks the significance of context in reading and learning to read. Reading ability depends upon not only letter and word recognition but in addition on the general knowledge of events that the text is about; consequently, a strict distinction between basic skills and specialized knowledge is indefensible. (Olson, 1994, p. 12)

Based on such an understanding of literacy, Olson argues that the current focus on the reading and writing skills of students seriously underestimates the significance of the understanding that students bring to school as well as the importance of oral discourse in turning that into consciousness, or in other words, in turning it into object of knowledge. The amount of time some students spend on remedial reading exercises might be more appropriately spent acquiring philosophical and scientific information (Olson, 1994). Furthermore, he maintains:

> Literacy in Western cultures is not just learning the abc's; it is learning to use the resources of writing for a culturally defined set of tasks and procedures…
>
> Literacy is not just a basic set of mental skills isolated from everything else. It is the evolution of those resources in conjunction with the knowledge and skill to exploit those resources for particular purposes that makes up literacy. That is why literacy and literate competence can have a history... We require a much more diversified notion of literacy. (Olson, 1994, p. 43)

Reconceptualized Literacy

Literacy can be defined narrowly or broadly (Paul & Wang, in press). In a narrow sense, it refers to typographic (type or print) and chirographic (handwritten) materials as mentioned previously. In a broad sense, all captured information is literacy, including script literacy, referring to materials that involve print or written symbols; performance literacy, including the capture of information that is typically rendered during face-to-face, live, contextualized situations, for instance, speech or signing; and caption literacy, which is performance literacy plus script literacy plus a video background in a captured mode. Computer literacy, scientific literacy, mathematical literacy and so on, are also captured information.

Multiliteracies

Although the printed word changed and incorporated oral traditions, print culture did not wipe out oral tradition. Similarly, radio, television and computers overlap and co-exist with other literacy technologies because these electronic communication technologies incorporate both oral and print conventions. Actually, book sales are at the all-time historical high in today's information age.

Facing the co-existence of multiliteracies, Tyner (1998) suggested categorizing them into tool literacies and literacies of representation. Tool literacies are related to the general proliferation of new technology tools in society, including computer literacy, network literacy, and technology literacy. Literacies of representation address the need to analyze information and to understand how meaning is created, which includes information literacy, visual literacy, and media literacy. According to Tyner, script literacy, performance literacy, and caption literacy should be referred as different literacies of representation.

The potential danger in the field is the tendency to promote one literacy over another. The competition is the same as arguing which paradigm is better. Similar to the paradigm war discussed in Chapter 2, the co-existing multiliteracies should work collaboratively for paradigmatic commensurability. "Through more collective, cross-disciplinary efforts to understand contemporary literacy needs and practices, a climate of both theory building and reflective practice can take root and grow" (Tyner, 1998, p. 97). Thus, there is no magic about any particular literacy: the pen, the book, the computer are only literacy artifacts that are used as technologies to record the information. Clanchy (1993) suggested that "literacy is primarily a technology of which records are the end products" (p. 20).

The Myths of Literacy

In his landmark book, *The Labyrinths of Literacy*, Graff (1995) provided some prominent and powerful conclusions on literacy: 1) literacy is historically founded and grounded; that is, literacy cannot be completely understood without knowing the sociohistorical forces of its time; 2) literacy is fundamentally complex; therefore, *strong*

theories of literacy fail; 3) no mode or means of learning and communicating is neutral, and literacy is not an exception; 4) alphabetic literacy (i.e., reading and writing) is an exceptionally valuable set of competencies among other literacies; 5) no set of literacies is superior to others; 6) reading and writing are not easy to learn; thus, blaming individual learners for their failure to learn and advance is irresponsible of schools or society; 7) the presence and significance of multiple paths of learning literacy should not be lost in the triumph of one correct path; 8) the practices that equated literacy learning (here meaning reading and writing) with elementary education have restricted and stratified both literacy and education; and 9) there is no one route to near-universal literacy and associated modern concomitants, and similarly, there is no one route in terms of literacy to economic development, industrialization, democraticization, and the like.

