5-16-2008

An Investigation of the Relationships Between the Scoring Rubrics Inventory and the Metacognitive Awareness Inventory as Reported by Secondary School Core-Subject Teachers

Paula Marie Pucheu
University of New Orleans

An Investigation of the Relationships Between the Scoring Rubrics Inventory and the Metacognitive Awareness Inventory as Reported by Secondary School Core-Subject Teachers

A Dissertation

Submitted to the Graduate Faculty of the
University of New Orleans
in partial fulfillment of the
requirements for the degree of

Doctor of Philosophy
In
Curriculum and Instruction

By

Paula Marie Pucheu

B.A. University of Southwestern Louisiana, 1986
M.A. University of Southwestern Louisiana, 1989

May 2008

DEDICATION

This manuscript and the road traveled to complete it is dedicated in loving memory of my father Kenneth and my grandparents Ben and Bertile, and Lilly Mae.

"If there is no understanding, there is no knowledge;
if there is no knowledge, there is no understanding."
(ben Azariah, trans. 1988)

ACKNOWLEDGEMENTS

I wish to express my sincere appreciation and gratitude to the Co-Chairs of my committee, Dr. Charles S. Gifford and Dr. Richard B. Speacker. Thank you for your intellectual and professional guidance, unrelenting support and cherished friendship. Your footprints on this path are indelible.

Also in sincere appreciation and gratitude I wish to thank my committee members Dr. Carl Drichta, Dr. Marvin E. Thames and Dr. Rene Casbergue. I am indebted to all of you for your expertise, intellectual stimulation and the opportunity to grow professionally and personally. Thank you for your time and consideration along this journey. Thank you most especially for you kindness, support and friendship.

With the deepest of gratitude and heartfelt appreciation, I thank my family and friends who walked this journey with me especially: my daughter Amanda Katherine who taught me the meaning of courage and perseverance; my parents Chris and Gwen for their strength, material and emotional support; my sister Jeanne and brother-in-law Russell for their spiritual direction, rock-solid confidence in me and their ability to reduce overwhelming challenges down to manageable tasks; last but never least, my dear and long-time friend Barbara who accompanied me on every trip to New Orleans with encouragement and laughter. Without the unwavering support of these loving people and the Lord my God, the journey would have been impossible.

In humble thanksgiving I acknowledge the work of the Lord in this and all of my endeavors. *"Now to Him who is able to do immeasurably more than all we ask or imagine, according to His power that is at work within us". Ephesians 3:20*

TABLE OF CONTENTS

ABSTRACT

The promise of increased student achievement through educational reform is delivered still-born if teachers do not know how to implement complex instructional practices and sophisticated analysis of student performance. Metacognitive awareness is crucial to the adoption and application of proven educational initiatives. Teachers who successfully implement criterion-referenced assessment instruction, scoring rubrics, transfer to their students the metacognitive knowledge and skills of *how* to learn. This study is predicated on the research assumptions that metacognition and its attendant skills are critical to the successful implementation of scoring rubrics.

A researcher-developed instrument, the Scoring Rubrics Inventory (SRI) and the Metacognitive Awareness Inventory (MAI) were distributed to core-subject teachers from three large public schools in Southwest Louisiana. From a population of sixty-eight (N=68) voluntary participants, eighteen teacher-participants self-reported as high implementers of scoring rubrics, thirty-nine as mid-level implementers and eleven as low-level implementers. From this population, twelve subjects were randomly selected (four high, four mid-level, and four low-level implementers) by an outside rater for double-blind observations and interviews.

Pearson Product Moment correlations of the SRI and the MAI revealed five significant pairings using an alpha level of .05. The statistical results, coupled with the observation and interview findings from the sample-subjects established the consistency and stability of the Scoring Rubrics Inventory. Further, the totality of the results reported here support the research hypothesis of the study: **H_1:** There is a significant correlation between the metacognitive

awareness of secondary school core-subject teachers and the successful implementation of scoring rubrics.

The results of the study indicated that secondary school core-subject teachers who successfully implement scoring rubrics possess a metacognitive awareness that transcends professional development training. The findings also suggested that teacher-participants who do not implement scoring rubrics either cannot or lack commitment to the innovation. Implications for teacher educators and school leaders indicated the need to: identify those persons who require additional professional development training; include operational strategies and modeling of successful implementation during training; and maintain a consistent training program in scoring rubrics. Recommendations for future research were offered.

Keywords: metacognitive awareness, criterion-referenced assessment instruction, scoring rubrics, Metacognitive Awareness Inventory, Scoring Rubrics Inventory

CHAPTER I

INTRODUCTION

Education's raison d'etre is to inculcate the culture, values and lessons of the past to current generations and to prepare our children for the world in which they live – a world of ever increasing intellectual demands. The information explosion of the technological age and economic globalization require a more highly skilled workforce. A broader knowledge-base and sophisticated skills of analysis are essential in order to compete in today's world (Collins, 2003; Molnar, 1997; Suarez-Orozco, 2005). The rapid changes of this new age render basic knowledge and cognitive skills insufficient; the basic principles of traditional instructional designs which are applied regardless of the content to be learned are no longer viable (Jonassen, 1991). Pedagogical paradigms of neatly compartmentalized subjects, taught with little or no interrelationship, are giving way to collaborative, project-based, interdisciplinary learning experiences and criterion-referenced performance assessments (Darling-Hammond, 2000; Glaser, 1987; Simmons & Resnick, 1993).

The last forty years of educational research reveals a significant focus on understanding expertise, organized hierarchical knowledge structures and higher-order cognitive skills (Darling-Hammond, 2000; Lehrer & Schauble, 2000). Further, the assumption that curriculum guides instruction and instruction precedes assessment (Tyler, 1950) is replaced with criterion-referenced performance assessments as the guiding force preceding instructional initiatives and curriculum reform (Frederiksen, 1994). The acquisition of complex, higher-order cognitive skills and how to measure and teach them is further emphasized by this nation's demands for higher standards of achievement. Educational

reform in today's schools requires restructured curricula based on the creation of learning-communities that produce effective problem-solvers and reflective decision-makers. Learning *how* to learn is paramount in the twenty-first century. In order to meet the demands of assessment-driven educational reforms teachers must learn complex new skills to prepare the nation's students for new industries and jobs (Molnar, 1997; Rutherford & Grana, 1995; Suarez-Orozco, 2005).

Studies indicate criterion-referenced performance assessments are intended to enhance student achievement by virtue of professional staff development. For several years, a significant amount of educational research and related literature directly links professional development of effective teaching initiatives with improved student performance (Darling-Hammond, 2000; Guskey, 2003; Hirsh, 2003; Kelleher, 2003; Scribner, 2003). At the heart of these educational research arguments lies a revolutionary paradigm shift in cognitive developmental psychology – one that promotes the development of higher-order thinking skills, problem-solving strategies and self-regulation through learning experiences (Bandura, 1977; Bruner, 1966; Dewey, 1910, 1938a, 1938b; 1958; Gardner, 1985; Piaget, 1950, 1971, 1973; Piaget & Inhelder, 1969; Vygotsky, 1962, 1978). The core expressions of performance assessments, born of the multiple theories of cognitive developmental psychology, require professional educators to create learning environments aimed at optimal learning. Through a complex process of making students aware of effective strategies for problem-solving and communicating the characteristics of thinking, teachers foster independent, self-regulated learning (Paris & Winograd, 1990). Subsequently, the serious research and evaluation of teaching practices rooted in cognitive processes and student achievement is predicated on new instructional approaches that demonstrate the performance expectations of criterion-referenced assessment.

Attendant to the emphasis on criterion-referenced performance are the stringent federal demands for quality teaching aimed at increased proficiency levels for all students. National assessments measure whether or not these demands are met and local schools are held accountable. In light of the standards-driven, high-stakes accountability mandates of the No Child Left Behind Act (NCLB), professional development is critical (Rebora, 2003). With so much riding on student performance, many schools are experiencing a gap between professional development training and the actual implementation of research-based, student-centered initiatives.

The lack of full implementation of results-based initiatives may be attributed to several reasons. Insufficient funding, poor structure and organization impact professional development programs negatively. One-shot training sessions fall short of proven research methods concerned with sustained adult learning (Murphy, 2000; Paez, 2003). Teachers require reliable, accessible support and in-depth, sustained training with "hands-on" practice of new innovations that are tied to the cognitive assumptions of how adults learn (Greenwald, Hedges, & Laine, 1996; Murphy, 2000; Paez, 2003; Sykes, 1999). Training must emphasize deeper content knowledge and articulate clearly its impact on student learning (Guskey, 2003; Kelleher, 2003: Scribner, 2003). Cognizant of these concerns, professional development programs continue to restructure training efforts to meet the needs and challenges of high quality professional learning communities. According to the National Center for Education Statistics (2000), only 25% of teachers indicate that professional development improves teaching and content knowledge. Educational reform supported by professional development training continually asks what strategies are crucial to student achievement, but perhaps has not examined the strategies crucial to adult learning.

Educational reform guided by assessment performance both directs teaching practices and measures student progress toward standards through an emphasis on increased development of cognitive functions. Specifically targeted are the strategies and skills of executive functions (Berliner, 1987; Brown, Collins & Duguid, 1989; Palincsar, 1986; Puntambekar & de Boulay, 1997). Complex decision-making, problem-solving, interpreting and integrating information, self-regulation and self-assessment are considered executive functions of metacognition (Corno, 1987; Palincsar, 1986; Schraw & Dennison, 1994). Considered an important component of intelligence and understanding, metacognition plays a major role in criterion-referenced performance and academic success (Borkowski, 1985; Corno, 1987; Marine & Escribe, 1994; Puntambekar & du Boulay, 1997; Schraw, Dunkle, Bendixen & Roedel, 1995). Performance assessments identify the cognitive developmental status and skills of the learner and are then utilized to direct instructional experiences. With practice and experience, students accumulate the knowledge and the procedural strategies necessary for subject and skill mastery (Cooper, Horn & Strahan, 2005; Frederiksen, 1994; Hunter-Blanks, Ghatala, Pressley & Levin, 1988; Palincsar, 1986; Royer, Cisero & Carlo, 1993). Scoring rubrics is a method of criterion referenced performance assessment noted for promoting the development of improved metacognitive skills.

Endorsed by the Louisiana State Board of Education, the successful utilization of scoring rubrics mandates a significant change in the teacher's role. High levels of scoring rubrics implementation require teacher regulation of organization and planning, instructional strategies, reflective decision-making, and evaluation of the effectiveness of classroom practices. Metacognition is the governing agent of every aspect of the process (Colton & Sparkes-Langer, 1993; Palincsar, 1986). Most importantly, teachers are expected to model and teach these same

cognitive and self-regulatory functions to their students. The ability to self-regulate and teach students how to self-regulate and self-assess, is predicated on *self-awareness* (Baker & Brown, 1980; Corno, 1987; Gordon & Braun, 1985; Marine & Escribe, 1994; Schraw & Dennison, 1994). One's knowledge of his/her strengths and weaknesses precedes the selection and application of successful learning strategies and self-regulation, and is indicative of higher levels of metacognitive knowledge (Cooper, Horn & Strahan, 2005; Leinhardt, 1993; Palincsar, 1986; Puntambekar & de Boulay, 1997; Schraw, Dunkle, Bendixen & Roedel, 1995).

The emphasis on higher-order skills in performance-driven assessment practices is firmly rooted in educational psychology (Anderson & Schunn, 2000; Glaser, 1993; Leinhardt, 1993; Simmons & Resnick, 1993). The relationship between educational achievement and the methods and strategies that promote improved cognitive abilities is a critical focus that will continue and expand with increased interest and research. As learners, teachers require the necessary cognitive skills for implementing new teaching initiatives and the ability to model said strategies and skills for their students.

The lack of full implementation of criterion-referenced assessment methods is one of the most serious impediments to the objectives of improved student performance and accountability mandates. Teacher implementation of standards-driven assessments is influenced by the aforementioned systematic problems and of critical importance, their abilities to adapt new tasks and situations based on their self-awareness. While educational psychology continues to play an influential role in assisting all students toward performance achievement, it has yet to meet the ever-expanding needs of this nation's teachers.

Statement of the Problem

Despite the Louisiana State Department of Education's emphasis on the utilization of scoring rubrics and the numerous opportunities provided in professional development training sessions to promote the implementation of criterion-referenced assessments, there are indications that scoring rubrics have not been adopted as the state department desired. Further, there are indications of cases where scoring rubrics are not implemented in the manner intended, as in their incorporation into classroom practices for the purposes of GEE (Graduation Exit Examination) preparation only.

Research indicates that, regardless of the quality of the professional development training or how much "hands-on" practice is offered in seminars and workshops, staff development does not automatically translate into the implementation of effective classroom practices (Bransford, Brown & Cocking, 1999; Mosenthal & Ball, 1992; Sykes, 1999; Wenglinsky, 2002). According to the National Commission on Teaching for America's Future (1996), the majority of the nation's teachers and schools are unable to produce effective learning experiences promoted through professional staff development "not because they do not want to, but because they do not know how…" (p. 5). Teachers, especially secondary school teachers, are often unaware of the underlying mental structures of the more advanced knowledge domains promoted in criterion-referenced performance curricula (Bransford, Brown & Cocking, 1999; Gavelek & Raphael, 1985; Glaser, 2000; Graber, 1998; Mosenthal & Ball, 1992Killion 2002). Perhaps this explains why the learning strategies identified for deliberate and conscious intellectual competency are seldom taught (Bransford, Brown & Cocking, 1999; Borkowski, Carr, Rellinger & Pressley, 1990; Graber, 1998; Hunter-Blanks, Ghatala, Pressley & Levin, 1988; Mosenthal & Ball, 1992). Additionally, commitment to an innovation and persistence in its practice does not automatically

assure successful implementation (Graber, 1998; Hunter-Blanks, Ghatala, Pressley & Levin, 1988; Wlodkowski, 1999). The will to implement student-centered initiatives results in failure without the knowledge of *how*. Simply stated, there are teachers who do not possess the cognitive self-awareness necessary for the kinds of metacognitive capabilities required to transfer professional development training into effective classroom practices (Bransford, Brown & Cocking, 1999; Graber, 1998; Palincsar & Brown, 1984).

Teacher metacognitive awareness and self-regulated learning strategies are essential for the adoption, modification of tasks, and assessment of educational initiatives (Bransford, Brown & Cocking, 1999; Corno, 1987; Palincsar & Brown, 1984). Noted differences in adult strategy use and performance are directly linked to differences in metacognitive awareness rather than significant differences in intellectual abilities (Corno, 1987; Palincsar & Brown, 1984; Schraw & Dennison, 1994; Swanson, 1990). Metacognitive knowledge born of accurate self-awareness provides a crucial compensatory and correlational connection in cognitive performance. The adult learner who possesses a greater metacognitive awareness performs at a higher-ability level (Ertmer & Newby, 1996; Palinscar & Brown, 1984; Pressley & Ghatala, 1990; Schraw & Dennison, 1994; Swanson, 1990). Research concerned with the utilization of metacognitive functions in adult learning environments is critical for efficacious, self-directed, long-term learning. This study intends to explore the levels of implementation and application of scoring rubrics from the perspective of the teacher's metacognitive awareness.

Background to the Study

The No Child Left Behind Act of 2001 imposes the most universal and rigorous school accountability reforms ever in the history of education in this nation. Signed into law on January

8, 2002 by President George W. Bush the law mandates annual testing and academic progress of all public school students, annual state report cards of student achievement in school-by-school data in Adequate Yearly Progress (AYP) reports and strict adherence to revised teacher qualifications (Rebora, 2003). The purpose of NCLB is to close the achievement gaps between the disadvantaged, minority and non-English speaking students and their higher-achieving peers.

Schools are required to increase the percentage of students who perform at the "proficient" level on state exams by increasing increments each year. Of particular importance, NCLB mandates that proficiency reports (AYP) separate minority, disadvantaged and special education scores into subgroups. Schools can no longer average or omit progress data, thereby hiding low-performance scores. Low-performance scores of subgroup populations must be made public and addressed (U.S. Dept. of Ed., n.d.).

According to NCLB, all public school students must perform at grade level in reading and mathematics by the year 2014. In order to reach the objectives of NCLB all states must establish and delineate achievement benchmarks in their accountability plans submitted to the U.S. Department of Education for approval (U.S. Dept. of Ed., n.d.).

The state of Louisiana began an educational accountability policy several years ahead of the NCLB law. Louisiana's education accountability system became law in 1997 and the state began reporting criterion-referenced test (CRT) scores in English language arts and mathematics in 1999 (La. Dept. of Ed., n.d.a.). CRT scores ascertain student performance with respect to performance standards of established criterion. In compliance with NCLB, Louisiana submitted her Accountability Workbook of educational plans and benchmarks to the U.S. Department of Education and received full approval of its assessment system for Title I on November 8, 2000 (U.S. Dept. of Ed., n.d.).

At the core of the state's criterion-referenced testing (CRT) are the Louisiana Educational Assessment Program for the Twenty-first Century (LEAP 21) which is administered to fourth and eighth grade students and the Graduation Exit Examination for the 21st Century (GEE 21) which is administered to tenth and eleventh grade students (La. Dept. of Ed., n.d.b.). These exams are now administered in four subject-content areas: English language arts, mathematics, science and social studies. Further, the assessments must meet the testing standards of the National Assessment of Educational Progress (NAEP) (La. Dept. of Ed.,n.d.b.).

Scoring rubrics are utilized to assess both the LEAP 21 and the GEE 21 (La. Dept. of Ed., 2000). Accordingly, the Louisiana Department of Education promotes the use of scoring rubrics in the classroom.

> "Certainly we encourage teachers to use rubrics in classroom assessment. The department has provided training to teachers and district staff across the state on rubrics assessment as a service to help teachers use rubrics in the classroom since it is such a valuable tool and since it would help students and teachers prepare for the LEAP assessments." (Communication Nancy Beben, Section Supervisor Middle and Secondary Standards, La. Dept. of Education, August 19, 2004).

Purpose of the Study

The purpose of this study was to investigate the relationships between the Metacognitive Awareness Inventory and the Scoring Rubrics Inventory as reported by secondary school core-subject teachers. Specifically, the study was designed to examine and identify the relationships between the levels of two of the components of metacognitive awareness: 1) cognitive

knowledge of abilities and strategy decision-making; 2) cognitive knowledge of self-regulation and scoring rubrics implementation levels. It was predicted that teachers who report significantly higher knowledge recognition and regulation of cognition also report higher levels of innovation implementation.

Research Questions

The information investigated in this study focused on the following research questions:

1. Is there a relationship between the Scoring Rubrics Inventory and the Metacognitive Awareness Inventory?
2. How do the self-reported levels of implementation compare to the actual levels of implementation as noted in observations and interviews?

Research Hypothesis

***H*o:** There is no significant correlation between the metacognitive awareness of secondary school core-subject teachers and their successful implementation of scoring rubrics.

H_1: There is a significant correlation between the metacognitive awareness of secondary school core-subject teachers and their successful implementation of scoring rubrics.

Need for the Study

Staff development tied to standards-driven assessment strategies are seldom fully adopted by all faculty. Investigations concerning effective staff development training may address the various aspects of effective training and support but do not address all of the possible cognitive factors that may explain what constitutes full and successful implementation by teachers. Successful adoption of staff development initiatives, such as scoring rubrics, hinge on efficacious teacher preparation and practices that promote metacognitive awareness. What is needed is a

better understanding of teacher self-perceptions of their application of the rubrics process relative to their metacognitive capabilities.

If improved student achievement in criterion-referenced performance assessment is a major goal of educational reform, then the metacognitive abilities of the teachers required to implement said reform initiatives, and who are expected to model said performance, should be considered. Further, information concerning teacher cognitive knowledge may reveal gaps in the existing literature. This study could provide additional and useful information to guide existing programs and their evaluations, as well as contribute to the development of new initiatives.

Significance of the Study

The focus on performance assessments that promote higher-order thinking and improved student achievement will continue due to standards-driven mandates and continued interest and advances in educational psychology. Any knowledge regarding what can be done to identify an appropriate teaching population for innovative program efforts or to better explain inconsistencies in levels of implementation would greatly enhance the success of professional development efforts.