Although the definition of literacy remains complex, literacy scholar Kaestle (1991) suggested the existence of a "cultural price" tagged to literacy:

> The uses of literacy are various. As a technology, it gives its possessors potential power; as a stock of cultural knowledge within a given tradition, literacy can constrain or liberate, instruct or entertain, discipline or disaffect people. Princeton historian Lawrence Stone once remarked that if you teach a man to read the Bible, he may also read pornography or seditious literature; put another way, if a man teaches a woman to read so that she may know her place, she may learn that she deserves his. (p. 27)

Freire's (1970, 1973, 1985) work on critical literacy challenged the idea of defining literacy in service of the competitive marketplace. According to Freire, the brutal competition in capitalist societies means some individuals have to lose in order for

others to win and the social inequity would exist forever. He believed that the dominant culture defines literacy and the reading and writing skills that are accepted by the mainstream society as tools to reinforce social status. Minority groups have to passively accept the dominance of mainstream culture by learning their literacy in order to survive in the competition. Freire and Macedo (1987) criticized the current practice of using script literacy to separate "literates" from "illiterates" in the schools of the United States: "this large number of people who do not read and write and who are expelled from school do not represent a failure of the schooling class; their expulsion reveals the triumph of the schooling class. In fact, this misreading of responsibility reflects the schools' hidden curriculum" (p. 121).

Multiliteracies and Deafness

Such an understanding of literacy might change the way we view the performance of students who are deaf or hard of hearing on printed standardized tests (see the review in Chapter 4). It might be possible that students who are deaf or hard of hearing have not received full credit for their literacy skills. For some students who are deaf or hard of hearing, it might be impossible for them to reach the same level as hearing students on print tests for school information which is conventionally offered in print, but it might be possible that they can gain and utilize the same school information in another mode, that is, signing or speech, which means that they can gain school information through signing or speech, and use signing/speech as a means of assessment.

Literate Thought

More than two millennia ago, Plato claimed that using the technology of literacy was a relatively minor problem compared to what people did with the information that

literacy made available to them (Tyner, 1998). That is, the technology of literacy (e.g., reading and writing) is not as important as the purpose of literacy. Then what is the purpose of literacy?

Paul (1998, 2001) proposed to connect the purpose of being literate with the concept of literate thought, which refers to the ability to access and utilize captured information. Literacy involves management of the language and thought we engage in, or in other words, literacy involves accessing information through communication and utilizing information through cognitive activity. In this study, *accessing information* means gaining the content/meaning of the exchanged information, which refers to the semantic content of the information; whereas *utilizing information* means reflecting upon information, solving problems, or developing other higher-level critical thinking skills. There is no doubt that different literacies have different modes of communication; the question is whether these different modes of communication result in different ways to access and utilize information during communication.

Prerequisite for Literate Thought

According to Vygotsky (1929), what is essential in psychological operation is the cultural means of behavior. That is, what is vital in thinking is a *bona fide* language which is a symbolic tool in thinking and gears thinking into communication, functioning as a method of cultural reasoning. Gross (1974) concurred in the importance of a symbolic tool and suggested that it could be in different modes:

> Only through competence in the modes of symbolic behavior does man transcend private experience and achieve even a modicum of creative mastery over his environment. Given the responsibility of contributing to the development of a

> citizenry which is capable of thinking and of realizing its creative potentialities, we must devise educational systems which permit and encourage the acquisition of the widest possible range of symbolic competence…Thinking is an activity embracing the perception and the cognitive processing, storage, and retrieval of structured information. Structured and meaningful information can be received, stored, transformed, and communicated through a variety of symbolic modes which are variously amenable to formulation in symbolic code systems. (pp. 56-57)

Oral-aural information is only one mode of symbolic information, and symbolic competence could be reached through another mode, for example, signing, which is more realistic for most students with hearing impairment. Spoken language, written language, and sign language are all symbolic code systems, and they might have similar essential functions in thinking. Therefore, it is suggested that a bona fide language, rather than reading and written skills, is the prerequisite for literate thought.

Literate Thought and Deafness

It is hard to imagine written language as a mother tongue because it is an apparently strenuous process involving enormous learning efforts. Compared to written language, speech is easy because sounds are spontaneously produced and speech progresses through simple play with sounds (Ong, 1967; Saljo, 1988). “Oral speech evolves naturally in the process of social interaction between children and adults”, whereas “written speech emerges as the result of special learning” (Luria, 1982, p. 165). Olson also argued: “Writing is dependent in a fundamental way on speech. One’s oral

language, it is now recognized, is the fundamental possession and tool of mind; writing, though important, is always secondary" (Olson, 1994, p. 8). Olson further claimed:

> We don't want to say that we think in writing. Rather, writing offers us a set of options for cognition, options we choose among when we write. There is no magic about writing. It is not merely transcription, but neither is it a medium that operates independently of speech and thought. Writing, as Gombrich said of art, offers us a formulary into which we insert information. If there is no space on the formulary for a certain kind of information, it is just too bad for that information. Scholars have become increasingly attentive to what our formulary, our writing, leads us to overlook, but we also continue to believe that what it allows us to capture more than compensates for what is lost. Hence, we look forward to a long literate tradition and with it increased interest in understanding just what all literacy involves. (Olson, 1994, p. 292)

For a number of students who are deaf or hard of hearing, signing has taken the place of speech as the mode for developing their first language, and compared to written language, signing is easier too. However, some students who are deaf or hard of hearing born to hearing parents, might not have any bona fide language before schooling, which means that written language might be the form of their first language.