The results of this study could contribute to the literature concerned with adult learning and educational psychology. Further, the study could contribute to the literature concerned with professional development goals of maximizing the impact of criterion-referenced assessments on student achievement. The pressure to meet external accountability requisites can lead to superficial incorporation of criterion-referenced assessments. The study's findings could provide valuable insight toward understanding what constitutes meaningful adoption.

CHAPTER II

RELATED LITERATURE

Introduction

To facilitate an understanding of metacognition, this chapter of related literature begins with a definition of the term and a brief history of metacognitive research. Instructional implications from metacognitive research and its impact on current research, investigations of expertise and the construct of metacognition are examined as well.

In recent years, high stakes assessments have become the driving force behind curriculum reform, and by extension, professional development programs. The importance of metacognitive skills and strategies to criterion-referenced assessments and instruction in today's classroom are delineated in this chapter under the subheading "Scoring Rubrics". The effectiveness of professional development and innovation implementation are included also, followed by a discussion of the Metacognitive Awareness Inventory (MAI) intended for use in this study.

Metacognition

The term metacognition refers to the cognitive skills, processes and strategies utilized to monitor and modify one's learning (Gordon & Braun, 1985). Metacognition is an awareness of one's thinking processes. It is the ability to govern one's cognition and cognitive processes such as: an awareness of one's knowledge base; organization and planning; the utilization of problem solving strategies; and the ability to self-assess and self-correct (Royer, Cisero & Carlo, 1993). It is the deliberate and conscious control of one's thought processes. John Flavell (1976), whose research in memory performance pioneered the concept, defines metacognition thus:

> Metacognition refers to one's knowledge concerning one's own cognitive processes and products or anything related to them, e.g., the learning-relevant properties of information or data…Metacognition refers among other things, to active monitoring and consequent regulation and orchestration of the processes in relation to the cognitive objects or data on which they bear, usually in the service of some concrete goal or objective (p. 232).

The history of metacognitive research represents a natural extension of Piaget's (1950; 1971; 1973; Piaget & Inhelder, 1969) studies in developmental psychology. Swiss psychologist Jean Piaget is credited with establishing the dominant psychological theory of intellectual development. The findings of his research of the mid-twentieth century assert that cognitive development occurs in distinct, measurable, and observable stages. He referred to these stages as *operational* to indicate mental activity where representations are non-rigid or isolated and are viewed as sequential levels of adapting (Piaget, 1950; 1971; 1973; Piaget & Inhelder, 1969). Piaget conceptualized the formal operations of cognitive development and of particular importance, higher-order levels of thought. In doing so, a new scientific, revolutionary paradigm of cognitive developmental inquiry effectively supplants the characterization of learning as a change in behavior. This new focus on learning emerges from the perspective of what learner's know and how they acquire it. Human thought is conceptualized as an active flow of information through a system of mental structures; learning is active and occurs in the mind. As a result, cognitive developmental psychology becomes the driving force in educational research, instructional and assessment designs, and curriculum reform (Case, 1978; Miller, 2002).

Scholars of educational and cognitive developmental psychology chart the evolution of metacognitive research in several phases. Some point to two generations of study (Pintrich, Wolters & Baxter, 2000), others to four (Borkowski, Chan & Muthukrishna, 2000). Regardless of the number of divisions drawn, a review of the literature distinguishes two discrete, but closely related research-veins of the early foundational studies. One vein is characterized by the correlational assessments of children's memory knowledge as it relates to a memory task and the quality of their verbalized memory awareness (Flavell, 1971; Flavell & Wellman, 1977; Schneider, 1985). Referred to as metamemory, early assessments of the relationships between the child's memory knowledge about events and the processes utilized to solve memory problems reveal a co-relational and compensatory connection. What an individual knows about memory processes, the ability to intentionally store and retrieve information, impacts memory performance.

Simultaneously, a second vein of information-processing research emerges from a wide field of inquiry. These studies conceptualize the importance of experience, assimilation and adaptation, and how knowledge is acquired (Bruner, 1966; Dewey, 1910, 1938a, 1938b, 1958; Piaget, 1950, 1971, 1973; Piaget & Inhelder, 1969). These examinations of cognitive development emphasize the cognitive gains made when the learner engages in problem-solving. The active effort to solve discrepancies between expectations and actualities reflects the ultimate learning process as the learner attempts to make sense of his/her world. No process better illustrates the role and value of encoding and retrieval than problem solving. Additionally, significant emphasis is placed on the appropriation of language as a mediating, pivotal tool in cognitive development (Bandura, 1977; Dewey, 1938a, 1938b, 1958; Piaget, 1950; 1971; 1973;

Vygotsky, 1962, 1978). The stimulation, modeling and challenges of interacting with others define the core of language acquisition. In the simplest terms, the ability to communicate thoughts and ideas requires social interaction for development.

Building on the research of the aforementioned theorists, some of the numerous studies that appear involve reading comprehension, writing, language acquisition, problem-solving and cognitive self-regulatory functions (Applebee, 1978; Baker 1979; 1989; Baker & Brown, 1980; Bereiter & Bird, 1985; Bower, 1974; Brown, Campione & Day, 1981; Jacobs and Paris, 1987; Palincsar & Brown, 1984; Paris & Jacobs, 1984; Stotsky, 1975). These studies, and others like them, examine the learner's awareness of his/her own knowledge-base, cognitive resources and abilities, and the ability to negotiate cognitive experiences. Most importantly, said research findings emphasize that self-awareness is a pre-requisite for self-regulatory control, monitoring and self-assessment. The learner's self-regulating and monitoring efforts are conscious attempts at comprehension. Research of reading comprehension and writing, for example, reveals that the unique learning strategies necessary for proficiency in reading and writing are directly linked to reasoning processes and the development of thinking (Baker, 1979; 1989; Baker & Brown, 1980; Bereiter & Bird, 1985; Bower, 1974; Brown, Campione & Day, 1981; Flavell, 1976; Palincsar, 1986; Palincsar & Brown, 1984). Significantly, the research also demonstrates that children who are taught more effective monitoring strategies not only perform better, but also recognize that the improvement is directly tied to the more effective strategies. Further, the value of the more effective learning strategies reinforced through improved performance usually assures continued use.

Driven by the instructional implications of decades of metacognitive research, the majority of current investigations are found in the field of educational psychology. Today's research focuses primarily on the issues of self-regulation and control (Howard-Ross & Winne, 1993; Pintrich & DeGroot, 1990; Puntambekar & du Boulay, 1997; Steinberg, Bohning & Chowning, 1991; Zabrucky & Ratner, 1992). The concept of self-regulated learning embodies an individual's ability to monitor and regulate cognition. Of particular significance, self-regulating learners are the most effective learners and exhibit higher performance achievement (Pintrich & DeGroot, 1990; Pintrich, Wolters & Baxter, 2000; Puntambekar & du Boulay, 1997).

Spawned from investigations of *expertise*, the nature of high levels of performance in a domain realizes critical importance in educational reform (Borkowski, Chan & Muthukrishna, 2000; Glaser, 1993; Marine & Escribe, 1994; Schraw, Dunkle, Bendixen & Roedel, 1995). Results of expertise-research reveal: experts exhibit better accuracy in determining the levels of difficulty of a problem (Artzt & Amour-Thomas, 1992; Chi, Glaser & Rees, 1982); anticipate attending procedural issues (Larkin, 1983); possess deep levels of connected schemata (organized networks of related facts, concepts, generalizations and experiences) (Colton & Sparkes-Langer, 1993); and demonstrate that high levels of competence and performance are directly related to the metacognitive skills of self-control and self-monitoring (Marine & Escribe, 1994; Schraw, Dunkle, Bendixen & Roedel, 1995; Tobias, 1995). In terms of instructional implications, it is discovered that these skills can be taught through intentional learning experiences (Corno, 1987; Palincsar, 1986; Paris & Winograd, 1990; Schraw, Dunkle, Bendixen & Roedel, 1995; Westerman, 1991).

In order to attain high levels of ability in students, instructors should utilize knowledge structures, procedural cognition, example and experience, all of which should be preeminent throughout education. Students can be taught *how* to think, problem solve, self-regulate, self-assess and *how* to apply these metacognitive skills to learning. They can, and should, be taught *how* to learn.

Construct of Metacognition

According to leading scholars, the construct of metacognition consists of two main arteries: *knowledge of cognition* and *regulation of cognition* (Baker & Brown 1980, Jacobs & Paris, 1987; Schraw & Dennison, 1994). Knowledge of cognition involves a metacognitive self-awareness of three specific areas: *declarative, procedural* and *conditional knowledge*. Declarative knowledge includes *what* an individual knows about things and *what* types of cognitive strategies are available in his/her repertoire. Procedural knowledge refers to one's knowledge of *how* to use said strategies. Finally, Conditional knowledge is one's knowledge of *when* and *why* cognitive strategies are utilized (Brown, 1987; Pintrich & DeGroot, 1990; Pintrich, Wolters & Baxter, 2000; Schraw, Wise & Roos, 2000). "Any kind of self-appraisal of cognition can be classified as either declarative, procedural, or conditional knowledge." (Jacobs & Paris, 1987, p. 259)

Control and monitoring of one's cognitive processes and learning are realized in the second main artery of metacognition: *regulation of cognition*. A number of self-regulatory skills are subsumed under these two metacognitive functions. Additionally, current studies focus on control and monitoring as the most relevant (Brown, 1987; Hunter-Blanks, Ghatala, Pressley &

Levin, 1988; Marine & Escribe, 1994; Pintrich & DeGroot, 1990; Schraw, Dunkle, Bendixen & Roedel, 1995; Steinberg, Bohning & Chowning, 1991).

In general the processes of planning, the allocation of resources, strategy selection and performance goals are the regulatory functions of metacognitive *control*. One may utilize these processes prior to or during the course of cognitive activities (Pintrich & DeGroot, 1990; Pintrich, Wolters & Baxter, 2000; Schraw, Wise & Roos, 2000). Research concerned with the effects of strategy instruction on metacognitive control in adults reveals significant increases in improved utilization of cognitive resources and processing (Baker, 1979; Brown, 1987; Dixon, Hultsch & Hertzog, 1988; Hunter-Blanks, Ghatala, Pressley & Levin, 1988; Pressley & Ghatala, 1990).

Self-assessment and self-correction processes are identified as metacognitive *monitoring* (Pintrich & DeGroot, 1990; Steinberg, Bohning & Chowning, 1991; Swanson, 1990). The feedback provided to the control system during or after a cognitive activity is associative and remunerative. According to Schraw, Wise and Roos (2000), "Without accurate monitoring, efficient control of one's performance may be impossible…" (p. 228). Further, performance may be improved through instruction in monitoring processes and with continual use will occur automatically (Artzt & Armour-Thomas, 1992; Bereiter & Bird, 1985; Gordon, & Braun, 1985; Palincsar & Brown, 1984; Pintrich & DeGroot, 1990). Thus, teaching individuals the underlying structures of metacognitive knowledge facilitates self-awareness of their cognitive processes and as a result, provides improved control over their learning and performance.

Scoring Rubrics

Scoring rubrics are a scale of descriptive performance-criteria which specify several levels of quality in student work (Glatthorn, 1999; Jonassen, Peck & Wilson, 1999). As a criterion-referenced assessment tool, rubrics articulate the components and dimensions of evidence required for evaluating complex student performance. Prior to task efforts, the performance rules of analysis assess the student's prior knowledge, resources available and the nature of performance competence. Expected proficiency and mastery contained in the rubrics scale become more advanced with each level of evidence expected from the student (Glatthorn, 1999; Jonassen, Peck & Wilson, 1999). This decomposition of a complex skill into subparts and procedural clarity links assessment and instruction (Darling-Hammond, Ancess & Falk, 1995; Glaser, 1987; Glatthorn, 1999).

Originally developed in the 1970's to evaluate complex performance, the performance criteria of the last few decades have been devoted to developing effective learning procedures. When utilized appropriately, scoring rubrics promote intentional learning (Glaser, 1987; 2000; Wiggins, 1993; 1998). Complex learning assignments are broken-down into manageable components and are described for better understanding. Clearly defined criteria provide a common understanding of all terms and expectations for successful completion of learning tasks. These descriptive levels of achievement assist in building student proficiency and provide greater consistency in student performance (Andrade, 2000; Darling-Hammond, Ancess & Falk, 1995; Schafer, 2001). The clarity of performance-evidence expressed in the rubrics enables the student to govern and self-assess achievement efforts thereby improving metacognitive skills (Glaser, 1987; 2000; Wiggins, 1993; 1998). Students are in charge of their learning performance and

thus assume greater control and ownership of their learning. The process of considering alternative solutions, options and other perspectives constitute higher-order thinking skills. Focused planning of workable strategies and reflection on performance build confidence and lay a foundation for life-long learning skills (Jonassen, Peck & Wilson, 1999; Stiggins, 2002; Wiggins, 1993; 1998).

For teachers, scoring rubrics serve as a guide to promoting systematic reliability and consistency of evaluative judgments in assessments (Andrade, 2000; Arter & McTighe, 2001). This is especially true when the rubrics' scores are standardized; there is a consistency to the scoring method for teachers trained in its use. Said consistency reduces subjective grading especially with respect to written assignments. Students are evaluated on the characteristics that identify knowledge and skills acquisition. For many teachers, the assessment tool promotes a new confidence in identifying the components of quality performance and effective writing (Arter & McTighe, 2001).

The utilization of criterion-referenced assessments such as scoring rubrics require a change in instructional preparation and delivery (Wiggins, 1993; 1998). Teachers who understand assessment targets must continually adjust instruction based on student developmental progress and provide continuous feedback and delivery of information necessary for student improvement (Arter & McTighe, 2001; Darling-Hammond, Ancess & Falk, 1995; Schafer 2001). Viewed to have the greatest impact on improved student achievement, studies demonstrate that the changes required in instructional delivery promote not only increased communication in the classroom but also with parents and the community (Andrade, 2000; Stiggins, 2002).

The implementation of scoring rubrics mandates a significant change in the teacher's role. The traditional role of the teacher as the gatekeeper of knowledge who dispenses information to passive learners gives way to instructional practices that place the teacher in the role of facilitator (Darling-Hammond, Ancess & Falk, 1995). As students become involved in complex, intellectual learning tasks they assume the role of researcher, author and critic (Wiggins, 1993; 1998). The teacher thus guides and supports the development of performance skills and higher-order thinking valued in postsecondary education and the workplace. It falls to professional development therefore, to bridge the gap in teacher knowledge, skills and instructional practices created by assessment-guided educational reform.

Professional Development

High-stakes assessments have been recognized as a force behind substantial curriculum reform, and by extension, more frequent and efficacious professional development. The focus on student achievement data means instructional approaches must shift to intellectually challenging, learning tasks (Cohen, 1996; Murphy, 2000). Much research articulates what constitutes effective professional development and its impact on student learning (Killion, 2000; Paez, 2003; Schafer, 2001; Wenglinsky, 2000; 2002). Though not all scholars agree on the importance of each and every aspect of training components (Guskey, 2003), there are areas of common ground.

Research-based professional development training embodies a host of recommendations for effectiveness. First and foremost, training must relate to the content of what students learn and teacher pedagogical knowledge (Guskey, 2003; Sykes, 1999). Generic presentations of educational innovations in training sessions do not assist teacher comprehension. Effective

training programs require teacher involvement in deeper content and an understanding of *how* students learn (Guskey, 2003; Sykes, 1999). Professional development involved with discipline-specific, developmental educational practices demand the following:

- sufficient time and practice to learn (Kelleher, 2003); Killion, 2000; Murphy, 2000; Paez, 2003; Scribner, 2003); school-wide delivery (Richardson, 2003);
- adequate funding to provide for substitute teachers, materials, skilled experts, long-term follow-up and sustained support (Ingvarson & MacKenzie, 1988); Richardson, 2003; Wenglinsky, 2000; 2002);
- site-based collaboration with colleagues (Blackwell, 2003; Guskey, 1997; Hirsh, 2003);
- district and school administrative support (Darling-Hammond, 2000; Sykes, 1999).

Additionally training must acknowledge teachers' existing beliefs of educational practices and their perceptions of new innovations (Behar-Horenstein, Pajares & George, 1996; Darling-Hammond, Ancess & Falk, 1995; Guskey, 1989; Richardson, 2003; Thompson, Warren & Carter, 2004). Finally, professional development programs should provide for the evaluation of the innovation and the professional training that promotes its use (Darling-Hammond, Ancess & Falk, 1995; Guskey, 2003; Norton, 2001). Of vital importance, among the aforementioned is the extent to which proposed changes are compatible with teachers' perceptions of the value of the innovation and the feasibility of its implementation (Darling-Hammond, Ancess & Falk, 1995; Guskey, 1989; Killion, 2000; Thompson, Warren & Carter, 2004).

Innovation Implementation

According to the National Commission on Teaching for America's Future (1996), American students rank near the bottom on mathematics and science international assessments and an overwhelming majority of U.S. students cannot read, write or compute at grade level. If student achievement is the yardstick by which we measure the value of professional development, then in the light of the data we fall short. "What you teach is what you get." (Valverde & Schmidt, 1997, p.2)

If effective learning strategies and skills are core aspects of intelligence necessary for competent performance and said strategies are to be acquired through learning experiences and examples of procedural modeling, then teacher cognition could not be more critical in the current assessment-centered educational environment (Anderson & Schunn, 2000; Chi, Glaser & Rees, 1982; Colton, Sparkes-Langer, 1993; Frederiksen, 1994; Graber, 1998; Lehrer & Schauble, 2000; Wlodkowski, 1999). It is the teacher's cognitive and metacognitive script that determines the depth of inquiry, considerations, interpretations, reflections and assessment of new information (Colton, Sparkes-Langer, 1993). Unfortunately, the empirically-validated learning strategies emphasized in professional development for educational reform are practically non-existent in the classroom. Further, research demonstrates that many teachers who do incorporate learning strategies into their classroom practices do so inadequately. The cognitive structures of increasingly complex knowledge domains are obscure to the average teacher. Providing the final or correct answer is much easier than modeling procedural cognition (Anderson & Schunn, 2000; Berliner, 1987; Glatthorn, 1999; Graber, 1998). Effective strategies such as establishing collaborative learning groups, facilitating, explaining, modeling explicitly thought processes and monitoring progress are seldom included at the depth necessary for students to understand,

emulate and adopt (Borkowski, Carr, Rellinger& Pressley, 1990; Trawick & Corno, 1995). Most teachers, in spite of the advancements made in the development and delivery of staff development programs, cannot duplicate, much less create, the kinds of learning environments required to meet performance assessment criteria and reform standards (Anderson & Schunn, 2000; Borkowski, Carr, Rellinger & Pressley, 1990; Graber, 1998; National Commission on Teaching for America's Future, 1996; Royer, Cisero & Carlo, 1993).

Ineffective instructional efforts illuminate a lack of metacognitive skill and understanding of strategy use. Failure to incorporate student-centered initiatives appropriately may result even among those who commit to reform standards and persist in implementation efforts (Chinien & Boutin, 2001; Graber, 1998; Wlodkowski, 1999), thus creating a negative impact on students. Teachers who model ineffective cognitive skills produce students whose achievement performance reflects the same inadequacy (Chinien & Boutin, 2001; Gavelek & Raphael, 1985; Gorrell & Capron, 1990; Wenglinsky, 2002). Without effective instructional models, teachers and students alike are likely to feel anxious, directionless and confused. Additionally, when learning efforts are fruitless, innovation implementation becomes difficult to sustain, and in most cases is abandoned (Chinien & Boutin, 2001; Gooden, 1996; Graber, 1998; Guskey, 2003). This may explain why the majority of the nation's teachers (seventy percent) believe that professional development has moderate or little impact on their classroom practices (National Center of Educational Statistics, 2000).

A small percentage of U.S. faculty (twenty-five percent) indicate that professional development has a positive impact on their teaching practices and improved student

achievement. In cases where professional development incorporated identified higher-order thinking skills, students perform forty percent ahead of grade level compared to peers whose teachers do not receive similar training (Wenglinski, 2000; 2002). Further, students perform thirty-nine percent ahead of grade level in mathematics when higher-order thinking skills are utilized in the classroom. Training in higher-order thinking skills however, may not accompany each and every staff development program. Therefore what is to be said of teachers who do not receive training in higher-order thinking skills and/or strategies, yet successfully implement innovations delineated in professional development programs? What accounts for an almost seamless transition from traditional instruction to criterion-referenced assessment? What is the explanation for their continued successful application without school or district support or social dialogue with colleagues? It appears they "came to the table" with something more or different than their professional peers. Perhaps the difference lies in their self-awareness and metacognitive knowledge.

Inconsistencies in the levels of innovation implementation continue to plague and fuel professional development introspection as evidenced by research efforts to identify the most important components of high-quality programs (Guskey, 2003; Ingvarson & MacKenzie, 1988; Kelleher, 2003; Killion, 2000; Murphy, 2000; Paez, 2003; Richardson, 2003; Scribner, 2003; Torff, 2005; Wenglinsky, 2002). The promise of increased student achievement through criterion-referenced performance assessments is delivered still-born if teachers do no know how to implement complex instructional innovations and sophisticated analyses of student performance. Conceptualizing how to teach professional educators to adapt and modify learning initiatives and reform measures is crucial. If student and teacher high-achievement performance

are designated goals worth attaining, then metacognitive awareness and regulation may be worth more consideration.

Metacognitive Awareness Inventory

In spite of the tremendous potential for gathering metacognitive information from research-based measures, researchers lament the inadequacy of current measurements (Baker & Cerro, 2000; Meichenbaum, Burland, Gruson & Cameron, 1985; Pintrich, Wolters & Baxter, 2000; Schraw, 2000). No single instrument is capable of a comprehensive measurement of all of the theoretical constructs of metacognition. There are advantages and disadvantages to all of the current measures. To some, the disadvantages impede a more complete understanding of human cognition (Baker & Cerro, 2000; Pintrich, Wolters & Baxter, 2000).

The multiple dimensions of metacognitive knowledge confound the serious attempts to wed theoretical models of metacognition and empirical data. Some research instruments are tied to specific domains such as reading; others measure more general metacognitive knowledge. Some incorporate qualitative measures, others are self-report questionnaires (Baker & Cerro, 2000; Pintrich, Wolters & Baxter, 2000; Schraw, 2000). In light of the complexity of the multiple dimensions identified in the theoretical models of metacognition, those in research who lament the absence of one comprehensive measurement seem unrealistic. Instead, improving upon the several reliable instruments that measure one or two constructs appears to be a more reasonable expectation.

The Metacognitive Awareness Inventory (MAI), developed by Schraw and Dennison (1994) (located in Appendix A), is a fifty-two item self-report questionnaire and is selected for use in this study. It is a two-factor model measuring metacognitive awareness (Knowledge of

Cognition and Regulation of Cognition) and is considered one of three existing adult and adolescent measures of psychometric reliability (Schraw, 2000). The other two are: the Learning and Study Strategies Inventory (LASSI) (Weinstein, Zimmerman & Palmer, 1988) that measures test strategies, attitudes, motivation and anxiety among its ten subscales; the other is the Motivational Strategies for Learning Questionnaire (MSLQ) (Pintrich & DeGroot, 1990; Pintrich, Smith, Garcia & McKeachie, 1993) that measures motivation and strategy.

According to Baker and Cerro (2000), Schraw and Dennison's (1994) Metacognitive Awareness Inventory (MAI) is a "promising new instrument focusing more exclusively on metacognitive awareness " (p.113). The MAI is practical and efficient; subjects find the instrument easy to use. The instrument provides researchers with information from large study populations, and its summative scoring facilitates its use in several research settings (Pintrich, Wolters & Baxter, 2000). In terms of psychometric reliability, the MAI is the only self-report instrument currently available for measuring metacognitive awareness.

CHAPTER III

METHODOLOGY

Introduction

The procedural elements of data collection and the population surveyed for this study are discussed in this chapter, including quantitative measures and qualitative analyses. The qualitative data streams (double blind observation and interviews of a sample population) allow for triangulation with the quantitative measures. This chapter provides a specific narrative of these procedures and the locations within this text of accompanying instruments. Information is presented relevant to the two self-report instruments used in the study: Schraw and Dennison's (1994) Metacognitive Awareness Inventory (MAI); and a researcher-developed Scoring Rubrics Inventory (SRI). The chapter concludes with a description of the development of the SRI, a brief discussion of the scoring of both instruments and the statistical measures used to discern correlations.

Procedures and Data Collection

In compliance with the Human Subjects Review Committee guidelines, this study was conducted under the supervision and approval of the University of New Orleans Graduate School. As per the Human Subjects requirements, there has been no potential risk to those who chose to participate. All participants in the study were assured anonymity; those who were observed and interviewed were assured confidentially. All volunteer participants had the option to withdraw at any time. Additionally, all records, materials and data collected are maintained by the researcher identified on the consent form (See Appendix B, Informed Consent Form).

Several criteria were considered in identifying prospective target schools for this study. Through contacts in a five-system area, three public high schools in a large school system in

southwest Louisiana were identified. Each high school in this particular system houses an academy in a specific field (ie: medicine, business, arts and humanities, engineering) along with its regular courses and curriculum and are engaged in the application of scoring rubrics. Any student who resides within this school system can attend any one of the academies provided the student meets the criteria for acceptance into the academy. In other words, place of residence within this geographical area does not necessarily determine school attendance at an assigned school. Further, as all of the schools in this system maintain an academy, the faculty are more diverse professionally than the typical area high school. For example, the school providing academy courses in medicine employs a veterinarian and a forensic scientist. Both of these female teachers were randomly selected for the sample population of twelve. Of particular importance to this study were schools who employ sixty to eighty core faculty members.

Upon approval of the research proposal by the University of New Orleans Human Subjects Committee and the National Institutes of Health (Appendix B), a letter seeking permission to conduct the study was mailed to the superintendent of the identified school system. This was followed by an on-line application to the school system's governing board to conduct research. Having received written approval, the principals of the three identified schools were telephoned and meetings of introduction arranged. During the introductory meetings a brief explanation of the purpose of the study and the amount of time required of the school's faculty and/or staff was provided. Follow-up meetings with the principals or assistant principals of each identified school were held immediately after the data collection process was completed. Simultaneous to the research approvals from the university and the National Institutes of Health,

a Copyright Permission Letter (located in Appendix B) was received from Dr. Gregory Schraw allowing the reprinting of the Metacognitive Awareness Inventory and the related operational definitions in this manuscript.

Utilizing purposive sampling (Popham, 1993), teachers of English/Language Arts, Mathematics, science and social studies, also known as core teachers, were identified as prospective subjects. This deliberate selection was made due to the greatest possible likelihood of their implementation of conceptual and criterion-referenced assessments. Faculty members in the chosen school system who teach the aforementioned subjects are responsible for Graduation Exit Exam (GEE) results and therefore are more likely to have attended staff development training in scoring rubrics. Further, every student from the ninth through the twelfth grade is impacted by these teachers. As a naturally-occurring, pre-formed, convenient group of individuals, the subjects also constitute a cluster sampling (Popham, 1993). The largest school identified employs eighty-four core teachers; the second school, sixty; and the third school, fifty-two.

Participants for the study were recruited during the system's regularly scheduled teacher in-service sessions held over a period of two days prior to the start of the academic school year 2007-2008. During recruitment remarks, a brief introduction and explanation of the study was provided. These remarks included the study's focus and the amount of time required of those who volunteered to participate. Packets containing the Informed Consent Form, the Metacognitive Awareness Inventory (MAI) and the Scoring Rubrics Inventory (SRI) were distributed to volunteer participants at the beginning of the teacher in-service at one school and at the close of the teacher in-services at the other two. Both inventories included instructions for completion. (See Appendix A for the MAI and Appendix C for the Scoring Rubrics Inventory)

The majority of the teacher-participants chose to complete the surveys at the time of distribution. Others chose to complete the surveys at their convenience. Both surveys were completed in approximately twenty minutes by those who chose to respond at the time of distribution. Surveys completed after the two day in-service were retrieved by the researcher one week after distribution. Upon retrieval of the completed packets, each packet was labeled with the school's name on the outside of the packet. Completed packets were then grouped into three separate stacks according to school name. Approximately one third of the packets from the top of each stack were boxed and delivered to a trusted colleague on the faculty of Louisiana State University at Eunice.

This colleague has been a faculty member of the aforementioned university for more than a decade and earned a Doctor of Philosophy in Science. She was appointed Head of the Math and Science Division approximately two years ago.

To review reliability and consistency of the Scoring Rubrics Inventory, the first forty-two inventories were scored by this educator. In her function as the outside rater, she reported having received forty-two inventories. She reduced the group of forty-two to a manageable observational sample of twelve (four high implementers, four middle implementers and four low implementers). The names of the twelve teachers, without any identification of their implementation level reflected by their SRI scores, and their schools were supplied by the outside rater. Observations and interviews of the twelve were conducted to verify teacher placement levels categorically.

Observation and Interview Sample

Seven teachers in the sample population were female and five were male. The ages of the sample population ranged from thirty-one to mid-sixty's. The number of years of teaching experience among the twelve was equally broad and ranged from the first year in the classroom to forty-plus. Designated teaching tracts represented among the English/Language Arts teachers were as follows: one Advance Placement (high implementer); and three Special Education (two high implementers, one mid-level). Three of the sample population represented the discipline of science: one biology instructor (who happened to be a Doctor of Veterinary Medicine and also a high implementer); a forensic science instructor, "high" (mid-level) and the third a physical science teacher (low implementer). The first two of these teachers were employed by the school that maintains the Academy of Medicine. Four of the twelve were math instructors: one Advanced Math (mid-level implementer); one Statistics (mid-level); two regular tract Math (one mid-level implementer and one low). The fourth and final core subject represented, Social Studies was a low implementer. Thus, the disciplines represented in the sample population were English/Language Arts (four teacher-participants) Mathematics (four), Science (three), and Social Studies, (one).

Observation and Interview Procedures

The areas of focus for the observations were drawn from the researcher-developed Rubric of Teacher Implementation of Scoring Rubrics (located in Appendix D). Over a period of two weeks, each of the twelve teachers in the sample were observed for one class period. The observation sessions provided the opportunity to document and assess the utilization of scoring rubrics. The researcher-developed Observation of Scoring Rubrics Implementation template and a companion Observation Check List of Scoring Rubrics Implementation are located in

Appendix E. Informal notes of the teacher's classroom managerial skills, a description of the teaching environment and student interest accompanied the designated areas of focus.

The interview questions and techniques were established for an open-ended structured interview to allow exploration of the participants' perceptions, opinions, knowledge and use of scoring rubrics (Glesne, 1999; Patton, 1990). The interviews required approximately thirty to forty-five minutes each along with written notations. Each of the participants were interviewed individually and separately during their planning or "off" period. Observations of the subjects' affect, such as demeanor, tone of voice, and body-language were informally noted. The interview questions (Appendix E) concentrated on the teacher's perceptions of: the quality of the professional training they received; the impact of the assessment innovation on student performance and teacher workload; and the teacher's commitment to student learning. Research literature concerned with the application of scoring rubrics and the research questions of this study guided the development and order of the interview questions.

The products of this study included: 1) the Informed Consent letter; 2) the Metacognitive Awareness Inventory; 3) the Scoring Rubrics Inventory; 4) the Observation of Scoring Rubrics Implementation; 5) the Observation of the Implementation of Scoring Rubrics Checklist; 6) and 7) Interview Questions. Additional products included the informal and summary notes of the process and interpretations, statistical data, and the final report.

Development of the Scoring Rubrics Inventory

The development of the Scoring Rubrics Inventory (SRI) first required a rubric of the criteria of the desired evidence of teacher implementation. Several available sources were consulted in the creation of the rubric and are cited parenthetically at the bottom of the "ideal" columns of the Rubric of Teacher Implementation of Scoring Rubrics (Appendix D). Desired

evidence of scoring rubrics use were developed first followed by the descriptive evidence of a combination of scoring rubrics utilization and traditional instructional practices. Last, evidence of "poor" teaching practices were described.

Once the rubric was developed, the criteria of each of the five levels of implementation for all six factors was re-worded into small paragraphs as "first person" accounts of instructional practices. Finally, the paragraphs were arranged in a particular pattern to avoid recognition of rubric criteria and design: the top left paragraph of each page represents the "ideal"; the top right, a high level of "acceptable"; the center left paragraph represents a moderate level of "acceptable"; the center right paragraph, a moderate level of "unacceptable"; the bottom center paragraph represents the "unacceptable" level of a non-implementer.

Upon review by the committee chair of this study, a brief explanation of the researcher's intentions and the purpose of the SRI were included in a cover sheet to the instrument. This explanation reminded the research participant that individual data would not be reported in the study; all data would be examined in aggregate. Instructions for completing the SRI followed the reminder.

Instruments

Prior to 1994, virtually all experimental research aimed at identifying metacognitively aware learners involved extensive time, testing and interviews. In the absence of a more timely, yet reliable, means of identifying metacognitive awareness, Schraw and Dennison (1994) developed an easily administered self-report inventory for adolescents and adults. At the time of this study, the Metacognitive Awareness Inventory (MAI) was selected because it was the only psychometrically reliable sef-report of adult metacognitive awareness (Schraw & Dennison,

1994). Further, statistical correlations of the two instruments (SRI and the MAI) are a means of verifying the consistency and reliability of the Scoring Rubrics Inventory (SRI).

Schraw and Dennison's (1994) two-factor Metacognitive Awareness Inventory (MAI, located in Appendix A) consists of fifty-two items of five levels of awareness distributed across eight components of metacognition: Factor One, Knowledge of Cognition, includes Declarative, Procedural and Conditional knowledge; Factor Two, Regulation of Cognition includes Planning, Organizing, Monitoring, Debugging and Evaluation. Operational definitions for each of the components are located in Appendix A. The five levels range as follows: "Always True" (5); "Sometimes True" (4); "Neutral" (3); "Sometimes False" (2); and "Always False" (1).

Schraw and Dennison (1994) conducted two experiments with three hundred and seven undergraduates to ascertain instrument reliability. Two factor analyses revealed an internal consistency of .93 to .88 and a correlation of .54 suggesting that knowledge of cognition and regulation of cognition work in unison. Questions by category are located in Appendix A. According to Schraw and Dennison, the MAI scores are computed by averaging the number of items corresponding to each of the eight subscales.

The Scoring Rubrics Inventory (Appendix C) consists of six factors of five levels of implementation drawn from the researcher-developed Rubric of Teacher Implementation of Scoring Rubrics (Appendix D). The six factors include: Knowledge of Benchmarks and Content Standards; Knowledge of Subject Content; Teaching/Learning Objectives Development; Instructional Delivery; Assessment Methods; and Intervention and Remediation. The five levels of implementation range from the Ideal (highest level=5); Acceptable (levels 4 & 3); and Unacceptable (levels 2 & 1).

The maximum score of the Scoring Rubrics Inventory is 30 and the minimum score is 6. The strata, or distinctional levels of implementation are as follows:

- highest levels of implementation may range from 24 to 30 with no factor below 3;
- mid-level scores may range from 15 to 23 with no factor below 2;
- and low level scores from 14 and below with no factor above 3.

Outliers in the study were identified as subjects whose scores fell outside the scoring margins of the SRI.

Statistical Analyses

Utilizing SPSS (Statistical Package for the Social Sciences) statistical analyses began with entering the numerical data into a data base [ie., the responses to each item on the MAI (fifty-two) and the SRI (six)]. The MAI scores were averaged according to each of the eight subscales as well as all of the responses. The mean and standard deviation were calculated from the total scores of both inventories. The mean and standard deviation of the two factors of the MAI was calculated as well as each of the eight sub-scales.

According to Schraw, "The MAI is not a nationally normed instrument, so there aren't hard and fast benchmarks for 'high' knowledge. I suggest you go with the norms from your sample" (Schraw, 2007). Thus, in order to make comparisons of and to draw correlations between the two instruments, the SRI scores were converted to z-scores: all z-scores greater than 1.00 were coded as 4; all z-scores between 0 and 1.00 were coded as 3; all z-scores between -1 and 0 were coded as 2; and all z-scores less than -1 were coded as 1. These statistical computations were followed by Pearson Product Moment correlations of the two instruments: SRI to MAI totals; SRI to MAI Knowledge of Cognition and SRI to MAI Regulation of Cognition; SRI to MAI Declarative Knowledge; SRI to MAI Procedural Knowledge; SRI to

MAI Conditional Knowledge; SRI to MAI Planning; SRI to MAI Organizing; SRI to MAI Monitoring; SRI to MAI Debugging; SRI to MAI Evaluation.

CHAPTER IV

RESULTS

Introduction

The main focus of this investigation was to determine the consistency of the Scoring Rubrics Inventory (SRI) and the relationships, if any, to the Metacognitive Awareness Inventory (MAI). The results of this study are delineated in this chapter with respect to the order of the research questions: 1) Is there a relationship between the Scoring Rubrics Inventory and the Metacognitive Awareness Inventory? and 2) How do the self-reported levels of implementation compare to the actual levels of implementation as noted in observations and interviews? The statistical analyses of the two self-report inventories precedes discussion of the findings from the double blind interviews and observations of the sample population of twelve. The results of the interviews are reported in the order of the interview questions and are followed by the observational findings. The totality of the results reported here support the research hypothesis of the study: $\mathbf{H_1}$: There is a significant correlation between the metacognitive awareness of secondary school teachers and their successful implementation of scoring rubrics.

Statistical Results

Out of the one hundred ninety-six core teachers from the three identified schools, one hundred eleven received packets containing the consent form and both instruments. From the one hundred eleven participants, eighty-two packets were viable – meaning the Informed Consent Form was signed and both self-report inventories were completed. Eighty-two viable packets were submitted.

The maximum possible score on the Scoring Rubrics Inventory, indicating an ideal level of implementation, was 30 and the lowest possible score was 6. The strata, or distinctional levels of implementation were as follows:

- highest levels of implementation may range from 24 to 30 with no factor below 3;
- mid-level scores may range from 15 to 23 with no factor below 2;
- and low level scores may range from 14 and below with no factor above 3.

The scoring ranges were specific to the levels of implementation. Factors delineating "above" or "below" a certain numerical value were deliberate. It would be inappropriate to consider an inventory as viable if a "high implementer" selected an "unacceptable" category on the self-report. Likewise, one would not be considered a "low implementer" if an "acceptable" category was selected.

Fourteen inventories were eliminated as outliers on the SRI, leaving sixty-eight. From a percentage perspective, ninety-five percent (including eight of the twelve sample-subjects) of the teacher-participants in this study reported implementation levels of either high or mid-level. Of the sixty-eight teacher-participants, the highest score on the SRI was 29; the lowest score was 11. The following table delineates the implementation levels of the remaining sixty-eight teacher-participants.

Table 1
Implementation Levels of Teacher-Participants

Level of Implementation	Number of Teacher-Participants
High	18
Mid-level	39
Low	11

Note. N=68

Statistical analyses of the data from the two self-report inventories was predicated on the dependent variable: the level of implementation of scoring rubrics. All statistical calculations of the two inventories were made through the use of the Statistical Package for the Social Sciences (SPSS). The results of this study provided a range of 29 to 11 with a mode of 24 on the SRI. For the MAI, the scores ranged from 4.96 to 3.42 with multiple modes. Calculations for mean and standard deviation indicated a mean of 4.1575 for the MAI and a standard deviation of .39218. The SRI mean calculated at 19.88 and the standard deviation, 4.477. The means and standard deviations of each subscale and factor of the MAI as well as the MAI total are found in Table 2 (Appendix F). The SRI mean and standard deviation are included in Table 2 also.

Pearson Product Moment correlations of the Scoring Rubrics Inventory and the Metacognitive Awareness Inventory revealed five significant pairings using an alpha level .05. These five significant correlations included three of the eight MAI subscales: SRI to MAI Procedural Knowledge (.331); SRI to MAI Conditional Knowledge (.268); and SRI to MAI Evaluation (.283). The fourth significant correlation included one of the two MAI factors: SRI to MAI Knowledge of Cognition (.279). The final, and most significant correlation revealed that the MAI as whole (all scores combined) significantly correlated with the SRI as a whole (.253). The correlation coefficients of all eleven comparisons are located in Table 3 in Appendix F. This information indicated a significant relationship between the SRI and the MAI.

Based on the population size of this study, N=68, the degree of the relationships between the five significant pairings does not indicate strong correlations. Although significant, the lack of correlational strength also reduces the magnitude of predictability between the two inventories.