It might be time for educators to consider how to adapt our educational environment for these students with hearing impairment. For example, the use of performance literacy materials for classrooms and educational interpreting situations is more reader-friendly for students who are deaf or hard of hearing. It is also critical to

help them utilize speech or signing as one of the psychological tools to access and utilize captured information.

Modes of Literacy and Literate Thought

It is suggested in this chapter that script literacy, performance literacy, and caption literacy might be independent modes of literacy. At first, it is argued that information can be accessed through these different modes without losing the essence of the information. Furthermore, it is argued that the ability to utilize information can be reached by modes other than reading and writing, for example, speech or signing. Therefore, success in performance literacy might compensate for a malfunctioning in script literacy and still reach the academic goal of education: a higher level of literate thought.

Modes of Literacy and Accessing Information

The main difference between script and performance is that, during communication, script is relatively permanent whereas performance is transient, meaning that it progresses with time (Ong, 1977). More specifically, script provides us with "a concrete, thing-like appearance" (Saljo, 1988, p. 3), whereas performance is more elusive. Thus, it is easier to register authority in script than in performance, which might explain in some degree the reason for the heavy reliance on script in assessment and viewing script as a prerequisite for civilization today. Moreover, Ong (1967) agrees that because of the motionlessness of writing, it is possible to return and correct it, which is an impossible task for speech or say, performance mode. Actually, reading and writing as communicative practices have been a part of Western culture long enough to have

become obviously perceived as a natural and neutral way of conveying message. In a sense, script literacy has been considered as "an essential ingredient of implicit Western ethnocentrism" (Saljo, 1988, p. 1).

Therefore, it is not surprising that script literacy has been the legitimate literacy in Western schools. Olson (1974) believes that dramatically challenging script literacy's crucial role in schooling is impossible: it is an essential part in the formation and communication of information on science and philosophy. Moreover, it is accessible to both producers and receivers. Nevertheless, Saljo (1988) argues that such a schooled literacy is a specific mode of literacy geared towards the needs of a special social institution which considers reading and writing as ends in themselves rather than as means to accomplish other tasks. In other words, the fixation on reading and writing has been a crucial mistake in our education system, which has led to misunderstanding the richness of literate thought in other modes.

Although it is too radical to deny the contribution of print literacy to communication and civilization, we need to devote more attention to the previous marginalized literacy (e.g., oral/sign literacy) and realize that literacy assists communication and makes us better thinkers not only by print, but also by other modes. It is well accepted that literacy helps us to view the multiplicity of the world and expands the span of our vision; it helps us to respect our interconnectedness with other people and the intrinsic pluralism of meaning (Langer, 1995). However, it might be difficult for some people to admit that at the same time, literacy is multi-mode, itself. There is no way to quantitatively measure the different modes of literacies, but it is suggested that they are equal to each other and independent of each other. There is research on individuals

contributing to the discussions of printed texts, which were offered orally (Olson, 1989). Furthermore, we have valued the civilized world before the invention of printing and treasure the role of oral (performance) literacy in present times.

Moreover, we need to recognize that modern technology makes an enormous contribution to the development of oral (performance) literacy. For example, script literacy is decontextualized information, which separates textual information and the reader's interpretation. Some people argue that script literacy is an essential foundation for language and communication, because it concentrates on the problem of human intersubjectivity and joint communication concern in social interaction by transferring decontextualized pieces of information from sender to recipient (Saljo, 1988). In contrast, as previously mentioned, performance typically is delivered in face-to-face, live, contextualized circumstances, which might put it in a disadvantageous position in communication. However, with the development of technology, information presented in speech or signing can be captured in audio or video electronic media (e.g., audio books, audio taped lectures, audio CDs, DVDs, etc.) and be viewed as performance literacy. Or in the video materials, the same information can be signed together with a print component to make it caption literacy. Therefore, the information is separated from the initial speaker or signer and can be decontextualized. Thus, print literacy has no privilege over performance literacy for being decontextualized information.