Qualitative Data Results

Unknown to the researcher, the sample-population selected by the outside rater consisted of four high implementers, five mid-level implementers and three low implementers. At the close of the observation and interview process, the categorical levels assigned during the blind observations and interviews were compared to the SRI scores. The findings of the observations and interviews of the sample population revealed that eleven of the twelve self-reported their implementation level of scoring rubrics accurately. The exception was the advanced math teacher who stated that he utilized rubrics to plan his lessons but does not use them with his students. During the interview this teacher-subject revealed that he "really didn't read the SRI", and selected his responses quickly to "get it over with". He self-reported as a mid-level implementer with a score of 19 when in fact he verbally confirmed he was non-implementer. Therefore the sample population legitimately consisted of four high, four mid-level and four low level implementers.

Two of the teacher-subjects were difficult to place categorically during the observation and interview phase. One appeared as either a "low" high implementer or a "high" mid-level implementer. Her survey revealed that she self-reported as a "high" mid-level implementer of scoring rubrics with a score of twenty-two. The second teacher-subject in question appeared to be either a "high" low implementer or a "low" mid-level implementer. Her SRI score of fifteen indicated she self-reported as a "low" mid-level implementer.

Interview Results

The interview questions utilized in the study are located in Appendix E. The results are reported here in the order of the questions.

Four of the teacher-participants received no professional development training in scoring rubrics – three of whom were high implementers and the fourth a mid-level implementer. In fact, the highest level implementer in the sample who received no training was a first year teacher. This teacher-subject utilized scoring rubrics with all of her assignments in her advanced placement English/Language Arts classes. She described her use of online rubrics through Rubi Star and how she modified them to her lessons and criteria. Another revealed she was not a graduate of Secondary Education, but a Doctor of Veterinary Medicine. She too utilized on-line rubrics with modifications in her honors' Biology classes. The remaining four implementers in the high and mid-level category reported having received professional development in scoring rubrics and described the training they received as follows:

- "Yes, it was good quality training. I began teaching with a specialist who used them. The training with the state combined English rubrics with writing skills. They were wonderful."
- "I attended a workshop in Baton Rouge in the Spring of '07. The training was excellent. The workshop added to my understanding. I had the opportunity to work with teachers from other schools and the opportunity to design rubrics. I was impressed with the person who provided training."
- "I received good training while in college at Xavier."
- "I received training in scoring rubrics in Brookline, New York. The training concentrated on planning backwards. It was pretty useful."

The four low implementers, who were actually non-implementers, reported having received either "poor" training in scoring rubrics or "inadequate" training. They described their professional development training thus:

- "I received minor training, a two hour workshop is not sufficient."
- "Administrators' love rubrics because it makes their job easier".
- "I attended the workshop, but its not mandatory to use it so I don't.
- "I have no use for such nonsense".

In terms of continuing professional development in scoring rubrics, nine of the teacher participants in the sample population indicated they had not received further professional development in scoring rubrics. Three of the teacher-subjects replied that scoring rubrics were revisited occasionally in departmental meetings.

Interview responses from the teachers who implemented scoring rubrics supported published research. Teacher-participants discussed the impact of scoring rubrics on student performance as follows:

- an increase in interaction and communication with their students as well as an
- increase in feedback and delivery of information (Arter & McTighe, 2001; Darling-Hammond, Ancess & Falk, 1995; Schafer, 2001);
- more student participation, especially as students contribute to the establishment of lesson goals and objectives (Arter & McTighe, 2001; Wiggins, 1998);
- students are more engaged in considering alternative solutions to problems and critical thinking (Stiggins, 2002; Wenglinsky, 2002);
- and more community involvement as students realize they can involve others in the learning process (Andrade, 2000; Stiggins, 2002).

Additionally, teacher-implementers reported an improvement in student grades due to greater effort and the opportunity to earn even partial credit (Andrade, 2000; Stiggins, 2002). Consistent with the objectives of scoring rubrics and the mission of NCLB, teachers reported more accountability on the part of students, teachers, administrators and parents (Hirsh, 2003; Murphy, 2000).

Several teacher-implementers spoke of increased confidence in grading and the ability to defend grading practices (Behar-Horenstein, Pajares & George, 1996):

- "It helps me ascertain that I've addressed everything in my lesson and provides security in grading. I'm more confident";
- "Aids grading like a checklist, it's more efficient".

Further, teacher-implementers reported increased student understanding of learning and performance goals (Darling-Hammond, Ancess & Falk, 1995); Schafer, 2001) as well as increased student responsibility for and ownership of learning (Jonassen, Peck & Wilson, 1999; Stiggins, 2002; Wiggins, 1998).

- "Empowers the kids highly; there are no unknowns."
- "They have guidelines they understand – clarity helps them achieve more."
- "Gives the students an opportunity to shine, its great."

Finally, teacher-implementers reported increased confidence in their teaching abilities and increased job satisfaction since the application of scoring rubrics (Behar-Horenstein, Pajares & George, 1996).

- "I feel more successful when the students succeed."
- "I truly see myself as a facilitator of their learning instead of a lecturer."
- "Scoring rubrics even the playing field – it's made me more objective."

In terms of the purpose of scoring rubrics, teacher-implementers reported clarity of identified, desired results improved student performance. Additionally, students prefer to know what evidence, characteristics and knowledge will be accepted as proof of understanding and proficiency levels (Arter & McTighe, 2001; Darling-Hammond, Ancess & Falk, 1995; Glatthorn, 1999; Wiggins & McTighe, 1998).

- "Expectations are spelled out."
- "Clarifies the objectives and sets clear goals for student work."
- "Scoring rubrics are supposed to accomplish two things: first, to understand expected outcomes; and second, inform instruction and keep you on track. It lends validity to the whole process, all persons involved – administrators on down know what's expected."

Whereas the non-implementers understood the purported impact of scoring rubrics on student performance, they expressed a dislike of being expected to use them:

- "I think they are a lot of work and because I have to prepare my students for the LEAP I am suppose to use them";
- "Scoring rubrics are in favor now, tomorrow it'll be something else".

In terms of any changes in their perceptions of their teaching abilities due to their exposure to scoring rubrics, the non-implementers replied:

- "It's been my experience that as the years go by I get better from exposure to many different learners as well as techniques."
- "None".
- "Students don't really understand scoring rubrics."

All of the non-implementers expressed an understanding of what scoring rubrics are suppose to accomplish with the exception of one – "I have no idea nor do I care."

Observation Findings

Two researcher-developed instruments were utilized to note observation information: the Observation of Scoring Rubrics template and the Observation Check List of Scoring Rubrics Implementation. Both instruments are located in Appendix E.

Seven of the eight teacher-implementers were observed utilizing scoring rubrics with their students and provided copies of the rubrics to the researcher. Comparative analysis of the observation data revealed a significant consistency with the related literature and reported research. Teacher-implementers utilized instructional strategies concerned with intentional learning (Perkins, 1991; Wiggins, 1998). Strategies observed included: vocabulary building; think-aloud problem-solving; computer use; critical thinking and "think outside the box" exercises. Additionally, implementers generated classroom discussions of: the execution and outcomes of scientific experiments; main themes; thesis statements; and statistical data entry. Examples of comprehension strategies utilized included review, recall, summarization, interpretation and synthesis, and in some cases, re-reading . Simply stated, teacher-implementers utilized strategies that emphasized and reinforced concepts and student understanding (Andrade, 2000, Chinien & Boutin, 2001; Lieberman, 1996; Wedman, Wedman & Folger, 1999).

In compliance with the research demand of the second research question, descriptive profiles of the teacher-implementers who self-reported at high levels are incorporated here. Seven of the eight teacher-implementers self-reported high or "high" mid-level implementation. All seven were observed utilizing criterion-referenced instruction:

I. Special Education class of English/Language Arts. (high-implementer)

Students in this class were free to choose their seating – either as a group at tables or in regular desks. T1 distributed wireless laptop computers to her students and demonstrated the use of

Alpha Smart for electronic portfolios. This step-by-step process allowed for questions and answers with her students. She then moved about the classroom providing assistance and encouraging creativity. Student handouts and the chalk board delineated the performance criteria (rubrics) for the week's writing assignments (Baker & Brown, 1980; Grabinger, 1996; Katims, Diem & Carlson, 1997; Kish, Sheehan, Cole, Struyk & Kinder, 1997; Marra & Jonassen, 2002).

II. Advanced Placement English/Language Arts. (high-implementer)

T2 guided the discussion of the performance criteria necessary for an essay of the novel *Demian* by Herman Hesse. The rubric for this assignment was distributed prior to the class observed. T2 guided a discussion of the performance criteria for an exam on the same novel. She then facilitated an in-depth discussion of the novel as well as interpretations and analyses of themes. Students were asked to verbally reflect upon and synthesize plot and character development; T2 solicited student opinions and feelings concerning the book. Finally, students provided a thumbnail sketch of their understanding of required preparation for the essay and the exam. T2 directed attention to the rubric and solicited student comprehension; she provided continual feedback and correction (where needed) through out the class period (Andrade, 2000; Baker & Brown, 1980; Lieberman, 1996; Palincsar, 1986; Perkins, 1991; Stiggins, 1999).

III. Honors Biology (high implementer)

Students were seated at lab tables in small groups; the rubric for the day's activities/experiments was distributed prior to the class observed. Each table group received a "your mission, should you accept it" card with the class period's assignments. T3 promoted an inquiry into the evidence of oxygen gas release and subsequent conclusions drawn from the lab experiments. Students were required to rely on and communicate prior knowledge, integrate the new

information and demonstrate comprehension. T3 repeatedly checked for understanding and facilitated each table group (Palincsar & Brown, 1984; Paris & Winograd, 1990; Slavin, 1991; Wedman, Wedman & Folger, 1999).

IV. Special Education class of English/Language Arts: Team-teaching (one high-implementer, one mid-level implementer)

T4 (female) and T5 (male) exhibited a well balanced sharing of teaching responsibilities, communication and interaction with their students. Students received handouts with the rubric for the day's reading and writing assignment. Students read silently for ten minutes. T5 guided vocabulary building and student use of pocket dictionaries. T4 checked for comprehension. T4 asked students to verbally summarize, interpret and analyze the reading. These activities were followed by an animated reading from T5. Although the day's assignment was difficult for the students, the majority were highly engaged and communicative (Andrade, 2000; Baker & Brown, 1980; Chinien & Boutin, 2001; Darling-Hammond, Ancess & Falk, 1995).

V. Forensic Science ("high" mid-level implementer)

Students arrived for class with their handmade models of crime scenes and corresponding research papers due that day. Each student arrived with evidence of completed assignments. The rubric for the week's assignment was distributed two days prior to the observed class period. T6 began with a "think outside the box" exercise for solving homicides, suicides or accidental deaths. These exercises were similar to riddles and the students collaborated to solve each aloud. When the exercise was completed, this class asked to solve more. The day's lesson involved knowledge building in chromatography and sepsis. Functioning as a collaborative group, the students utilized an extensive medical vocabulary. The expertise demonstrated by this class belied the amount of time spent together – the fifth week of school. T6 taught with enthusiasm

and her students responded in kind. She provided positive feedback and correction (where needed). For especially thoughtful answers, she doled out treats. Following the lesson, those students scheduled to present their crime scenes and research spoke for approximately ten minutes each (Corno, 1987; Darling-Hammon, Ancess & Falk, 1995; Palincsar & Brown, 1984; Wedman, Wedman & Folger, 1999).

VI. Statistics (mid-level implementer)

This class was held in the library's computer room; each student was seated at an individual computer. The learning activity for this class period involved entering numerical data from the previous assignment. T7 distributed the rubric and illustrated instructions for using Microsoft Excel. He demonstrated the use of Excel from his computer onto a large screen at the front of the room. The students and T7 maintained continuous communication; questions, answers and discussion of the day's learning activity kept everyone on task. After the demonstration, T7 circulated through the room reinforcing concepts and student understanding (Chi, Glaser & Rees, 1982; Corno, 1987; Grabinger, 1996; Marra & Jonassen, 2002; Wedman, Wedman & Folger, 1999).

Three of the four non-implementers demonstrated knowledge of their subject-matter. The two math teachers (one advanced placement; one regular algebra) engaged their students in lively competition to solve equations aloud. Both men entertained, and captured the interest of, their students through the use of humor, mock disbelief and playful teasing. Students who understood the day's lesson participated fully. Neither of these two teachers checked for student understanding from non-participating students.

The third non-implementer delivered a brilliant sociology lecture concerning vigilante justice and practices. Ten minutes into her lecture however, seven students were asleep. She

attempted to re-capture their attention by poking them in the ribs. As soon as she returned to the lectern, the students resumed sleeping. Though out her animated and interesting lecture, students passed notes to each other or whispered. Two students managed to maintain a card game through out the entire class period.

Without question, the aforementioned three teacher-subjects demonstrated intelligence and preparation of their lessons. Further, these teacher-participants expressed a genuine concern and caring for their students.

Thus, the second research question has been answered. The results of the observation and interview process indicated that the actual levels of implementation verified the self-reported levels of implementation on the Scoring Rubrics Inventory.

CHAPTER V

SUMMARY

Introduction

The past four decades of educational psychology and cognitive research reveal a significant concentration on understanding expertise, organized hierarchial knowledge structures and higher-order thinking skills. The acquisition of complex, executive cognitive skills and how to measure and teach them is further emphasized by this nation's demands for higher standards of achievement, as mandated in the No Child Left Behind Act of 2001. Learning *how* to learn has become paramount in the twenty-first century.

Educational reform designed to meet the ever-increasing intellectual demands of economic globalization and rapidly changing technological advances relies heavily on a restructured curricula of criterion-referenced performance assessments. Today's schools are tasked with the creation of learning-communities that produce effective problem-solvers and reflective decision-makers. Criterion-referenced performance assessments, such as scoring rubrics, both directs teaching practices and measures student progress toward standards through an emphasis on increased development of cognitive functions. Specifically targeted are the strategies and skills of executive cognitive functions. Complex decision-making, problem-solving, interpreting and integrating information, self-regulation and self-assessment are considered executive functions of metacognition.

Metacognition is the deliberate and conscious control of one's thought processes. It is an awareness of: one's knowledge base; organization and planning; the utilization of problem solving strategies; and the ability to self-assess and self-correct. Considered an important

component of intelligence and understanding, metacognition plays a major role in criterion-referenced performance and academic success.

Scoring rubrics are noted for promoting the development of improved metacognitive skills. High levels of scoring rubrics implementation require teacher regulation of: organization and planning; instructional strategies that promote cognitive development; reflective decision-making and evaluation of the effectiveness of classroom practices. Metacognition is the governing agent of every aspect of the process. Most importantly, teachers are expected to teach these same cognitive and self-regulatory functions to their students. Through a complex process of making students aware of effective strategies for problem-solving, and communicating the characteristics of thinking, teachers foster independent, self-regulated learning. This ability to self-regulate and teach students how to self-regulate and self-assess is predicated on *self-awareness.*

If effective learning strategies and skills are core aspects of intelligence necessary for competent performance and these strategies are to be acquired through learning experiences and examples of procedural modeling, then teacher cognition could not be more critical in the current assessment-centered educational environment. Research indicates that regardless of the quality of the professional development training or how much "hands-on" practice is offered in seminars and workshops, the fact remains that staff development does not automatically translate into the implementation of proven, effective instructional practices. Teachers, especially secondary school teachers, are often unaware of the underlying mental structures of the more advanced knowledge domains promoted in criterion-referenced performance curricula.

A small percentage of U.S. faculty, twenty-five percent, indicate that professional development has a positive impact on their teaching practices and improved student achievement (Wenglinsky, 2002). Training in higher-order thinking skills however, may not accompany each and every professional development program. Yet there are teachers who successfully implement educational innovations delineated in staff development. Further, they do so without school or district support or social dialogue with colleagues. It appears they "came to the table" with something more or different than their professional peers. The results of this study indicate that the difference lies in their self-awareness and metacognitive knowledge.

Research literature of educational psychology and metacognition assert that metacognitive skills are central to proficient learning (Applebee, 1978; Baker 1979; 1989; Baker & Brown, 1980; Bereiter & Bird, 1985; Brown, Campione & Day, 1981; Jacobs and Paris, 1987; Palincsar & Brown, 1984; Paris & Jacobs, 1984). This research emphasizes self-awareness as a pre-requisite for procedural strategies, self-regulatory control and self-assessment. At the heart of much of the literature are two tenets: 1) individuals who are metacognitively aware out-perform those who are not; 2) low-performing learners who are taught metacognitive strategies and skills improve performance achievement. Today's teachers require the necessary metacognitive knowledge and skills for implementing educational initiatives and the ability to teach and model both. This study was predicated on the research assertions that metacognition and its attendant skills are critical to the successful application of performance-achievement instruction. The results of this study provide data and interpretations identifying the significant relationships between the metacognitive awareness of secondary school core-subject teachers and the successful implementation of criterion-referenced performance assessments known as scoring rubrics.

The main focus of this investigation was to determine the consistency of the Scoring Rubrics Inventory (SRI) and the relationships, if any, to the Metacognitive Awareness Inventory (MAI). Developed specifically for this study, the SRI consists of six factors of five levels of implementation drawn from the researcher-developed Rubric of Teacher Implementation of Scoring Rubrics (Arter & McTighe, 2001; Darling-Hammond, Ancess & Falk, 1995; Glatthorn, 1999; Jonassen, Peck & Wilson, 1999; Roy & Hord, 2003; Wiggins & McTighe, 1998) located in Appendix D. Schraw and Dennison's (1994) two-factor MAI (located in Appendix A) consists of fifty-two items of five levels of awareness distributed across eight components of metacognition. Together, along with a consent form, the SRI and the MAI were distributed to the core teaching faculty of three high schools in a large school district in Southwest Louisiana.

Out of one hundred-ninety-six core-subject teachers from the three high schools, one hundred-eleven received packets containing the consent form and both self-report instruments. Of the one hundred-eleven, eighty-two packets were completed. Of the eighty-two, fourteen were eliminated as outliers on the SRI. Of the remaining sixty-eight (N=68) voluntary participants, eighteen teacher-participants self-reported as high implementers of scoring rubrics, thirty-nine as mid-level implementers and eleven as low-level implementers. From the sixty-eight teacher-participants, twelve sample-subjects were randomly selected by an outside rater for double blind observations and interviews.

Pearson Product Moment correlations between the Scoring Rubrics Inventory and the Metacognitive Awareness Inventory, and the double blind observations and interviews of sample subjects established the consistency and stability of the Scoring Rubrics Inventory. Additionally, the findings of this study support the research hypothesis:

H_1: There is a significant correlation between the metacognitive awareness of secondary school core-subject teachers and their successful implementation of scoring rubrics.

This chapter discusses the implications of the statistical and qualitative findings of the study with respect to the order of the research questions: 1) Is there a relationship between the Scoring Rubrics Inventory and the Metacognitive Awareness Inventory? 2) How do the self-reported levels of implementation compare to the actual levels of implementation as noted in observations and interviews? Limitations of the study and recommendations for future study are included, followed by the conclusion.

Statistical Implications

One of the most significant findings of the study is the consistency of the Scoring Rubrics Inventory. Developed specifically for this study, the SRI is capable of indicating implementation levels of scoring rubrics. Statistical analyses confirms significant and expected correlations between the Scoring Rubrics Inventory and the Metacognitive Awareness Inventory. Pearson Product Moment correlations reveal five significant pairings using an alpha level .05. The five correlations include three of the eight MAI subscales: Procedural Knowledge (.331); Conditional Knowledge (.268); and Evaluation (.283). The first two subscales, Procedural Knowledge and Conditional Knowledge, are subsumed under the fourth significant correlation, Knowledge of Cognition (.279).

The final, and most significant statistical correlation reveals that the MAI as a whole significantly correlates with the SRI (.253). Thus, the overall significant correlation between the two instruments exceeds that of the individual parings within and is expected. Expectations of positive correlations rely on the similarities between the two instruments. The SRI measures

implementation levels of scoring rubrics in general and not the implementation levels of a specific subject or discipline. Likewise, the fifty-two items of the MAI focus on an individual's general awareness of metacognitive knowledge and cognitive skills as opposed to the awareness of the metacognitive knowledge of a specific domain such as mathematics or reading (Pintrich, Wolters & Baxter, 2000; Schraw & Dennison, 1994). According to Pressley and Wharton-McDonald (1997), general learning strategies, self-regulation, monitoring, self-assessment and critical examination are viewed to be the most important.