Literacy can be considered as the combination of the captured information itself and the mode of the information, or in other words, the content, namely, meaning, of the information and the vehicle of the information. Different literacies might have different vehicles of the information, for the information is exchanged by speech, signing, or print,

but at the same time, have roughly the same content. For example, the same lecture can be signed by the interpreter or documented as a print record. The vehicles of the information can be understood as nonessential as long as there is roughly the same meaning communicated. The difference between different literacies is their different modes of exchanging information which contain little meaning; therefore, it is possible that different literacies can contain roughly the same content of information to access.

Modes of Literacy and Utilizing Information

If it is accepted that different modes of literacy are equivalent and self-sufficient for accessing information, how about their roles in utilizing information, for example, in creative, critical, and reasonable thinking?

Vygotsky (1962, 1978) believes that cognitive development depends on the internalization of psychological tools which can be defined as outside sign-stimuli influencing human behavior. Each sign has a specific meaning. We can understand signs as nonessential carriers of meaning; thus, signs retreat to the edge and semantics come to the center of internalization. If substituting one semiotic system for another while retaining its semantics is possible, then the internalization processes can be similar, which indicates that the development processes are similar as well. Students with hearing impairment can use alternative symbolic systems, meaning signing or speech, to gain the similar semantics; therefore, their literate thought development process could be similar as students with normal hearing.

One core of Vygotsky's theoretical framework is that mental processes cannot be understood without understanding the tools and signs that mediate them (Wertsch, 1985). Mediation, an essential concept in psychological tools, means "the use of certain signs or

symbols in mental processing. It involves using something else to represent behavior or objects in the environment. The signs or symbols can be universal or specific to a small group, such as a family or classroom, or they can be specific to a particular person" (Bodrova & Leong, 1996, p. 21). Although Vygotsky never limited the notion of mental tools to language, he argued that language played a preeminent role in mediation. Furthermore, he claimed that semiotic functions, such as the generalizing or abstracting function, would be difficult, if not impossible, to carry out in the absence of a bona fide language (Vygotsky, 1962, 1978).

Bodrova and Leong (1996) reiterated the role of language as a mental tool, an actual mechanism for thinking:

> Language makes thinking more abstract, flexible, and independent from the immediate stimuli. Through language, memories and anticipations of the future are brought to bear on the new situation, thus influencing its outcome. When children use symbols and concepts to think, they no longer need to have the object present in order to think about it. Language allows the child to imagine, manipulate, create new ideas, and share those ideas with others. It is one of the ways we exchange social information with each other. Thus, language has two roles; it is instrumental in the development of cognition and is also itself part of cognitive processing. (p. 13)

The basic element of language is the word. A word can be utilized to refer to objects and to identify properties, actions, and relationships. Words organize things into systems. That is to say, words codify our experience.

The basic function of a word is its referential function, or using Vygotskian terminology (Vygotsky, 1962), object reference. In the absence of words, human beings would have to deal only with things that could be perceived and manipulated directly; whereas with the help of language, they can deal with things that they have not perceived even indirectly and with things that were part of the experience of earlier generations. Thus, words add another dimension to the world of human beings: humans have a double world (Luria, 1982). Human beings can not only regulate their perceptions, they can also regulate their memory by utilizing images, because human beings can contrive these images at will even in the absence of the objects. They can control their actions, which means that words give rise not only to a bilateral world, but also to voluntary action, which could not exist without language. Furthermore, human beings can carry out trial and error thinking and other cognitive actions in the absence of real objects, or in other words, they can act internally. Internalization occurs when external behaviors *grow into the mind*, while maintaining the same structure, focus, and function as their external manifestation (Vygotsky & Luria, 1993).

A word not only substitutes for or represents an object, but also analyzes it by isolating and generalizing the properties of the object, or in other words, by incorporating it into a system of complex associations and relations. When we use a word to refer to some object, we automatically include it in a peculiar category. Such an abstracting and generalizing function is known as its meaning. Luria claimed that because the powers of abstraction and generalization are the most important functions of thinking, a word is a unit of thought. He further argued that by abstracting and generalizing the property of an

object, a word becomes an instrument of thought and a means of communication (Luria, 1982).