These findings are consistent with the theoretical assumptions of metacognition, and the cognitive executive functions necessary for the successful implementation of criterion-referenced assessment instruction. The necessity of transforming performance-assessment criteria into intentional learning instructional practices requires the metacognitive strategies and skills described in research literature. This literature describes Knowledge of Cognition (Declarative, Procedural and Conditional) and Regulation of Cognition (Planning, Organizing, Monitoring, Debugging and Evaluation) as the two main components of the construct metacognition (Baker & Brown, 1980; Brown, 1987; Jacobs & Paris, 1987).

According to Anderson (1995), "Procedural Knowledge originates in a problem" (p.239) and the process utilized to find the solution requires an awareness of the cognitive procedures of *how*. The act of "transforming the original problem into another phase or new problem state is called 'operator'"(p.238). For teacher-implementers, the problem-solving operators, or the sequence of "states", identify the search for a solution. The problem of designing intentional learning activities through the use of scoring rubrics begins with what criteria will be utilized to measure student performance and understanding. The process of *how* to measure knowledge and skill acquisition is followed by *how* to get the information across to a classroom of students of

varying abilities and skills. Finally, teacher-implementers are faced with *how* to model the strategies and skills necessary for proficient learning. Anderson states further that problem-solving operators are acquired through either discovery, instructions of *how to*, or observing successful problem-solving. Intentional learning instructional practices incorporate all three.

Strategies of *when* to utilize the *how* strategies and *why* they are used define Conditional Knowledge (.268). The modeling, scaffolding and facilitating of when to use certain procedures and why leads to more elaborate processing and increases an individual's cognitive resources (Bereiter & Bird, 1985; Brown, 1987). Further, an individual's metacognitive awareness of his/her cognitive knowledge and knowledge of the strategies necessary to reach a performance goal are developed in social context through reciprocal dialogue with an adult and/or peers (Bandura, 1977; Brown, Collins & Duguid, 1989; Vygotsky, 1962). Teacher-implementers who maintain a continuous dialogue with their students, directing, scaffolding and modeling strategy use are engaged in Conditional Knowledge. To reiterate, the subscales of Procedural Knowledge, Conditional Knowledge and Declarative Knowledge are identified as the components of Knowledge of Cognition (.279)(Brown, 1987; Jacobs& Paris, 1987).

The third subscale correlation, Evaluation (.283), refers to the analytical examination of the operational strategies utilized to solve a problem. The learner's assessment of what worked and what did not in the process of completing a performance task (problem-solving) is highly beneficial to the encoding and retrieval of knowledge, strategies and skills information (Bereiter & Bird, 1985; Brown, Collins & Duguid, 1989; Flavell, 1976; Palinscar, 1986). In the case of implementing educational initiatives, "learner" refers to the teacher as well. Critical examination of the procedures utilized in instructional practices allows for modifications to better meet student developmental needs.

Statistical results not expected in the study concern the lack of statistical correlation between the SRI and the remaining five MAI subscales: Declarative Knowledge, Planning, Organizing, Debugging and Monitoring. Considerable planning, organizing and monitoring is necessary for performance achievement instruction as well as assessing and making available needed resources. Teacher-implementers draw upon their knowledge of the subject content to be learned and the strategies and skills required for successful performance or correction. The absence of statistical correlation between the two instruments on these subscales is explained somewhat by Schraw and Dennison (1994).

Whereas Schraw and Dennison's (1994) experiments with the MAI reveal similar results, their findings are tied to the use of the Nelson Denny reading comprehension tests. In two studies of college students and the Nelson Denny, Schraw and Dennison "found no statistical relationship between monitoring accuracy and the MAI" (p.471). They posit two explanations for this unexpected finding: 1) "a high degree of within group variability" (p.471-472); and 2) the automated reading skills of older students reduces "the individual differences in monitoring accuracy" (p.472). Schraw and Dennison posit further that the predictive validity of the MAI may increase when used to measure difficult cognitive tasks. High implementation levels of scoring rubrics represent the performance of sophisticated and complex tasks, yet the statistical findings of the MAI in this study reflect findings similar to the automated tasks of reading comprehension.

Implications of Qualitative Findings

In the absence of other data, the lack of correlations between the two instruments on all eleven pairings could conceivably call into question the consistency of the Scoring Rubrics

Inventory. The results of the double blind interviews and observations however, support the stability and trustworthiness of the instrument.

The findings of the qualitative data confirm there are teachers who implement educational innovations successfully regardless of whether or not they have received professional development training. The continued and successful use of scoring rubrics by teacher-implementers in the sample population lends credence to the effectiveness of metacognitive awareness and its attendant skills. This is especially significant in light of the fact that the three highest implementers and one "high" mid-level implementer of the eight teacher-implementers in the sample population received no professional development training in scoring rubrics. These teacher-implementers spent time on-line getting acquainted with scoring rubrics to understand the value of criterion-referenced assessment, modify the sample rubrics to their discipline, and exercise adoption. Further, in spite of the emphasis placed on the innovation, there has been no significant reinforcement from either the state, system or school leadership for those persons who received training.

The non-implementers in the sample population fault, unanimously, the professional development training they received, and/or the quality of its delivery for not utilizing scoring rubrics. Their inability to grasp the cognitive strategies necessary for criterion-referenced instruction or their lack of commitment to the innovation negatively impacts their students' acquisition of performance-evidence knowledge and skills. Low or non-implementers who are unaware of the underlying mental structures of the more advanced knowledge domains promoted by criterion-referenced performance curricula cannot teach the learning strategies identified for deliberate and conscious intellectual competency (Behar-Horenstein, Pajares & George, 1996;

Bransford, Brown & Cocking, 1999; Gorrell & Capron, 1990; Graber 1998; Hunter-Blanks, Ghatala, Pressley & Levin, 1988; Mosenthal & Ball, 1992). It is important to note that the non-implementers in the sample population have received the same professional development training as their colleagues who praised the training provided.

Seven of the eight teacher-implementers were observed utilizing scoring rubrics. Consistent with research literature and the observed practices of these teachers, clearly defined criteria provide a common understanding of performance expectations. Collaborative discussions of the performance criteria demonstrates not only increased communication, but also intensive interaction. The clarity of the performance-evidence expressed in the rubrics enable students to govern and assess achievement efforts thereby building cognitive and metacognitive proficiency (Arter & McTighe, 2001; Darling-Hammond, Ancess & Falk, 1995; Wiggins, 1998). Further, criterion-referenced assessments promote educational equity: 1) by allowing students to demonstrate their abilities through various means; 2) by eliminating or reducing subjective grading practices. Teacher-implementers express greater confidence in grading complex assignments.

Strategies crucial to performance achievement such as complex decision making, problem solving, interpreting and integrating new information, self-regulation and self-assessment are considered executive functions of cognition. Seven of the eight teacher-implementers utilize metacognitive knowledge in their instructional practices and at times include multimedia use. In particular, the use of wireless laptops in Special Education English/Language Arts classes promotes better cognitive skills at a more rapid pace

than traditional drill and practice instruction (Grabinger, 1996; Katims, Diem & Carlson, 1997; Kish, Sheehan, Cole, Struyk & Kinder, 1997; Marra & Jonassen, 2002; Puntambekar & de Boulay, 1997; Spaulding & Lake, 1992). Computer use in the classroom engages the student and as a result the learner spends more time on task and in communication with the teacher and peers. Software programs for reading comprehension and skilled writing, spell check, dictionaries, encyclopedias and desktop publishing tools create student awareness of cognitive abilities and improve performance. The active effort to solve the discrepancies between expected performance and actual knowledge and skills reflects the ultimate learning process as the learner attempts to make sense of his/her world.

Consistent with research literature, the teacher-implementers of the study's sample subjects model metacognitive knowledge and skills; their students learn by observing successful knowledge and skill use. Cognitive modeling, think aloud reasoning on the part of the teacher, is a powerful technique for transmitting superior thinking skills (Dewey, 1910;1938a; Gorrell & Capron, 1990; Lehrer& Schauble, 2000). The process demonstrates what constitutes desired performance knowledge and skills (Brown, 1987; Brown, Collins & Duguid, 1989).

The seven implementers effectively teach their students *how* to learn, and *how* to think about thinking through reciprocal teaching and whole-class discussions (Bereiter & Bird, 1985; Bower, 1974; Cooper, Horn & Strahan, 2005; Palinscar & Brown, 1984). These teachers utilize phrases and questions indicative of conscious development of metacognitive strategies such as: "tell me how"… "how would you plan?"… "what do you interpret?"…"why didn't that work?". In doing so, the implementers function as both leaders of the discussion, and where correction is required or significant information needs reiterating, respondents. As teacher-implementers query students with statements of: "show me how"…"tell me what"…"interpret"…

"analyze…summarize" they force students to monitor and assess comprehension thereby promoting improved student comprehension and retention (Baker & Brown, 1980). For example, the Forensic Science students demonstrate evidence of improved dialogue through the extensive medical vocabulary they understand and use appropriately. According to Perkins (1991), when students review and assess thought processes during a task or engage in pre or post evaluation, they are thinking about thinking.

Whole-class or small group collaborative learning and dialogue directly develop problem-solving strategies and skills (Dewey, 1938b). Further, cognitive development is determined by language (Vygotsky, 1962). Teacher-implementers scaffold and facilitate collaborative groups in their classrooms and foster continuous communication with their students. Within this social context, students represent various cognitive abilities. Through collaboration, higher-ability students within the groups also model strategies and skills that promote a deeper understanding and more effective learning experience for the group (Artzt & Armour-Thomas, 1992; Choi and Hannifin, 1995; Finn & Rock, 1997; Greeno, 1997).

The repeated checks for student understanding, the coaching, scaffolding, facilitating, feedback and correction (where needed), coupled with demonstrated strategies for monitoring and assessing cognitive processes, assist students in recognizing their own thought patterns. Throughout the process, students and teacher-implementers build their knowledge base and skills. This is recognition of how to think and increased self-evaluation. The ability to teach students the underlying structures of metacognitive knowledge facilitates self-awareness of their cognitive processes and as a result, provides improved control over their learning and

performance. Improved performance achievement highlights the value of metacognitive knowledge for learners thereby promoting the incorporation of successful strategies (Baker & Brown, 1980).

Implications for Teacher Education and School Leaders

The majority of the teacher-participants in this study self-reported acceptable to high levels of implementation. The findings of the study suggest that teacher-participants who do not implement either cannot implement scoring rubrics or lack commitment to the innovation. The information gleaned from this study could assist in maximizing the impact of scoring rubrics on improved student achievement by identifying those persons who require additional professional development training. Additionally, the study could be utilized to re-examine the current assumptions, structure and delivery of professional development training in scoring rubrics. Appropriate training in metacognitive knowledge and skills (procedural strategies and explicit explanation and modeling) conveys understanding and should receive more consideration when planning educational experiences for faculty. Self-directed learning begins with the teachers' ability to take control of his/her learning. Teachers who understand performance targets and their value design more effective instructional experiences.

The pressure to meet external accountability mandates can lead to superficial incorporation of criterion-referenced assessment – as in Graduate Exit Exam (GEE) preparation only. The study's findings could provide valuable insight toward understanding what constitutes meaningful adoption.

Limitations and Recommendations for Future Research

Future studies should consider a selective subset of the correlated items from the SRI and the MAI. The issue of measuring evidence of self-regulatory skills and monitoring accuracy with a single, easy-to-use, self-report instrument remains a challenge for metacognitive research. To separate metacognitive knowledge and skills into distinct subscales is necessary for understanding how they function and are acquired. The ability to measure them as separate from each other may not be feasible.

It is not possible to state at this time that the Scoring Rubrics Inventory is a valid and reliable instrument. Numerous trials are necessary to establish the status of validity; simultaneous utilization with other instruments in research studies could determine validity as well. It is possible to state that in the context of this study and the findings thereof, the SRI is consistent and capable of measuring implementation levels of scoring rubrics.

Future studies should consider a larger population, sample and observational size. Other statistical measures should be considered as well. For example, regression analyses and the general linear model would allow for an understanding of the relationships among the various correlations and variables in the study and would provide equations that could be used to predict basic outcomes. Then further research could examine the values added by various innovative training formats and the differentiation of in-service instruction and professional development based on the metacognitive awareness and operational strategies necessary for criterion-referenced assessment implementation.

It is recommended that the state, school systems and school leadership maintain a consistent professional development program in scoring rubrics. Based on sample-subject's

responses, scoring rubrics has not been addressed by professional staff development programs in several years or in pre-service education and training.

It is recommended that educational leadership implement differentiated staff development and/or peer staff development. A peer tutoring program coupled with a summer continuing education program, for those persons who self-report low or non implementation levels, would address the operational and procedural knowledge and skills necessary for a metacognitive curriculum.

This study is limited to adults employed in a specific profession, work environment and geographic location. The results of the study therefore, may not be generalizable to adults employed in other professions or educational programs.

Due to the time constraints of the school day and the numerous tasks involved in the research process, this study did not incorporate student perspectives of the implementation of scoring rubrics. Larger more extensive studies should consider the inclusion of student perspectives of performance achievement instruction.

Conclusion

The results of this study suggest that the Scoring Rubrics Inventory is consistent and capable of indicating implementation levels of scoring rubrics by secondary school core-subject teachers. In Pearson Product Moment correlations between the SRI and the Metacognitive Awareness Inventory, five correlations prove to be significant. The most significant being the overall correlation between the two instruments.

The findings of this study also indicate that secondary school teachers who successfully implement scoring rubrics possess a metacognitive awareness that transcends professional development training. As relevant and successful as professional development programs have

become, there remain individuals who don't understand or commit to proven educational initiatives. For low and non-implementers, professional development training does not include adequate operational knowledge and skills of complex-performance assessments.

The promise of increased student achievement through educational reform is delivered still-born if teachers do not know how to implement complex instructional practices and sophisticated analysis of student performance. Metacognitive awareness is crucial to the adoption and application of proven educational initiatives. Teachers who successfully implement criterion-referenced instruction transfer to their students the metacognitive knowledge and skills of *how* to learn. In doing so, they increase the cognitive resources and skills necessary not only for performance achievement, but also for life-long learning.

REFERENCES

Anderson, J.R. (1995). *Cognitive psychology and its implications.* New York: W.H. Freeman

Anderson, J.R., & Schunn, C.D. (2000). Implications of the ACT-R learning theory. In R. Glaser (Ed.), *Advances in instructional psychology: Educational design and cognitive science, Vol.5* (pp. 1-35). Mahwah, NJ: Lawrence Erlbaum.

Andrade, H.G. (2000). What do we mean by results? Using rubrics to promote thinking and learning. *Educational Leadership, 57*(5), 13-18.

Applebee, A.N. (1978). *The child's concept of story.* Chicago: University of Chicago Press.

Arter, J., & McTighe, J. (2001). *Scoring rubrics in the classroom: Using performance criteria for assessing and improving student performance.* Thousand Oaks, CA: Corwin Press Inc.

Artzt, A.F., & Armour-Thomas, E. (1992). Development of a cognitive – metacognitive framework for protocol analysis of mathematical problem solving in small groups. *Cognition and Instruction, 9*(2), 137–175.

Baker, L. (1979). Comprehension monitoring: Identifying and coping with text confusions. *Journal of Reading Behavior, 11*(4), 365-375.

Baker, L. (1989). Developmental change in readers' responses to unknown words. *Journal of Reading Behavior, 21*(3), 241-261.

Baker, L., & Brown, A.L. (1980). *Metacognitive skills and reading.* (Technical Report No. 143). Urbana, Il: National Institute of Child Health and Human Development. (ERIC Document Reproduction Service No. ED195932)

Baker, L., & Cerro, L.C., (2000). Assessing metacognition in children and adults. In G. Schraw & J.C. Impara (Eds.), *Issues in the measurement of metacognition* (pp. 99-147). Lincoln: Buros Institute of Mental Measurements.

Bandura, A. (1977). *Social learning theory.* Englewood Cliffs, NJ: Prentice Hall.

Behar-Horenstein, L.S., Pajares, F., & George, P.S. (1996). The effect of teachers' beliefs on students' academic performance during curriculum innovation. *The High School Journal, 79*(4), 324-333.

ben Azariah, Rabbi Eleazar. (1988). *The mishnah: A new translation.* Jacob Neusner, Trans. New Haven, CT: Yale University Press. (Original work A.D. 110-135, m. Avot 3.17).

Bereiter, C., & Bird, M. (1985). Use of thinking aloud identification and teaching of reading comprehension strategies. *Cognition and Instruction, 2*(2), 131-156.

Berliner, D.C. (1987). Knowledge is power: A talk to teachers about a revolution in the teaching profession. In D.C. Berliner & B.V. Rosenshine (Eds.), *Talks to teachers* (pp. 3-37). New York: Random House.

Blackwell, P.J. (2003). Student learning: Education's field of dreams. *Phi Delta Kappan, 84* (5), 362-367.

Borkowski, J.G. (1985). Signs of intelligence: Strategy generalization and metacognition. In S.R. Yussen (Ed.), *The growth and reflection in children* (pp.105-140). New York: Academic Press.

Borkowski, J.G., Carr, M., Rellinger, E., & Pressley, M. (1990). Self-regulated cognition: Interdependence of metacognition, attributions, and self-esteem. In B.F. Jones & L. Idol (Eds.), *Dimensions of thinking and cognitive instruction* (pp. 53-92). Hillsdale, NJ: Lawrence Erlbuam.

Borkowski, J.G., Chan, L.K.S., & Muthukrishna, N. (2000). A process-oriented model of metacognition: Links between motivation and executive functioning. In G. Schraw & J.C. Impara (Eds.), *Issues in the measurement of metacognition* (pp. 1-43). Lincoln: Buros Institute of Mental Measurements.

Bower, G.H. (1974). Selective facilitation and interference in retention of prose. *Journal of Educational Psychology,* 66, 1-8.

Bransford, J.D., Brown, A.L., & Cocking, R.R. (1999). How people learn: Brain, mind, experience and school. *National Academy Press.* Retrieved April 24, 2000, from http://books.nap.edu/openbook.php?record_id=6160&page=17

Brown, A. (1987). Metacognition, executive control, self-regulation, and other more mysterious mechanisms. In F. Weinert & R. Kluwe (Eds.), *Metacognition, motivation and understanding* (pp. 65-116). Hillsdale, NJ: Lawrence Erlbaum.

Brown, A.L., Campione, J.C., & Day, J.D. (1981). Learning to learn: On training students to learn from texts. *Educational Research,* 10, 14-21.

Brown, J.S., Collins, A., & Duguid, P. (1989). Situated cognition and the culture of learning. *Educational Researcher*, *17,* 32-42.

Bruner, J.S. (1966). *Towards a theory of instruction.* Cambridge: Harvard University Press.

Case, R. (1978). Piaget and beyond: Toward a developmentally based theory and technology of instruction. In R. Glaser (Ed.), *Advances in instructional psychology, Vol.1* (pp. 167-224). Hillsdale, NJ: Lawrence Erlbaum.

Chi, M.T.H., Glaser, R., & Rees, E. (1982). Expertise in problem solving. In R. Sternberg (Ed.), *Advances in the psychology of human intelligence, Vol. 1* (pp. 17-76). Hillsdale, NJ: Lawrence Erlbaum.

Chinien, C., & Boutin, F. (2001). Qualitative assessment of cognitive-based dropout prevention strategy. *The High School Journal,85*(2), 1-11.

Choi, J., & Hannafin, M. (1995). Situated cognition and learning environments: Roles, structures, and implications for design. *Educational Technology Research and Development,43*(2), 53-69.

Cohen, D.K. (1996). Standards-based school reform: Policy, practice, and performance. In H.F. Ladd (Ed.), *Holding schools Accountable: Performance-based reform in education* (pp. 99-127). Washington, D.C.: The Brookings Institution.

Collins, S. (2003). Industry perspective – Filling educational gaps with online learning: An educationally, economically sound solution. *Technological Horizons in Education Journal, 30*(6), 42-43.