In brief, a word not only duplicates the world, it also serves as a powerful instrument for analyzing this world. Luria concluded: “language is a system of codes adequate for independently analyzing an object and expressing any of its features, properties, and relationships. The word is the foundation of the system of codes which ensures the transition from the sensory to the rational world” (Luria, 1982, p. 39). Therefore, the word, not reading and writing skills, becomes the main instrument of human conscious activity, or in other words, the mental tools of literate thought. Such an understanding of literate thought does not limit the mode of the word to print, which suggests that literate thought could be mode independent.

Conclusion

Rethinking the definition and goals of literacy, Chapter 5 suggests the additional dimension that technology adds to the concept of literacy and proposes literate thought as a missing puzzle in the field. By connecting the concept of literate thought with the goal of literacy, this chapter broadens the choices for students who are deaf or hard of hearing to access and utilize captured information.

If the hypothesis that literate thought is mode independent is accepted and that, as a vehicle of accessing information and interpreting information, performance literacy could be justified to be as roughly equivalent to print literacy, the usage of performance literacy in the classroom could be an alternative way for some students who are deaf or hard of hearing, as well as other struggling readers, to develop their literate thought. At the same time, the pervasive reliance on pencil-and-paper standardized test as a means of

assessment might be viewed as oppression for many students who are deaf or hard of hearing as well as other students who are struggling readers. Thus, using performance literacy with alternative assessments will contribute equity and social justice in learning and, hopefully, bridge the achievement gap between hearing students and students with hearing impairments. Furthermore, the literacy of schooling is based on a hierarchical access to script literacy. Such a linear media form is increasingly in conflict with the more diverse and interactive media forms made available by digital technologies that are used in the real world of home and community. The use of performance literacy in the classroom can be the bridge between school and the home community as well.

CHAPTER 6

NO CHILD LEFT BEHIND: CONCLUSIONS AND IMPLICATIONS

President Bush's educational reform bill, the No Child Left Behind (NCLB) Act, has triggered intense debates in the field of education. At the heart of the debate is the call for *scientifically based research* conducted to determine *what works* (see the review in Chapter 2). Because the debate is grounded in two different paradigms, there is no way to validate who is correct and who is wrong. The interest of the current study is to look at the intent of the law, which is *no child left behind*, that is, everyone should succeed academically although in their own different ways and different paces.

Academic success is interpreted in this study as reaching the goal of education, which is proposed as literate thought, that is, the ability to access and utilize captured information. The whole idea of being literate is to be a literate thinker, who can actively access and efficiently consume the captured information that is available in contemporary civilization. The traditional concept of literacy recognizes only the ability in reading and writing (i.e., script literacy skills) as the measurement for academic success. Students who are deaf or hard of hearing, as well as other struggling readers, for example, students

with learning disabilities, encounter great difficulties in accessing information in the print mode and cannot keep up with the *standard*. Thus, the linear understanding of academic success has left these children behind.

This study believes that the road to literate thought, which could be considered as the goal of education, should not be restricted to only the script literacy mode. The reconceptualized concept of literacy validates multiple modes of literacy including performance literacy, as mental tools of developing literate thought. Legitimizing only one mode of literacy (i.e., print literacy) in school while marginalizing other modes of literacy (e.g., performance literacy), especially when print literacy is not easily accessible for particular individuals, could be a form of oppression in education.

In this conclusion chapter, we first revisit the research questions and then summarize the answers for each one. Detailed instructional suggestions are also provided for practice and further research as well as metatheorizing in the field. It is suggested that we should divert from paradigm rigidity and seek a more productive solution that actually results in *no child left behind.*

Research Questions Revisit

In Chapter 1, three research questions were established to guide the entire study. Let's look at each one of them and see what we have accomplished in this study.

1. How has the notion of literacy been conceptualized?

The reality is that we have not moved too far away from the traditional concept of literacy, which is reading and writing. The major measurement for academic success in school today is still the reading and writing skills of students. Although other literacies such as performance literacy (e.g., CDs, DVDs, audio-books) and caption literacy (e.g.,

captioned TV programs) have emerged in homes and communities, script literacy is still valued as the only legitimate literacy at school. The gap between school and home has grown larger and larger. The paradigmatic difference in literacy theories is grounded in script literacy only. There have been few or no literacy theories that address other modes of literacy. However, there has been growing attention to the existence of multiliteracies and to the contribution of multiliteracies for equity and diversity issues in education.