Colton, A.B., & Sparkes-Langer, G.M. (1993). A conceptual framework to guide the development of teacher reflection and decision-making. *Journal of Teacher Education, 44*(1), 45-54.

Cooper, J.E., Horn, S., & Strahan, D.B. (2005). "If only they would do their homework": Promoting self-regulation in high school English classes. *The High School Journal, 88*(3), 10-25.

Corno, L. (1987). Teaching and self-regulated learning. In D.C. Berliner & B.V. Rosenshine (Eds.), *Talks to teachers* (pp. 249-267). New York: Random House.

Darling-Hammond, L. (2000, January 1). Teacher quality and student achievement: A review of state policy evidence. *Education Policy Analysis archives, 8* (1). Retrieved September 7, 2003, from http://epaa.asu.edu/epaa/v8n1

Darling-Hammond, L., Ancess, J., & Falk, B. (1995). *Authentic assessment in action: Studies of schools and students at work.* New York: Teachers College Press.

Dewey, J. (1910). *How we think.* Boston: D.C. Heath.

Dewey, J. (1938a). *Experience and education.* New York: Collier

Dewey, J. (1938b). *Logic: The theory of inquiry.* New York: Holt & Co.

Dewey, J. (1958). *Philosophy of education: Problems of men.* Totowa, NJ: Littlefield, Adams.

Dixon, R.A., Hultsch, D.F., & Hertzog, C. (1988). The metamemory in adulthood (MIA) questionnaire. *Psychopharmacology Bulletin, 24*(4), 671-688.

Ertmer, P.A., & Newby, T.J. (1996). The expert learner: Strategic, self-regulated, and reflective. *Instructional Science, 24,* 1-24.

Finn, J.D., & Rock, D.A. (1997). Academic success among students at risk for school failure. *Journal of Applied Psychology, 82*(2), 221-234.

Flavell, J.H. (1971). First discussant's comments: What is memory development the development of? *Human Development, 14,* 272-278.

Flavell, J.H. (1976). Metacognitive aspects of problem solving. In L.B. Resnick (Ed.), *The nature of intelligence* (pp. 231-235). New York: Lawrence Erlbaum.

Flavell, J.H., & Wellman, H. (1977). Metamemory. In R. Krail, Jr., & J. Hegen (Eds.), *Perspectives on the development of memory and cognition* (pp. 3-33). Hillsdale, NJ: Lawrence Erlbaum.

Frederiksen, N. (August 1994). The integration of testing and teaching: Applications of cognitive psychology in instruction. *American Journal of Education*, *102*(4), 527-564.

Gardner, H. (1985). *The mind's new science: A history of the cognitive revolution.* New York: Basic Books.

Gavelek, J.R., & Raphael, T.E. (1985). Metacognition, instruction, and the role of questioning activities. In D.L. Forrest-Pressley, G.E. MacKinnon, & T.G. Waller (Eds.), *Metacognition, cognition, and human performance, Vol. 2* (pp.103-132). Orlando: Academic Press.

Glaser, R. (1987). The integration of instruction and testing. In D.C. Berliner & B.V. Rosenshine (Eds.), *Talks to teachers* (pp. 329-341). New York: Random House.

Glaser, R. (Ed.). (1993). *Advances in instructional psychology, Vol.4.* Hillsdale, NJ: Lawrence Erlbaum.

Glaser, R. (Ed.) (2000). *Advances in instructional psychology: Volume5: Educational design and cognitive science.* Mahwah, NJ: Lawrence Erlbaum.

Glatthorn, A.A. (1999). *Performance standards and authentic learning.* Larchmont, NY: Eye On Education, Inc.

Glesne, C. (1999). *Becoming qualitive researchers: An introduction* (2nd ed.). New York: Longman.

Gooden, A.R. (1996). *Computers in the classroom: How teachers and students are using technology to transfer learning.* San Francisco: Jossey-Bass.

Gordon, C.J., & Braun, C. (1985). Metacognitive processes: reading and writing narrative discourse. In D.L. Forrest-Pressley, G.E. MacKinnon, & T.G. Waller (Eds.), *Metacognition, cognition, and human performance, Vol. 2* (pp. 1-75). Orlando: Academic Press.

Gorrell, J., & Capron, E. (1990). Cognitive modeling and self-efficacy: Effects on preservice teacher's learning of teaching strategies. *Journal of Teacher Education, 41*(4), 15-22.

Graber, K.C. (1998). Implementing pedagogical principles in the absence of operational knowledge: A longitudinal case study examining the influence of teacher education on the instructional behaviors of a high school teacher. *The High School Journal, 81* (3), 140-153.

Grabinger, R.S. (1996). Rich environments for active learning. In D.H. Jonassen (Ed.), *Handbook of Research for Educational Communications and Technology.* (pp. 665-693). New York: Macmillian.

Greeno, J.G. (1997). Theories and practices of thinking and learning to think. *American Journal of Education, 106*(1), 85-126.

Greenwald, R., Hedges, L., & Laine, R. (1996). The effects of school resources on student Achievement. *Review of Educational Research, 66*(3), 361-396.

Guskey, T.R. (1989). Attitude and perceptual change in teachers. *International Journal of Educational Research, 13,* 439-453.

Guskey, T.R. (1997, Spring). Research needs to link professional development and student learning. *National Staff Development Council.* Retrieved December 2, 2003, from http://www.nsdc.org/library/publications/jsd/jsdgusk.cfm

Guskey, T.R. (2003). What makes professional development effective? *Phi Delta Kappan, 84* (10), 748-750.

Hirsh, S. (2003, May). Quality teaching in federal spotlight. *National Staff Development Council.* Retrieved September 12, 2003, from http://www.nsdc.org/library/publications/results/res5-03hirs.cfm

Howard-Ross, D., & Winne, P.H. (1993). Measuring component and sets of cognitive processes in self-regulated learning. *Journal of Educational Psychology, 85* (4), 591-604.

Hunter-Blanks, P., Ghatala, E.S., Pressley, M., & Levin, J.R. (1988). Comparison of monitoring during study and during testing on a sentence-learning task. *Journal of Educational Psychology, 80*(3), 279-283.

Ingvarson, L., & MacKenzie, D. (1988). Factors affecting the impact of in-service courses for teachers: Implications for policy. *Teaching and Teacher Education, 4*(2), 139-155.

Jacobs, J., & Paris, S. (1987). Children's metacognition about reading: Issues in definition, measurement, and instruction. *Educational Psychologist, 22*(3-4), 255-278.

Jonassen, D. H. (1991). Evaluating constructivist learning. *Educational Technology, 31*(9), 33-35.

Jonassen, D.H., Peck, K.L., & Wilson, B.G. (1999). *Learning with technology: A constructivist perspective.* Columbus: Merrill.

Katims, D.S., Diem, R.A., & Carlson, P. (1997). Technological interventions and student attitudes: A case study of secondary students identified as at-risk. *The High School Journal, 80*(4), 95-102.

Kelleher, J. (2003). A model for assessment-driven professional development. *Phi Delta Kappan, 84*(10), 751-756.

Killion, J. (2000, February). Connect adult learning with student learning. *National Staff Development Council.* Retrieved August 12, 2003, from http://www.nsdc.org/library/publications/results/res2-00kill.cfm

Killion, J. (2002). Student achievement, teacher quality, and professional learning. *What works in the high school results-based staff development* (pp. 11-22). National Staff Development Council.

Kish, C.K., Sheehan, J.K., Cole, K.B., Struyk, L.R., & Kinder, D. (1997). Portfolios in the classroom: A vehicle for developing reflective thinking. *The High School Journal, 80*(4), 254-261.

Larkin, J.H. (1983). The role of problem representation in physics. In D. Gentner & A.L. Stevens (Eds.), *Mental models* (pp. 75-98). Hillsdale, NJ: Lawrence Erlbaum.

Lehrer, R., & Schauble, L. (2000). Modeling in mathematics and science. In R. Glaser (Ed.), *Advances in instructional psychology: Volume 5: Educational design and cognitive science* (pp. 101-161). Mahwah, NJ: Lawrence Erlbaum.

Leinhardt, G. (1993). On teaching. In R.Glaser (Ed.), *Advances in instructional psychology, Vol.4* (pp. 8-54). Hillsdale, NJ: Lawrence Erlbaum.

Lieberman, A. (1996). Creating intentional learning communities. *Educational Leadership, 48*(5), 51-55.

Louisiana Department of Education. (n.d.a.). Louisiana's school, district and state accountability system. Retrieved August 12, 2003, from http://www.doe.state.la.us/lde/ssaa/1563.html

Louisiana Department of Education. (n.d.b.). Section 1: The Louisiana educational assessment program leap 21/gee21 2002-2003 annual report. Retrieved August 12, 2003, from http://www.doe.state.la.us/lde/ssaa/1563.html

Louisiana Department of Education. (2000 June). LEAP 21 teacher's guide to state wide assessment: Grades 4, 8, and 10: English language arts. Retrieved March 23, 2003, from http://www/doe.state.la.us/lde/comm/pr.asp?PR=527

Marine, C., & Escribe, C. (1994). Metacognition and competence on statistical problems. *Psychological Reports, 75,* 1403-1408.

Marra, R.M., & Jonassen, D.H. (2002). Transfer effects of semantic networks on expert systems: Mindtools at work. *Journal of Educational Computing Research, 26* (1), 1-23.

Meichenbaum, D., Burland, S., Gruson, L., & Cameron, R. (1985). Metacognitive assessment. In S.R. Yussen (Ed.), *The growth of reflection in children* (pp. 3-27). New York: Academic Press.

Miller, P. (2002). *Theories of developmental psychology* (4th ed.). New York: Worth.

Molnar, A.R. (1997). Computers in education: A brief history. *Technological Horizons in Education Journal, 24*(11), 63-68.

Mosenthal, J.H., & Ball, D.L. (1992). Constructing new forms of teaching; Subject matter knowledge in inservice teacher education. *Journal of Teacher Education,43*(5), 347-356.

Murphy, M. (2000, September). Designing staff development with the system in mind. *National Staff Development Council.* Retrieved August 12, 2003, from http://www.nsdc.org/library/publications/results/res9-00murp.cfm

National Center for Education Statistics. (2000). Percent of public school teachers who participated in professional development activities during the last 12 months that focused on various content areas, by number of hours spent on the activity. Retrieved March 23, 2003, from http://www.nces.edgov/quicktables/Details.aspKey=582

National Commission on Teaching for America's Future. (1996). *What matters most: Teaching for America's future.* New York: Author.

Norton, J. (2001 Summer). Grounded in research. *National Staff Development Council,22* (3), Retrieved December 2, 2003, from http://www/nsdc.org/library/publication/jsd/norton223.cfm

Paez, M. (2003). Gimme that school where everything's scripted!: One teacher's journey Toward effective literacy instruction. *Phi Delta Kappan, 84*(10), 757-763.

Palincsar, A.S. (1986). Metacognitive strategy instruction. *Exceptional Children, 53*(2) 118-124.

Palincsar, A.S., & Brown, A.L. (1984). Reciprocal teaching of comprehension-fostering and comprehension-monitoring activities. *Cognition and Instruction, 1*(2), 117-175.

Paris, S.G. & Jacobs, J.E. (1984). The benefits of informed instruction for children's reading awareness and comprehension skills. *Child Development, 55*(6), 2083-2093.

Paris, S.G., & Winograd, P. (1990). How metacognition can promote academic learning and instruction. In B.F. Jones, & L. Idol (Eds.), *Dimensions of thinking and cognitive instruction* (pp. 15-51). Hillsdale, NJ: Lawrence Erlbaum.

Patton, M.Q. (1990). *Qualitative evaluation and research methods* (2nd ed.). Newbury Park, CA: Sage Publications.

Perkins, D.N. (1991). Technology meets constructionism: Do they make a marriage? *Educational Technology, 31*(5), 18-23.

Piaget J. (1950). *The psychology of intelligence.* (J. Percy & D.E. Berlyne, Trans.). London: Routledge & Kegan Paul L.T.D.

.Piaget, J. (1971). *The language and thought of the child.* New York: World Publishing.

Piaget, J. (1973). *To understand is to invent.* New York: Grossman.

Piaget, J., & Inhelder, B. (1969). *The psychology of the child.* New York: Basic Books.

Pintrich, P.R., & DeGroot, E. (1990). Motivational and self-regulated learning learning components of classroom academic performance. *Journal of Educational Psychology, 82*(1), 33-40.

Pintrich, P.R., Smith, D., Garcia, T., & McKeachie, W. (1993). Predictive validity and reliability of the Motivated Strategies for Learning Questionnaire (MSLQ). *Educational and Psychological Measurement, 53,* 801-813.

Pintrich, P.R., Wolters, C.A., & Baxter, G.P. (2000). Assessing metacognition and self-regulated learning. In G. Schraw & J.C. Impara (Eds.), *Issues in the measurement of metacognition* (pp. 43-99). Lincoln: Buros Institute of Mental Measurements.

Popham, W.J. (1993). *Educational evaluation* (3rd ed.). Boston: Allyn & Bacon.

Pressley, M., & Ghatala, E.S. (1990). Self-regulated learning: Monitoring learning from text. *Educational Psychologist, 25*(1), 19-33.

Pressley, M., & Wharton-McDonald, R. (1997). Skilled comprehension and its development through instruction. *School Psychology Review, 26, 448-466.*

Puntambekar, S., & du Boulay, B. (1997). Design and development of MIST – A system to help students develop metacognition. *Journal of Educational Computing Research, 16*(1), 1-35.

Rebora, A. (2003, August, 6). No child left behind. *Education Week.* Retrieved August 18, 2003, from http://www.edweek.org/context/topics/issuespage.cfm?id=59

Richardson, V. (2003). The dilemmas of professional development. *Phi Delta Kappan, 84* (5), 401-406.

Roy, P., & Hord, S. (2003). *Moving NSDC's staff development standards into practice: Innovation configurations.* Oxford, OH: National Staff Development Council.

Royer, J.M., Cisero, C.A., & Carlo, M.S. (1993). Techniques and procedures for assessing cognitive skills. *Review of Educational Research, 63*(2), 201-243.

Rutherford, L.H., & Grana, S.J. (1995). Retrofitting academe: Adapting faculty attitudes and practices to technology. *Technological Horizons in Education Journal, 23* (2), 82-86.

Schafer, W.D. (2001). Effects of teacher knowledge of rubrics on student achievement in four content areas. *Applied Measurement in Education, 14*(2), 151-171.

Schneider, W. (1985). Developmental trends in the metamemory-memory behavior relationship: An integrative review. In D.L. Forrest-Pressley, G.E. MacKinnon, & T.G. Waller, (Eds.), *Metacognition, cognition, and human performance, Vol.1* (pp. 57-109). New York: Academic Press.

Schraw, G. (2000). Assessing metacognition: Implications of the Buros symposium. In G. Schraw & J.C. Impara (Eds.), *Issues in the measurement of metacognition* (pp. 297-323). Lincoln: Buros Institute of Mental Measurements.

Schraw, G., & Dennison, R.S. (1994). Assessing metacognitive awareness. *Contemporary Education Psychology, 19,* 460-475.

Schraw, G., Dunkle, M.E., Bendixen, L.D., & Roedel, T.D. (1995). Does a general monitoring skill exist? *Journal of Eduational Psychology, 87*(3), 433-444.

Schraw, G., Wise, S.L., & Roos, L.L. (2000). Metacognition and computer-based testing. In G. Schraw & J.C. Impara (Eds.), *Issues in the measurement of metacognition* (pp. 223-262). Lincoln: Buros Institute of Mental Measurements.

Scribner, J.R. (2003, March 28). Teacher learning in context: The special case of rural high school teachers. *Education Policy Analysis Archives, 11*(12). Retrieved September 7, 2003, from http://epaa.asu.edu/epaa/v11n12

Simmons, W., & Resnick, L. (1993). Assessment as the catalyst of school reform. *Educational Leadership, 50*(5), 11-15.

Slavin, R.E. (1991). Synthesis of research on cooperative learning. *Educational Leadership, 48*(5), 71-82.

Spaulding, D.L., & Lake, D. (1992). Interactive effects of computer network and student characteristics on students' writing and collaborating. *The High School Journal, 76* (1), 67-77.

Steinberg, I., Bohning, G., & Chowning, F. (1991). Comprehension monitoring strategies of nonproficient college readers. *Reading Research and Instruction,* 30, 63-75.

Stiggins, R.J. (1999). Assessment, student confidence and school success. *Phi Delta Kappen, 81*(3), 191-198.

Stiggins, R.J. (2002). Assessment crisis: The absence of assessment for learning. *Phi Delta Kappan, 83*(10), 758-765.

Stotsky, S. (1975). Sentence combining as a curricular activity: Its effect on written language development and reading comprehension. *Research in the Teaching of English,* 9, 30-71.

Suarez-Orozco, M. (2005). Rethinking education in the global era. *Phi Delta Kappan*, 87, (3) 209-213.

Swanson, H.L. (1990). Influence of metacognitive knowledge and aptitude on problem solving. *Journal of Educational Psychology, 82*(2), 306-314.

Sykes, G. (1999, Spring). Make subject matter count. *National Staff Development Council.* Retrieved August 12, 2003, from http://www.nsdc.org/library/publications/jsd/sykes202.cfm

Thompson, G.L., Warren, S., & Carter, L. (2004). "It's not my fault": Predicting high school teachers who blame parents and students for student's low achievement. *The High School Journal, 87*(3), 5-15.

Tobias, S. (1995). Interest and metacognitive word knowledge. *Journal of Educational Psychology, 87*(3), 399-405.

Torff, B. (2005). Getting it wrong on threats to teacher quality. *Phi Delta Kappan, 87* (4), 302-305.

Trawick, L., & Corno, L. (1995). Expanding the volitional resources of urban community college. In P.R. Pintrich (Ed.), *Understand self-regulated learning* (pp. 88-108). San Francisco: Jossey-Bass.

Tyler, R.W. (1950). *Basic principles of curriculum and instruction.* Chicago: University of Chicago Press.

U.S. Department of Education. (n.d.). Elementary and secondary education: Part a-improving basic programs operated by local educational agencies. Retrieved February 3, 2004, from http://www.ed.gov/policy/elsec/leg/esea02/pg.2.html

Valverde, G., & Schmidt, W. (1997 Winter). Refocusing U.S. math and science education. *Issues in Science and Technology.* Retrieved January, 23, 2006 from http://www.nap.edu/issues/14.2/schmid.htm

Vygotsky, L.S. (1962). *Thought and language.* Cambridge: Harvard University Press.

Vygotsky, L.S. (1978). *Mind in society.* Cambridge: Harvard University Press.

Wedman, J.F., Wedman, J.M., & Folger, T. (1999). Thought processes in analogical problem solving: A preliminary inquiry. *Journal of Research and Development in Education, 32*(3), 160-167.

Weinstein, C.E., Zimmerman, S., & Palmer, D. (1988). Assessing learning strategies: The design and development of the LASSI. In C.E. Weinstein, E. Goetz, & P. Alexander (Eds.), *Learning and study strategies: Issues in assessment, instruction, and evaluation* (pp. 25-40). San Diego: Academic Press.

Wenglinsky, H. (2000). *How teaching matters: Bringing the classroom back into discussions of teacher quality.* Princeton, NJ: Milken Family Foundation and Educational Testing Service.

Wenglinsky, H. (2002 February). How schools matter: The link between teacher classroom practices and student academic performance. *Education Policy Analysis Archives, 10*(12), Retrieved September 7, 2003, from http://epaa.asu.edu/epaa/v10n12/

Westerman, D.A. (1991). Expert and novice teacher decision making. *Journal of Teacher Education, 42*(4) 292-305.

Wiggins, G.P. (1993). *Assessing student performance: Exploring the purpose and limits of testing.* San Francisco: Jossey-Bass.

Wiggins, G. (1998). *Educative assessment: Designing assessments to inform and improve student performance.* San Francisco: Jossey-Bass.

Wiggins, G. & McTighe, J. (1998). *Understanding by design.* Alexandria: Association for Supervision and Curriculum Development.

Wlodkowski, R.J. (1999). *Enhancing adult motivation to learn: A comprehensive guide for teaching all adults to learn.* San Francisco: Jossey-Bass.