2. How has the notion of literacy been conceptualized in research with students who are deaf or hard of hearing?

Similar patterns appear in the field of education for students who are deaf or hard of hearing: reading and writing skills are considered the only vehicles for academic success. Over a century, the formal assessment of reading ability for students who are deaf or hard of hearing documented a substantial gap between the reading achievement of students who are deaf or hard of hearing and that of their hearing peers (see the review in Chapter 4). Twenty years ago, King and Quigley (1985) concluded that 1) relatively little was known about reading instructional practice for students who are deaf or hard of hearing, and 2) there had been a dearth of intervention research on effective reading instruction for this population of students. Unfortunately, these comments are still relevant today. Although researchers from different paradigms have tried to approach the question from different angles, they have all been trapped in the reading difficulties of students who are deaf or hard of hearing. The advance of technology has made capturing information in modes other than print available, but little research has investigated the impact of these literacies on students who are deaf or hard of hearing.

3. How should the notion of literacy be conceptualized with students who are deaf or hard of hearing and possibly with all other students?

This study suggests that we should broaden the notion of literacy from script literacy only to multiple literacies which include script literacy, performance literacy, and caption literacy. Furthermore, the goal of literacy should be connected with literate thought, which this study argues is mode independent. This reconceptualized literacy provides students with more choices to develop literate thought and other higher thinking skills. Thus, students who are deaf or hard of hearing, as well as traditional struggling readers including students with learning disabilities, could use alternative tools to accomplish academic success. It will be a significant step in building an inclusive society where all children can succeed.

Instructional Suggestions

From the comprehensive review of literacy research on deafness in Chapter 4, the most observable pattern that emerges is that many students who are deaf or hard of hearing cannot read and write as well as their hearing counterparts. Encountering such a problem, there are two ways to approach it: 1) face the challenge, try to find why many students who are deaf or hard of hearing have reading difficulties, and seek an effective way to solve the problem; or 2) circumvent the challenge, try to find why we need to read and write, and seek an alternative way to reach the goal. This chapter provides instructional suggestions to guide further research and practice in both of the aforementioned areas.

The following sections start with a discussion of Visual Phonics which is suggested as one way of facing the challenge of reading difficulties of students who are

deaf or hard of hearing. It is then proposed that with instructional support, students who are deaf or hard of hearing should be able to develop a level of literate thought in an alternative literacy mode (e.g., performance mode) that is commensurate to that of typical readers and writers working in print mode (Paul & Wang, in press). It is emphasized that these two ways of approaching the reading problems of students who are deaf or hard of hearing will also apply to other struggling readers including students with learning disabilities. Finally, this section proposes the integration of inquiry-based science and performance literacy to provide an alternative approach by which students with disabilities and/or struggling readers may be taught or assessed for science knowledge and skills. It connects literacy with other academic areas and provides opportunities for students of various backgrounds and abilities to succeed in all academic areas.

Visual Phonics

The obvious difference between students who are deaf or hard of hearing and their hearing peers is the hearing loss. Studies with hearing readers have well established the role of phonological awareness and phonemic awareness in reading abilities (Adams, 1990; Chall, 1996; National Reading Panel, 2000; Snow et al., 1998). In the field of deafness, a few research studies have also been conducted regarding the role of phonology in the reading abilities of students who are deaf or hard of hearing, and the evidence suggests that the ability to use phonological information while reading is what distinguishes skilled readers who are deaf and hard of hearing from average and poor readers who are deaf and hard of hearing (see the review in Chapter 4). The ability to hear the phonemes and articulate them properly is not considered critical; instead, it is

claimed that the major goal of acquiring phonological knowledge is to understand that phonemes are the building blocks of a language and to obtain the ability to manipulate them (Adams, 1990). The reading problems of individuals who are deaf or hard of hearing are claimed to be closely connected with the failure to appropriately address the phonological components of reading instruction (Leybaert, 1993).

How do we make phonological information available for students who are deaf or hard of hearing? Studies on Cued Speech have provided some promise (see the review in Chapter 4). According to National Cued Speech Association (2000), Cued Speech is a sound-based visual communication system that includes eight handshapes in four different locations in combination with the natural mouth movements of speech. The emphasis is on visually representing the sounds of spoken language. There has been research evidence that Cued Speech can be used to develop the phonological ability of students who are deaf or hard of hearing (LaSasso, Crain & Leybaert, 2003; Leybaert, 2000; Leybaert & Lechat, 2001). However, as a communication system, Cued Speech is in conflict with the communication philosophy of Bi-Bi and Total Communication programs. Thus, it is not widely used in deaf programs in the United States.

The emergence of using Visual Phonics in reading instruction has gained increasing interest in the field of deaf education. Visual Phonics is the abbreviated title for See The Sound/Visual Phonics (STS/VP) which is a multisensory system of 45 hand cues and written symbols that represents aspects of the phonemes of a language and the grapheme-phoneme relationships. This system was developed in 1982 by the International Communication Learning Institute to help individuals with profound hearing loss to master letter/sound correspondence (Waddy-Smith & Wilson, 2003). This

multimodal representation of phonemes can be used to assist students who are deaf or hard of hearing or other struggling readers who experience difficulties to appropriately and adequately access the phonological components of English language. Visual Phonics can be used with deaf students from any communication methodologies because it is an instructional tool instead of a communication system. Another distinguishing feature of Visual Phonics is that it represents the phonemes which are the building block of a language; thus, it is directly designed to assist the students in manipulating the phonemes and acquiring phonemic awareness and phonics skills.

Although Visual Phonics has been implemented in the field for more than twenty years, little empirical research has been conducted to evaluate its efficiency in assisting the phonological development of students who are deaf or hard of hearing. Trezek and Malmgren (2005) conducted a pioneer study to investigate the effectiveness of a phonics treatment package incorporating Visual Phonics in teaching phonological processing skills to middle school deaf students. They found that students in the treatment group significantly outperformed the students in the control group.

Visual Phonics has also been used in special education classrooms with students with learning disabilities and in general education classrooms with typical developing students. Slausen and Carrier (1992) explored the effectiveness of using Visual Phonics in reading instruction for typical kindergarten children. The result indicated that perceptible positive effects were obtained for students with lower scores on letter-sound recognition skills and no negative influence or no influence appeared on students with high and average scores.

In sum, Visual Phonics is a promising instructional tool to assist students in the acquisition of phonemic awareness and phonics skills. Not only students who are deaf or hard of hearing, but also other struggling readers can obtain potential benefits from this alternative access to phonological information. Long-term intervention research is needed in the field to further assess the effectiveness of Visual Phonics as an instructional tool. Furthermore, research from teacher training perspectives for implementing Visual Phonics in the classrooms is needed. It is suggested that Visual Phonics alone could not produce sufficient support for students' phonological development. Visual Phonics needs to be grounded in a systematic and explicit phonics program such as the Direct Instruction *Corrective Reading-Decoding* series to yield the maximum positive results (Trezek & Malmgren, 2005).

Performance Literacy

Research into the performance of students who are deaf or hard of hearing on standardized tests of reading indicates that these students encounter immense difficulty in processing English in print (see the review in Chapter 4). Students who are not reading at grade level by the 4th grade almost never catch up and progress at an exceptionally slow rate throughout their school years (Stanovich, 1988, 2000, 2004). These students who are deaf or hard of hearing and other students with reading disabilities might be exposed continually to only low-reading-level script literacy materials or to low-demanding instructional activities. Walmsley and Allington (1995) suggested that the difference between good and poor script-literacy users might be partially explained by instructional tasks that provide unchallenging content and reduced information. Better readers and writers continue to advance because they can access challenging texts and are required to

perform complicated cognitive tasks. On the other hand, some students who are deaf or hard of hearing and students with reading disabilities are engaged in less rigorous, more literal cognitive activities, which do not provide ample opportunities for increasing metacognitive growth. Consequently, these students may not be capable of or have fewer opportunities to develop literate thought. Paul (1998, 2001) called for the necessity of developing alternative literacy materials (e.g., performance literacy) so as not to encumber the cognitive development of many children who are deaf or hard of hearing.

Paul and Wang (in press) provide three factors to consider regarding instructional implications and further research on performance literacy: 1) individuals need to have access to decontextualized texts representing all varieties of genres, including academic subjects and literature; 2) it is critical for individuals to develop and use a metalanguage or metalanguages--that is, the language(s) often associated with schooling; and 3) a bona fide language should be an obvious necessity for individuals to possess. A well-developed language is hypothesized as the prerequisite for accessing and interpreting decontextualized, captured information in any literacy mode (see the discussion in Chapter 5).

In terms of instructional implications, Paul and Wang (in press) suggest that script literacy texts can be translated into performance literacy texts to match the communication and cognitive levels of the students. Furthermore, debates, discussions, and instruction can be captured into performance literacy materials (i.e., audio-tapes, CDs or DVDs); thus, individuals should be able to use these materials for review and study. Many current instructional practices for script literacy can be used or adapted for

performance literacy--specifically, prior knowledge, metacognitive and assessment activities.