Zabrucky, K., & Ratner, H.H. (1992). Effects of passage type on comprehension monitoring and recall in good and poor readers. *Journal of Reading Behavior, 24*(3) 373-391.

APPENDICES

APPENDIX A

Metacognitive Awareness Inventory (MAI)
Identification and Definitions of Theoretical Subscales
Questions By Category

METACOGNITIVE ASSESSMENT INVENTORY

We would like you to respond to the questions in this packet by indicating how true or false each statement is about you. If a statement is always true, write the number 5 in the blank provided to the left of each statement. Your responses are scored anonymously, so please answer as truthfully as you can.

ALWAYS FALSE	SOMETIMES FALSE	NEUTRAL	SOMETIMES TRUE	ALWAYS TRUE
1	2	3	4	5

_____ 1. I ask myself periodically if I am meeting my goals.

_____ 2. I consider several alternatives to a problem before I answer.

_____ 3. I try to use strategies that have worked in the past.

_____ 4. I pace myself while learning in order to have enough time.

_____ 5. I understand my intellectual strengths and weaknesses.

_____ 6. I think about what I really need to learn before I begin a task.

_____ 7. I know how well I did once I finish a test.

_____ 8. I set specific goals before I begin a task.

_____ 9. I slow down when I encounter important information.

_____ 10. I know what kind of information is most important to learn.

_____ 11. I ask myself if I have considered all options when solving a problem.

_____ 12. I am good at organizing information.

_____ 13. I consciously focus my attention on important information.

_____ 14. I have a specific purpose for each strategy I use.

_____ 15. I learn best when I know something about the topic.

_____ 16. I know what the teacher expects me to learn.

_____ 17. I am good at remembering information.

_____ 18. I use different learning strategies depending on the situation.

_____ 19. I ask myself if there was an easier way to do things after I finish a task.

_____ 20. I have control over how well I learn.

_____ 21. I periodically review to help me understand important relationships.

_____ 22. I ask myself questions about the material before I begin.

_____ 23. I think of several ways to solve a problem and choose the best one.

_____ 24. I summarize what I've learned after I finish.

_____ 25. I ask others for help when I don't understand something.

_____ 26. I can motivate myself to learn when I need to.

_____ 27. I am aware of what strategies I use when I study.

_____ 28. I find myself analyzing the usefulness of strategies while I study.

_____ 29. I use my intellectual strengths to compensate for my weaknesses.

_____ 30. I focus on the meaning and significance of new information.

_____ 31. I create my own examples to make information more meaningful.

_____ 32. I am a good judge of how well I understand something.

_____ 33. I find myself using helpful learning strategies automatically.

_____ 34. I find myself pausing regularly to check my comprehension.

_____ 35. I know when each strategy I use will be most effective.

_____ 36. I ask myself how well I accomplished my goals once I'm finished.

_____ 37. I draw pictures or diagrams to help me understand while learning.

_____ 38. I ask myself if I have considered all options after I solve a problem.

_____ 39. I try to translate new information into my own words.

_____ 40. I change strategies when I fail to understand.

_____ 41. I use the organizational structure of the text to help me learn.

_____ 42. I read instructions carefully before I begin a task.

_____ 43. I ask myself if what I'm reading is related to what I already know.

_____ 44. I re-evaluate my assumptions when I get confused.

_____ 45. I organize my time to best accomplish my goals.

_____ 46. I learn more when I am interested in the topic.

_____ 47. I try to break studying down into smaller steps.

_____ 48. I focus on overall meaning rather than specifics.

_____ 49. I ask myself questions about how well I am doing while I am learning something new.

_____ 50. I ask myself if I learned as much as I could have once I finish a task.

_____ 51. I stop and go back over new information that is not clear.

_____ 52. I stop and reread when I get confused.

METACOGNITIVE SCALES

KNOWLEDGE OF COGNITION:

1. Declarative Knowledge: knowledge about learning and one's cognitive skills and abilities

2. Procedural Knowledge: knowledge about how to use strategies

3. Conditional Knowledge: knowledge about when and why to use strategies

REGULATION OF COGNITION:

1. Planning: planning, goal setting, and allocating resources.

2. a) Organizing: implementing strategies and heuristics that help one manage information

   b) Information Management: organizing, elaborating, summarizing, and selectively focusing on important information

3. Monitoring: on-line assessment of one's learning or strategy use

4. Debugging: strategies used to correct performance errors or assumptions about the task or or strategy use

5. Evaluation: post-hoc analysis of performance and strategy effectiveness

QUESTIONS BY CATEGORY

DK. Items	5, 10, 12, 16, 17, 20, 32, 46	(8)
PK. Items	3, 14, 27, 33	(4)
CK. Items	15, 18, 26, 29, 35	(5)
PL. Items	4, 6, 8, 22, 23, 42, 45	(7)
Str. Items	9, 13, 30, 31, 37, 39, 41, 43, 47, 48	(10)
Mo. Items	1, 2, 11, 21, 28, 34, 49	(7)
DB. Items.	25, 40, 44, 51, 52	(5)
Ev. Items	7, 19, 24, 36, 38, 50	(6)

APPENDIX B

Human Participant Protections Education for Research Teams Certificate
University Committee for the Protection of Human Subjects in Research Certificate
Letter of Consent For Adults
Copyright Permission

National Cancer Institute
U.S. National Institutes of Health | www.cancer.gov

Search

NCI Home | Cancer Topics | Clinical Trials | Cancer Statistics | Research & Funding | News | Ab

Human Participant Protections Education for Research Tea

Completion Certificate

This is to certify that

paula pucheu

has completed the **Human Participants Protection Education for Research Teams** online course, sponsored by the National Institutes of Health (NIH), on 03/21/2007.

This course included the following:

- key historical events and current issues that impact guidelines and legislation on human participant protection in research.
- ethical principles and guidelines that should assist in resolving the ethical issues inherent in the conduct of research with human participants.
- the use of key ethical principles and federal regulations to protect human participants at various stages in the research process.
- a description of guidelines for the protection of special populations in research.
- a definition of informed consent and components necessary for a valid consent.
- a description of the role of the IRB in the research process.
- the roles, responsibilities, and interactions of federal agencies, institutions, and researchers in conducting research with human participants.

National Institutes of Health
http://www.nih.gov

University Committee for the Protection of Human Subjects in Research
University of New Orleans

Form Number: 05jan07

(please refer to this number in all future correspondence concerning this protocol)

Principal Investigator: Charles Gifford, Professor
Paula Pucheu, Graduate student

Department: Curriculum and Instruction **College:** Education

Project Title: An investigation of the relationships between the levels of implementation of scoring rubrics and the levels of metacognitive awareness in secondary school teachers

Dates of Proposed Project Period From 3.1.07 to 5.1.07

Approval Status:

☐ Full Board Review ☑ Approved Date: 4/5/07

☑ Expedite ☐ Deferred Date:

☐ Exempt ☐ Disapproved Date:

☐ Project requires review more than annually. Review every _____ months.

approval is for 1 year from approval date only and may be renewed yearly.

1st continuation Signature of IRB Chair Date:

2nd continuation Signature of IRB Chair Date:

3rd continuation Signature of IRB Chair Date:

4th continuation Signature of IRB Chair Date:

Committee Signatures:

Laura Scaramella, Ph.D. (Chair)
James Evans, LCSW
Pamela Jenkins, Ph.D.
Isabelle Maret, Ph.D.
Ann O'Hanlon, Ph.D.
Richard B. Speaker, Ph.D.
Kari Walsh
Kathleen Whalen, LCSW

Version 2.2 9/7/2006

College of Education and Human Development
Department of Curriculum and Instruction
Letter of Consent For Adults

Dear Teacher:

I am a graduate student studying under the direction of Professor Charles S. Gifford, Ed.D in the College of Curriculum and Instruction at the University of New Orleans. I am conducting a research study of the correlations between the scores on the Metacognitive Awareness Inventory and the scores on a scoring rubrics inventory. Specifically, my main focus is to validate an instrument I developed called the Levels of Implementation of Scoring Rubrics Inventory and identify any relationships between the two instruments utilized in the study.

I am requesting your participation, which will involve completing two self-report surveys of approximately ten to fifteen minutes each. Additionally, you may become one of the participants selected to be observed in one of your class periods followed by a fifteen minute interview at your convenience. The observations and interviews will involve teachers of all levels on the surveys. All materials and data collected in this study will be kept confidential.

Your participation in this study is voluntary. You are free to choose not to participate or withdraw from the study at any time without penalty to your employment. Your identity will be kept confidential as the study will examine all teacher responses in aggregate. The results of the study may be published, but your name will not be used.

Although there may be no benefit to you personally, the possible benefit of your participation may contribute to existing professional development programs.

If you have any questions concerning this research study, I can be reached at (337) 550-1212. Or you may contact Dr. Charles S. Gifford through his e-mail address: cgifford@uno.edu.

Sincerely,

Paula M. Pucheu

By signing below you are giving consent to participate in the above study.

_____	_____	_____
Signature	Printed Name	Date

If you have any questions about your rights as a subject/participant in this research study, or if you feel you have been placed at risk, please contact Dr. Richard Speaker at the University of New Orleans (504) 280-6607.

Paula M. Pucheu
15 Gov. Edwards Dr.
Crowley, La. 70526

October 16, 2007

Dr. Gregory Schraw
UNLV, MS 3003
4505 Maryland Parkway
Las Vegas, NV 89154

Dear Dr. Schraw,

This letter confirms our recent communication. I am completing a doctoral dissertation at the University of New Orleans that investigates the relationships between the Metacognitive Awareness Inventory and a Scoring Rubrics Inventory I developed. I would like your permission to reprint in the appendices of my dissertation the Metacognitive Awareness Inventory and your "Identification and Definitions of Theoretical Scales".

The requested permission extends to any future revisions and editions of my dissertation, including non-exclusive world rights in all languages, and to the prospective publication of my dissertation by UMI Company. These rights will in no way restrict republication of the material in any other form by you or by others authorized by you. Your signing of this letter will also confirm that you own the copyright to the above-described material.

If these arrangements meet with your approval, please sign this letter where indicated below and return it to me in the enclosed return envelope. Thank you for your time and consideration.

Sincerely,

Paula M. Pucheu

Paula M. Pucheu

PERMISSION GRANTED FOR THE USE REQUESTED ABOVE:

Dr. Gregory Schraw

DATE: Oct. 22, 2007

APPENDIX C

Scoring Rubrics Inventory

SCORING RUBRICS INVENTORY

Instructions

This instrument is intended to allow you the opportunity to describe your class(es) with regard to the implementation of scoring rubrics. It will not be used for reporting individual data in anyway, manner, shape or form. I am studying teacher profiles collectively. Each of the six concepts or factors are identified here. I would like you to rate yourself by circling the top most line of the description that best applies to you.

SCORING RUBRICS INVENTORY

I. Knowledge of Benchmarks and Content Standards:
Please circle the top line of one of the following as it most applies to you.

Due to repeated examinations, I have a thorough understanding of mandated Benchmarks (Grade Level Expectations) and Content Standards. I consider the standards crucial to the planning, execution, and evaluation of learning objectives. In concert with the state's standards-driven assessments, I have received, and value, professional development training in scoring rubrics. I continue to examine the evaluative dimensions of quality performance in criterion-referenced assessments.

I have developed a sufficient understanding,
and continue to review mandated Benchmarks (GLE's) and Content Standards. I refer to them frequently in order to plan the year's lessons. Due to the adoption of standards-driven assessments by the state, I value the professional development
training I have received in scoring rubrics. I continue to review the evaluative dimensions of quality performance in criterion-referenced assessments.

I have a working knowledge of the mandated Benchmarks (GLE's) and Content Standards. I refer to them as needed, especially during exit exam preparation. I value the professional development training I received in scoring rubrics, as the state has moved to standards-driven assessments. I refer to the components of quality performance contained in criterion-referenced assessments.

I am familiar with the mandated Benchmarks (GLE's) and Content Standards. While I am concerned with the skills and knowledge students should learn in a given subject area, I am not obsessed with them. I may or may not have received training in scoring rubrics several years ago. I possess some knowledge of criterion-referenced assessments, but I prefer the testing system I have utilized for several years.

I have received copies of the Benchmarks (GLE's) and the Content Standards. I'm aware of their location should I want to refer to them. I believe that students should strive for the knowledge and skills in a given subject area, but it is not possible to guarantee every student's success just because it's mandated. I may or may not have received training in scoring rubrics several years ago, but I have not been impressed with criterion-referenced assessments.

II. Knowledge of Subject Content:

Please circle the top line of one of the following as it most applies to you.

Due to the research and preparation required for criterion-referenced assessments and instruction, I have acquired a broad and thorough understanding of the subject-content I teach. The adaptation and integration of scoring rubrics has resulted in an ever-increasing knowledge and skills acquisition. The move to scoring rubrics has been a relatively smooth one.

The preparation required for authentic learning and assessment has provided a much deeper understanding of the subject-content I teach. I have experienced no real problems adapting and integrating scoring rubrics. I have realized ever-increasing knowledge and skills from the incorporation of scoring rubrics.

I possess and demonstrate a breadth of knowledge of the subject-content I teach. I am certain of my abilities to explain and describe new concepts in my subject-area and those promoted by scoring rubrics. I incorporate and utilize scoring rubrics with some regularity, and especially during exit exam preparation.

I am quite knowledgeable of the subject(s) I teach, and I am confident of my abilities to explain and demonstrate the concepts contained in the assigned textbook. I am familiar with the new standards-driven assessments and with scoring rubrics, but I do not feel it necessary to incorporate them at this time.

I am more than knowledgeable of the subject(s) I am responsible for, especially considering the grade level(s) I teach. I am certainly capable of describing clearly any instructions for daily activities, worksheets, handouts, etc. I find that the assigned text more than adequately covers the information necessary for a broad understanding of the subject-area and I rely on it.

III. Teaching/Learning Objectives Development:

Please circle the top line of one of the following as it most applies to you.

I establish long-term teaching/learning objectives of deep content knowledge and utilize research-based, sequenced instructional strategies that promote intentional learning. I introduce and explore complex concepts through hands-on, problem-based, guided learning experiences. Performance tasks are designed in clear, intellectually challenging, manageable components of scoring rubrics. I am confident of my abilities in the adaptation and integration of scoring rubrics into my teaching/learning objectives.

I establish teaching objectives of in-depth content knowledge utilizing sequenced instructional strategies that promote improved student learning. I stay abreast of research-based instructional strategies that are disseminated by the district/ school. My learning objectives are created ahead of time and include the introduction and exploration of complex concepts. Performance tasks of guided inquiry are selected and then delineated in clear, challenging, manageable components of scoring rubrics. I am confident of my abilities in adapting and integrating scoring rubrics in my objectives.

I create lesson plans of the subject-content to be taught and describe appropriate instructional delivery methods and activities. My lesson plans are developed prior to teaching the targeted unit and, at times, include authentic learning activities/ experiences. Scoring rubrics are utilized to delineate expected performance criteria and guide student learning. The rubrics are developed for six weeks projects and exit exam preparation. I plan to incorporate the knowledge and skills I have gained into future objectives.

I record and follow the lesson objectives of the assigned textbook. Instructional activities in my class focus on the skills and facts necessary for student progress as outlined in the curriculum guide. At times, lesson plans are recorded after instruction has taken place in order to accurately reflect classroom activities and the material covered. I incorporate an abbreviated version of scoring rubrics for exit exam preparation only, and this is recorded in the lesson plans of that month.

My lesson plans usually come from the unit objectives delineated in the assigned text. I find the text objectives appropriate to the subject-content I teach. My instructional methods focus heavily on the much needed drill and practice of the basic skills and facts necessary to complete the unit. Exit exam preparation reviews are incorporated into regular classtime. There is not enough time in the school day for elaborate lesson plans, therefore scoring rubrics are not included in my teaching objectives.

IV. Instructional Delivery:

Please circle the top line of one the following as it most applies to you.

The performance targets delineated in scoring rubrics require intentional diversification of my instructional delivery. Authentic learning experiences promote instructional strategies that very to accommodate student needs and elevate academic proficiencies. In the role of facilitator, I guide and support the development of performance skills and higher-order thinking through problem-based experiences, increased communication and continuous feedback.

I utilize a variety of instructional strategies aligned with learning outcomes based on the standards and performance criteria contained in scoring rubrics. To help students meet performance targets and improved achievement levels, I coach them in extensive, hands-on, problem-based learning experiences. My guidance and support includes descriptive learning outcomes, continuous feedback and follow-up.

I utilize a combination of traditional and authentic instructional strategies that are aligned with learning outcomes. My instructional strategies and delivery are based on the required standards and, at times, are in concert with scoring rubrics performance targets. I deliver increased guidance and engage in increased communication with students during the utilization of the rubrics, and especially during exit exam preparation. I provide feedback and follow-up.

My instructional delivery methods include a variety of activities described in the text and are aligned with unit objectives. Note-taking, worksheets, handouts, and short papers help students internalize correct information and answers, thus I focus on the information and skills necessary for student progress. I provide abbreviated scoring rubrics for exit exam reviews. I believe that all students can learn, but that depends largely on how hard they are willing to work.

I use a variety of instructional tools designed for quick and accurate feedback and student evaluation. Worksheets, quizzes and handouts are aligned with the objectives delineated in the text. Study time is provided in class. I maintain a quiet and disciplined classroom. I provide drill and practice sessions for exit exam reviews based on the questions most likely to be asked. I have found that if more parents made education a priority in their homes, then maybe more students would want to succeed.

V. Assessment Methods:

Please circle the top most line of one of the following as it most applies to you.

I design and utilize criterion-referenced assessments based on the performance targets clearly described in scoring rubrics. I am pleased that scoring rubrics promote a systematic reliability and consistent evaluative judgments of authentic learning experiences. A variety of formal (Benchmark tests) and informal assessments (homework, projects, papers, etc.) are utilized as well. The resulting test data guides my intervention measures and subsequent instruction.

I develop and utilize scoring rubrics in my assessment of intentional learning experiences. I find that the rubrics provide a more reliable evaluation of student performance and replaces subjective grading. This consistency assures that students, teacher, and parents know the assessment targets. I utilize a variety of formal (Benchmark tests) and informal assessments (homework, papers, projects, etc.). The assessment information highlights skills attained and problem-areas, and determines follow-up measures.

Various assessment measures are utilized in my classroom, both formal (Benchmark tests) and informal (projects, papers, homework, etc.). I utilize scoring rubrics for out-of-class projects and exit exam preparation. I continue to maintain that improved student learning is a priority, thus assessment scores pin-point areas of missed objectives that require follow-up. I provide intervention aimed at increased student achievement.

I utilize both formal (Benchmark tests) and informal (quizzes, homework, unit exams, etc.) assessments. My exams and tests are primarily concerned with the knowledge and information contained in the unit studied. Drill and practice sessions help students memorize definitions and check their learning. All assessments, and the occasional out-of-class paper, are rated on a 100 point scale.
I utilize test results as a guide for what should be stressed in class next year.

I use both formal (Benchmark tests) and informal (homework, quizzes, exams, etc.) assessments. I find that end of secion quizzes and end of unit tests, taken from the assigned text, are excellent assessment vehicles because they test directly the student's knowledge of what has been studied. My reviews for exit exams focus on the questions most likely to be asked from the subject-content and include several drill and practice sessions in class.

VI. Intervention and Remediation:

Please circle the top most line of one of the following as it most applies to you.

I develop and provide individual and class-as-a-whole intervention and/or remediation. The results from formal and informal assessments determine the type of intervention necessary and the length of time required for improved student understanding. Immediate feedback on the implementation of new skills is provided during class; missed objectives are re-taught by creating exercises or problems "on-the-spot". Additional learning opportunities are realized in collaborative groups of mixed-ability students.

I develop and provide class-as-a-whole intervention and individual remediation when necessary. The type of intervention selected is based on the results of formal and informal assessments. I provide feedback in a timely manner and re-teach missed components to facilitate improved student achievement. Small. collaborative learning groups are formed to assist student understanding and attainment of performance targets. I also provide immediate feedback on the implementation of new skills.

I provide feedback and remediation as an instructional intervention for the class-as-a-whole based on their assessment and assignment scores. Occasionally, I utilize pre-packaged materials that are keyed to subject-content objectives for remediation. I usually re-teach some aspect or part of a new concept or skill that students misses. I stay after school to before school, or during lunch to help students who lag behind.