Essentially, the use of performance literacy in the classroom can be a potential alternative approach to develop literate thought and other higher thinking skills. It can be used with students who are deaf or hard of hearing or other struggling readers who learn best visually. The field of performance literacy is still immature, and intervention research to assess its efficiency is needed. On the other hand, we need to be cautious that performance literacy can never totally replace print literacy. As discussed in Chapter 5, multiliteracies will co-exist and the development in one mode of literacy might contribute to the advance in other modes of literacy as well.

Performance Literacy and Inquiry-based Science

Many students with disabilities have difficulty accessing academic content information such as science that, traditionally, has been presented in print. For example, in traditional text-based science instruction, much of the information that reflects school knowledge is obtained through printed texts. Heavily reliant on textbooks as the major tool, conventional science instruction and assessment present a problem for students with disabilities and/or struggling readers who cannot successfully access and utilize the information in print. The pattern of low performance was similar across the literature on traditional science assessments for students with disabilities where the tests require students to read and write in print and students' performance is evaluated mainly on the written product (Cawley & Parmar, 2001; Donohoe and Zigmond, 1988; Harnisch and Wilkinson, 1989).

Facing such a challenge, some researches have tried to teach and improve reading and writing skills of students with disabilities, particularly students with learning disabilities (Cawley & Parmar, 2001) and students who are deaf or hard of hearing (Barman & Stockton, 2002; Borron, 1978) within the context of science. But the question is: do students need to read to be taught or to be assessed for science knowledge and skills?

It is necessary to reconceptualize and broaden our current notion of literacy in the classroom. Students with disabilities, including those who are deaf or hard of hearing and/or struggling readers, might need opportunities to gain and think about complex information through a captured (i.e., preserved, saved, or documented) mode other than print—that is, in a speaking and/or signing literacy mode. Oral or sign literacy (i.e., performance literacy) (Paul, 1998, 2001) might be another legitimate route for developing scientific conceptual knowledge for many students with disabilities.

Students with disabilities, including students who are deaf or hard of hearing, students with learning disabilities, and students with emotional disabilities, need to be able to access and utilize information that has been typically presented in script literacy materials. If these children have extreme difficulty accessing print literacy materials, then alternative means can be employed to capture spoken and/or signed information on compact (CD) or digital video discs (DVD) (e.g., audio and/or video texts). That is, information that is typically presented in print (books, journals) can be transliterated and captured in oral (e.g., talking books) or sign (e.g., video books) forms. Furthermore, children can be taught skills and/or have numerous opportunities for working with such captured information (e.g., studying, remembering, synthesizing, etc.).

In traditional text-based science classrooms, the majority of instruction focuses on the acquisition of factual knowledge. However, inquiry-based science instruction emphasizes conceptual knowledge which is more likely to be generalized than factual information. The conceptual approach only considers scientific knowledge that helps students make sense of their surroundings as meaningful. Within such a conceptual approach, students act as involved performers instead of detached observers and their comprehension of the subject matter is contextually contingent and grounded in experience (Stoddart, Pinal, Latzke, & Canaday, 2002; Cawley & Parmar, 2001).

In essence, through the contextualized use of performance literacy in scientific inquiry, students with disabilities can develop and practice metacognitive thinking skills while simultaneously enhancing their scientific conceptual understanding. The curricular integration of inquiry-based science instruction and performance literacy is a promising practice for students with disabilities to access general education curriculum.

Conclusion

The persistent pattern that emerged from metatheorizing in the field of literacy and deafness is the limited literacy skills of students who are deaf or hard of hearing. This chapter provides two general directions for resolving the dilemma: 1) find the source underlying the difficulties and try to settle the problem and 2) seek the ends of being literate and try to find alternative means to attain the ends instead of the route of script literacy. Furthermore, this chapter goes beyond literacy education and attempts to provide directions for students with disabilities to access general educational curricula such as science. Accordingly, instructional suggestions in Visual Phonics, performance literacy, and the integration of performance literacy and inquiry-based science are presented.

Generally speaking, it is suggested that the reconceptualized literacy that connects literate thought with the goal of education can be beneficial for all children when planned and implemented properly. However, launching a successful practice takes a mixture of leadership, vision, commitment, cooperative planning, knowledge and time. It took a century from the invention of print to the wide-spread use of print literacy in society (Tyner, 1998), and the development of performance literacy and other modes of literacy to their maturity is expected to take long as well. The ultimate goal of education is or should be literate thought. The use of alternative paths, such as performance literacy, should be considered for individuals who are struggling with the traditional print literacy mode.

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