I always review test results with the entire class within a few days of the test's return. Test answers that are incorrect are briefly explained and sometimes a re-test is administered. The results of benchmark tests are utilized to highlight needed instructional focus for next year.

I review test results with the students usually within a few days of the test's return. I make certain that unit testing is accomplished within each six weeks grading period. Student questions of test items are answered, but there is not enough classtime available to bring slow students "up-to-speed". I do incorporate extra practice sessions for the exit exam.

APPENDIX D

Rubric of Teacher Implementation of Scoring Rubrics

Rubric of Teacher Implementation of Scoring Rubrics

I. Knowledge of Benchmarks and Content Standards

Ideal 5	**Acceptable 4**	**Acceptable 3**	**Unacceptable 2**	**Unacceptable 1**
Repeatedly examines mandated Benchmarks (Grade Level Expectations) and Content Standards. Considers the standards crucial to the planning, execution and evaluation of learning objectives. Is thoroughly familiar with standards-driven assessments, and values professional development training received in scoring rubrics. Continues to examine the evaluative dimensions of quality performance in criterion-referenced assessments (Arter & McTighe, 2001; Glatthorn, 1999; Roy & Hord, 2003.	Has developed a sufficient understanding, and continues to review mandated Benchmarks (GLE's) and Content Standards. Refers to them frequently in order to plan the year's lessons. Is familiar with the state standards-driven assessments, and values professional development training received in scoring rubrics. Continues to review the evaluative dimensions of quality performance in criterion-referenced assessments.	Is cognizant of, and has a working knowledge of the mandated Benchmarks (GLE's) and Content Standards. Refers to them as needed, especially during exit exam preparation. Is cognizant of the state standards-driven assessments, and values the professional development training received in scoring rubrics. Refers to the components of quality performance in criterion-referenced assessments when they are utilized.	Is cognizant of, and is familiar with the mandated Benchmarks (GLE's) and Content Standards. Is somewhat concerned with the knowledge and skills students should learn in a given subject-area. May or may not have received professional development training in scoring rubrics several years ago. Possesses some knowledge of criterion-referenced assessments, but does not utilize or refer to them. Prefers to use the same tests/exams used for several years.	Has received copies of the Benchmarks (GLE's) and Content Standards. May or may not have received professional development training in scoring rubrics. Does not have a working knowledge of either the standards or scoring rubrics. Is not particularly concerned with the knowledge and skills students should learn in a given subject-area. Has little regard for learner outcomes, student progress, or quality teaching measures.

Rubric of Teacher Implementation of Scoring Rubrics

II. Knowledge of Subject Content

Ideal 5	Acceptable 4	Acceptable 3	Unacceptable 2	Unacceptable 1
Engages in the research and preparation required for successful implementation of criterion-referenced assessments and instruction. Has a broad and thorough understanding of the subject content. Demonstrates the capacity and confidence to integrate new concepts and skills. Recognizes increased professional knowledge and skills acquisition (Darling-Hammond, Ancess & Falk, 1995; Wiggins & McTighe, 1998).	Engages in the research and preparation required for authentic learning experiences and assessment. Has a deeper understanding of the subject-content. Demonstrates the capacity to adapt and integrate scoring rubrics into the classroom. Recognizes increased professional knowledge and skills acquisition.	Maintains and demonstrates a breadth of knowledge and skills of the subject-content responsible for teaching. Has the ability to explain and describe the components of scoring rubrics when utilized. Integrates scoring rubrics with some regularity. Recognizes professional knowledge and skills acquisition.	Maintains and demonstrates a working knowledge of the subject-content. Capable of explaining and demonstrating concepts delineated in the assigned textbook. Is aware of the kinds of concepts promoted in scoring rubrics, but chooses not to engage in the preparation necessary for their use. Is completely comfortable with professional knowledge and skills.	Maintains and demonstrates a superficial knowledge of subject-content. Believes more than enough information and material is covered in the assigned textbook and relies solely on it. Does not explain concepts delineated in the text, nor demonstrates the ability to do so. Is indifferent to the need for improved professional knowledge and skills.

Rubric of Teacher Implementation of Scoring Rubrics

III. Teaching/Learning Objectives Development

Ideal **5**	**Acceptable** **4**	**Acceptable** **3**	**Unacceptable** **2**	**Unacceptable** **1**
Establishes long-term teaching/learning objectives of deep content knowledge and utilizes research-based, sequenced instructional strategies that promote intentional learning. Introduces and explores complex concepts through hands-on, problem-based, guided learning experiences. Performance tasks are designed in clear, intellectually challenging, manageable components of scoring rubrics. Is confident of abilities to adapt and integrate scoring rubrics into teaching/ learning objectives (Arter & McTighe, 2001; Glatthorn, 1999; Roy & Hord, 2003).	Establishes teaching/ learning objectives of in-depth content knowledge utilizing sequenced instructional strategies that promote improved student learning. Stays abreast of research-based instructional strategies that are disseminated by the district/school. Learning objectives are created ahead of time and include the introduction and exploration of complex concepts. Performance tasks of guided inquiry are selected and then delineated in clear, challenging, manageable components of scoring rubrics. Is confident of incorporation of scoring rubrics into objectives.	Creates lesson plans of the subject-content to be taught and describes appropriate instructional delivery methods and activities. Lesson plans are developed prior to teaching the target Unit and occasionally includes authentic learning Activities and experiences. Scoring rubrics are utilized to delineate expected performance criteria and Guide student learning. Said rubrics are developed for six weeks projects and exit exam preparation. Plans to incorporate new knowledge and skills into Future teaching/learning objectives.	Records and follows the lesson objectives from the assigned textbook. Instructional activities focus on the basic skills and facts necessary for student progress as out-lined in the curriculum guide. Lesson plans are usually noted after instruction has taken place due to lack of planning and preparation for sequenced instruction. Is somewhat concerned with general and specific learner outcomes. Notes the utilization of scoring rubrics for exit exam preparation. Likes to demonstrate knowledge acquisition and opinions.	Lesson plans are recorded verbatim from the unit objectives delineated in the assigned textbook. Maintains no regard for content knowledge or sequenced instructional planning. Primary purpose of lesson plans is to stress the importance of the facts of the subject-content. Is not concerned with either general or specific learner outcomes or improvement and therefore does not consider them in the development of teaching/ learning objectives.

Rubric of Teacher Implementation of Scoring Rubrics

IV. Instructional Delivery				
Ideal	**Acceptable**	**Acceptable**	**Unacceptable**	**Unacceptable**
5	**4**	**3**	**2**	**1**
Intentionally diversifies instructional strategies and delivery to assist students in reaching the performance targets contained in scoring rubrics. Promotes instructional strategies of authentic learning experiences that vary to accommodate student needs and elevate academic proficiencies. Facilitates, guides, and supports the development of performance skills and higher-order thinking through problem-based experiences, increased communication, and continuous feedback (Arter & McTighe, 2001; Roy & Hord, 2003; Wiggins & McTighe, 1998).	Utilizes a variety of instructional strategies aligned with learning outcomes based on the required standards and performance criteria contained in scoring rubrics. Provides intentional learning experiences that vary to meet student needs and increase academic proficiencies. Facilitates and guides the development of performance skills and understanding. Supports intentional learning with descriptive learning outcomes, continuous feedback and follow-up.	Utilizes a combination of traditional instructional strategies and authentic learning strategies that are aligned with learning outcomes. Instructional strategies and delivery are based on the required standards and, at times, in concert with scoring rubrics performance targets. Provides increased guidance and engages in increased communication with students, especially during six-weeks projects and exit exam preparation. Provides feedback and follow-up.	Uses instructional strategies that engage students in activities that are not necessarily aligned with learning outcomes. Exhibits an over-reliance on the assigned textbook, its suggestions and worksheets. Introduces and stresses basic skills. Occasionally provides general student learning outcomes for new activities. Utilizes abbreviated versions of scoring rubrics for exit exam preparation. Makes no instructional changes to support students who lag behind.	Does not use instructional strategies that promote or engage students in learning activities that are aligned with performance targets. Exhibits an over-reliance on the assigned textbook and busywork. Is more concerned with classroom management than teaching. Does not provide expected learning outcomes nor expected results. Does not adequately articulate instructions necessary for student understanding and proficiency. Is not cognizant of performance-based assessment/instruction. Does not utilize scoring rubrics for instruction or exit exam preparation.

Rubric of Teacher Implementation of Scoring Rubrics

V. Assessment Methods

Ideal 5	Acceptable 4	Acceptable 3	Unacceptable 2	Unacceptable 1
Designs and utilizes criterion-referenced assessments based on the performance targets clearly described in scoring rubrics. Is confident of the systematic reliability and consistent evaluative judgements of scoring rubrics. Utilizes a variety of formal (Benchmark tests) and informal assessments (homework, projects, papers, presentations, etc.). Utilizes the resulting data to guide intervention and remediation measures, and subsequent instruction(Arter & McTighe, 2001; Darling-Hammond, Ancess, & Falk, 1995; Wiggins & McTighe, 1998).	Developes and utilizes criterion-referenced assessments based on the performance targets clearly described in scoring rubrics. Believes scoring rubrics provide a more reliable evaluation of student performance and replaces subjective grading. Utilizes a variety of formal(Benchmark tests) and informal (homework, papers, projects, etc,) assesments. Utilizes test results to guide intervention and remediation measures and subsequent instruction.	Utilizes various assessment measures, both formal (Benchmark tests) and informal (homework, paper, and projects). Utilizes scoring rubrics for out-of-class projects and papers, and for exit exam preparation. Gives student learning and improvement priority status and utilizes assessment scores to highlight areas of missed objectives. Provides intervention and follow-up.	Uses formal (Benchmark tests) and informal (home-work, quizzes, unit exams) assessments. All assessments administered in class and the occasional out-of-class paper or project are graded on a 100 point scale. Utilizes abbreviated versions of scoring rubrics for exit exam preparation. Utilized drill and practice sessions and requires students to memorize facts and information for exams. Uses test results to plan drill and practice sessions for the next year.	Uses a variety of informal (quizzes, exams, home-work, etc.) assessments. Exhibits and over-reliance on the section and end-of-unit exams from the assigned textbook. Exams are concerned with the facts and information memorized from the unit studied. Utilizes drill and practice sessions for exit exam preparation. Does not utilize test results to guide future instruction or instructional planning. Does not provide intervention measures or remediation.

Rubric of Teacher Implementation of Scoring Rubrics

VI. Intervention and Remediation

Ideal 5	Acceptable 4	Acceptable 3	Unacceptable 2	Unacceptable 1
Develops and provides individual and class-as-a-whole intervention and/or remediation. Utilizes the results from formal and informal assess-ments to determine the type of intervention necessary and the length of time required for improved student under- standing. Provides immediate feedback on the implementation of new skills during class; reteaches missed objectives by creating exercises or problems "on-the-spot". Additional learning opportunities are provided in collaborative groups of mixed ability students (Darling- Hammond, Ancess & Falk, 1995; Jonassen, Peck & Wilson, 1999).	Develops and provides class-as-a-whole intervention and individual remediation when necessary. Utilizes the results from formal and informal assessments to determine the type of inter-vention necessary and the length of time required for improved student learning. Provides feedback in a timely manner, and reteaches missed components to facilitate improved student achievement. Utilizes small collaborative groups to assist student understanding, skills acquisition and attainment of performance targets. Provides immediate feedback on the implementation of new skills.	Provides feedback and remediation as instructional intervention for the class-as-a-whole. Utilizes results from formal and informal assessments and assignments to determine when and how long to revisit a concept or skill. Utilizes pre-packaged materials keyed to subject-content objectives for remediation. Makes time for re-teaching some aspect or part of a missed new concept or skill. Incorporates extra practice sessions where needed. Willing to stay after school to tutor students who lag behind, if asked.	Reviews test results for class-as-a-whole within a few days of the administered exam. Intervention and remediation consists of brief explanations of incorrect test answers. Re-administers some exams if the majority of the students' scores are too low. Views Benchmark tests with a "single-event" mindset and prepares students from repeated practice sessions. Utilizes results from Benchmark tests to prepare for the next year. Has some regard for class- as-a-whole progress.	Reviews test results with students usually within a few days of the test's return. Occasionally provides brief explanations of incorrect test answers. Does not provide intervention or remediation. Administers a number of tests, but does nothing with the results. Does not view poor results as the teacher's respon-sibility. Believes there is not enough time available to bring slow learners "up-to-speed". Believes that some students just aren't capable of learning and thus deserve poor grades.

APPENDIX E

Observation of Scoring Rubrics Implementation
Observation Check List of Scoring Rubrics Implementation
Interview Questions for Implementers

Observation of Scoring Rubrics Implementation

Assignment expectations are clearly identified in rubric and explained by the teacher.

Teacher use of knowledge-level questions; recall of facts.

Teacher use of higher-cognitive questions; requires students to think, apply, interpret, analyze, synthesize, create, reflect and self-assess.

Checks for understanding; requires students to demonstrate an understanding of the content and procedures through explanation, comparison and contrast, summarizing, etc.

Provides feedback and acknowledgement of student work products.

Provides guided correction and critiques student work; guides, probes, restates, etc.

Allows for student initiation of discussion and questions.

Makes use of collaborative groups, technological resources, etc.

Observation Check List of Scoring Rubrics Implementation

Has a broad and thorough understanding of the subject content. Demonstrates the capacity and confidence to integrate new concepts and skills.

Has a deeper understanding of the subject-content. Demonstrates the capacity to adapt and integrate scoring rubrics into the classroom

Maintains and demonstrates a breadth of knowledge and skills of the subject content responsible for teaching. Has the ability to explain and describe the components of scoring rubrics when utilized. Integrates scoring rubrics with some regularity.

Maintains and demonstrates a working knowledge of the subject content. Capable of explaining and demonstrating concepts delineated in the assigned text. Is aware of the kinds of concepts promoted in scoring rubrics, but does not implement them appropriately. Is not comfortable with the use of scoring rubrics.

Intentionally diversifies instructional strategies and delivery to assist students in reaching the performance targets contained in scoring rubrics.

Utilizes a variety of instructional strategies aligned with learning out-comes based on the required standards and performance criteria contained in scoring rubrics.

Utilizes a combination of traditional instructional strategies and authentic learning strategies that are aligned with learning out-comes.

Uses instructional strategies that engage students in activities that are not necessarily aligned with learning out-comes.

Promotes instructional strategies of authentic learning experiences that vary to accommodate student needs and elevate academic proficiencies in concert with scoring rubrics performance targets.

Provides intentional learning experiences that vary to meet student needs and increase academic proficiencies in concert with scoring rubrics performance targets.

Instructional strategies and delivery are based on the required standards and are somewhat in concert with scoring rubrics performance targets.

Exhibits an over-reliance on the assigned textbook, its suggestions and worksheets. Introduces and stresses basic skills; occasionally provides general student learning out-comes for new activities.

Facilitates, guides and supports the development of performance skills and higher-order thinking through problem-based experiences, increased communication, and continuous feedback.

Facilitates and guides the development of performance skills and understanding. Supports intentional learning with descriptive learning out-comes, continuous feedback and follow-up.

Provides increased guidance and engages in increased communication with students, especially during six-weeks projects and exit exam preparation. Provides feedback and follow-up.

Utilizes abbreviated versions of scoring rubrics for exit exam preparation. Makes no instructional changes to support students who lag behind.

Designs and utilizes criterion-referenced assessments based on the performance targets clearly described in scoring rubrics. Utilizes a variety of formal and informal assessments. Utilizes the resulting data to guide intervention and remediation measures, and subsequent instruction.

Develops and utilizes criterion-referenced assessments based on the performance targets clearly described in scoring rubrics. Utilizes a variety of formal and informal assessments. Utilizes test results to guide intervention and remediation measures and subsequent instruction.

Utilizes various assessment measures, both formal and informal. Utilizes scoring rubrics for out-of-class projects and papers, and for exit exam preparation. Utilizes assessment scores to highlight areas of missed objectives. Provides intervention and follow-up.

Uses formal and informal assessments. All assessments administered in class and the occasional out-of-class paper or project. Utilizes abbreviated versions of scoring rubrics for exit exam preparation. Uses drill and practice sessions, requires students to memorize facts and information for exams. Uses test results to plan drill and practice sessions.

Provides immediate feedback on the implementation of new skills during class; reteaches missed objectives by creating exercises or problems "on the spot". Additional learning opportunities are provided in collaborative groups.

Provides feedback in a timely manner, and reteaches misses components. Utilizes small groups to assist student understanding, skills acquisition, and attainment of performance targets.

Utilizes pre-packaged materials keyed to subject-content objectives for remediation. Makes time for re-teaching some aspect or part of a missed concept or skill. Incorporates extra practice sessions where needed.

Re-administers some exams if the majority of the students score low. Prepares students from repeated practice sessions. Has some regard for class-as-a-whole progress.

(Andrade, 2000; Arter & McTighe, 2001; Darling-Hammond, Ancess, & Falk, 1995; Glatthorn, 1999; Jonassen, Peck, & Wilson, 1999; Roy & Hord, 2003; Wiggins & McTighe, 1998)

Interview Questions (Implementers)

- Briefly describe the training you received in scoring rubrics and your opinion of the quality of the training you received.

- Do you revisit scoring rubrics in your professional training days at least once a year?

- How often do you utilize scoring rubrics and has your opinion changed any since you have applied them?

- Are they utilized in the assessment of all assignments or just in certain situations?

- What are your perceptions of the implementation and application of scoring rubrics and how have they changed your instructional delivery?

- How has the application of scoring rubrics impacted student performance in your classroom?

- What, if any, changes have you made in your perceptions of your teaching abilities since the application of scoring rubrics?

- What do you perceive scoring rubrics is supposed to accomplish?

APPENDIX F

Table 2

Means and Standard Deviations of the Metacognitive Awareness Inventory and the Scoring Rubrics Inventory

Instrument Name	Mean	Standard Deviation
MAI Knowledge of Cognition	4.2344	.40442
MAI Regulation of Cognition	4.1202	.42555
MAI Declarative Knowledge	4.2426	.40799
MAI Procedural Knowledge	4.2206	.56239
MAI Conditional Knowledge	4.2324	.41410
MAI Planning	3.9769	.60840
MAI Strategies	4.1750	.45330
MAI Monitoring	4.0861	.47805
MAI Debugging	4.4029	.44854
MAI Evaluation	4.0000	.48783
MAI All	4.1575	.39218
SRI	19.88	4.477

Table 3

Pearson Product Moment Coefficients of the Metacognitive Awareness Inventory and the Scoring Rubrics Inventory

Instrument Name	Correlation Coefficients
SRI * MAI DK (Declarative Knowledge)	.190
SRI * MAI PK (Procedural Knowledge)	.331*
SRI * MAI CK (Conditional Knowledge)	.268*
SRI * MAI Plan (Planning)	.150
SRI * MAI Strt (Strategies)	.445
SRI * MAI Moni (Monitoring)	.217
SRI * MAI Debg (Debugging)	.160
SRI * MAI Eval (Evaluation)	.283*
SRI * MAI KOFC (Knowledge of Cognition)	.279*
SRI * MAI ROFC (Regulation of Cognition)	.217
SRI * MAI	.253*

Note. * $p<.05$

Vita

Paula M. Pucheu earned a Bachelor of Arts in History from the University of Louisiana at Lafayette in 1986. She received her Master of Arts in History from the University of Louisiana at Lafayette in 1989 and completed her Doctor of Philosophy in Curriculum and Instruction from the University of New Orleans in May 2008.

Pucheu has worked as the Academic Coordinator and Social Studies teacher in a high school enrichment program known as Upward Bound at Louisiana State University at Eunice for eighteen years and later as the Coordinator of the Academic Assistance Center. Her area of specialty has been increased performance achievement of at-risk students.

Pucheu is a member of Phi Delta Kappa International, Who's Who Among America's Teachers, Who's Who Historical Society, and the International Who's Who of Professional Management. She is currently serving on the Curriculum and Courses Committee at Louisiana State University at Eunice and conducts workshops in research writing for Student Support Services. Previous committee appointments include chair of the Americans with Disabilities Act committee on the LSUE campus and chair of the LSUE Thirtieth Anniversary committee - a retrospective through photographs, music, technology, timeline events and fashion.