Improving Teaching Practices through Action Research

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Abstract

This study investigated teachers' perceptions of the influences of action research on their thinking about instructional practices and the impact of this thinking on teaching practices. The four specific areas of investigation were teachers' perceptions about (a) the overall teacher role, (b) teachers' knowledge about teaching, (c) teaching practices, and (d) reflective practices. The data were collected from interviews with teacher researchers, informal classroom observations, and collection of teacher and student work and related artifacts. The data revealed that teachers perceived changes in the four areas of investigation. Engaging in the stages of action research provided teachers with a methodical structure for implementing and analyzing the teaching and learning process. This defined structure guided teachers through more systematic and conscious data collection, data analysis, and reflection.

DEDICATION

This manuscript is dedicated to my late grandmother, Alice Wood, who continues to guide me with her courageous spirit.

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CHAPTER 1: INTRODUCTION

Context for the Inquiry

School reform efforts with specific emphasis on reforming the profession of teaching began in the 1980s with the publication of two reports, *The Carnegie Report, A Nation Prepared: Teachers for the 21st Century* (1986); and *Tomorrow's Teachers: A Report of the Holmes Group* (1986). The publication of these reports began to raise public awareness of the necessity for changes to the teaching profession. Later in 1996, the National Commission on Teaching and America's Future, published *What Matters Most: Teaching for America's Future* which again focused educational reform efforts on teacher improvement. One assumption reported pertaining to teaching practices and student performance was, "What teachers know and can do are the most important influences on what students learn" (p. vi).

As educational reform efforts continue into the twenty-first century, the shift towards teaching must continue. Sirotnik (1989) stated,

> In attempting, therefore, to sustain whatever is left that is positive in this decade of educational reform, it must not be forgotten where the ultimate power to change is and always has been in the heads, hands, and hearts of the educators who work in our schools. True reform must go where the action is (p.109).

We must continue to ask questions about how to improve the profession of teaching. What makes teachers successful at improving instructional practices? What kinds of thinking and decision-making underlie their practice? Engaging teachers in the process of raising questions and answering questions about how to improve the practice of teaching is essential.

The Problem

Almost twenty years ago Johnson and Johnson (1984) stated, "We are in a period of educational crisis, with a wide discrepancy between the instructional methods used in schools and those verified by research as most effective" (p. 2). One must ask why there is still such a disconnect between theory and practice when there is even more pressure on teachers to perform than ever before.

One response to the problem focuses on changing our schools' learning environment to promote staff development opportunities such as action research and

reflective teaching. "If teacher research is concerned with the practical wisdom of professional teachers, their voices and their articulation of the reality of understanding students and schools, then those voices have to be heard across the academy" (Hollingsworth & Sockett, 1994, p. 17). Perhaps then educators can begin to shift the paradigm of implementing routine instructional customs to more innovative instructional practices that are grounded in practitioner research.

Similarly, Johnson (1993) stated, “The future directions of staff development programs, teacher preparation curricula, as well as school improvement initiatives, will be impacted by the things teachers learn through the critical inquiry and rigorous examination of their own practice and their school programs that action research requires” (p. 2). Empowering teachers to examine their own practice through classroom based inquiry will provide a significant step towards the reform of teaching overall. Guskey (2000) also focused on teachers as the key to successful reform and stated, “The overwhelming majority of educators are thoughtful, inquiring individuals who are inclined to solve problems and search for answers to pressing questions. The inquiry/action research model of professional development provides them with opportunities to do just that” (p. 26).

Another significant aspect of teacher research is its potential as a means of bridging the gap between scholars and practitioners. Hollingsworth & Sockett (1994) described teacher research not as a passing trend but as being instrumental in creating the groundwork and vision needed to further "professionalize teaching and rethink . . . schools" (p. 17). Similarly, Oja and Pine (1989) stated that teachers who engage in the process of action research become more critical and reflective about their own practice. Teachers’ capability of being more critical is grounded in their research. Therefore, teachers can substantiate their practices in practitioner-based research.

Action Research is characterized by five spiraling steps: (a) planning, (b) acting, (c) observing, (d) reflecting, (5) re-planning (Kemmis & McTaggert, 1990). Teachers can use action research and reflection to better inform their practice in a cycle of continuous improvement. Both Kilbourne (1988) and Schon (1987) believed that reflection on one’s experience was an important method of improving and building a repertoire of

professional knowledge. The notion that reflection is an important aspect of professional learning continued to emerge in literature about school improvement over the decades.

For example, one decade ago, Grimmett, Erickson, Mackinnon, and Riecken, (1990) stated that reflective practices involve the introspection of experiences. More recently, Danielson and McGreal (2000) stated, "Few activities are more powerful for professional learning than reflection on practice" (p.24). Reflective practices are embedded within the process of action research. Action research enables educators to inquire, to observe, to collect data, and to dialogue during the school day. "It is a form of self-reflective inquiry that is now being used in school-based curriculum development, professional development, school improvement schemes, and so on, and, as such, it actively involves teachers as participants in their own educational process" (McNiff, 1997, p. 1). Reflective practitioners critically assess their actions in order to change their practices.

The inclusion of teacher research and reflective teaching into our educational programs is one option that should be considered when looking at the larger schema of education planning. The results of teachers engaging in the processes of action research and reflective teaching place educators in a more able position to critically influence the future of teaching and learning. Today's educators can not afford to ignore their invaluable role in leading society through the challenges of present and future educational trends.

Purpose of the Study

The purpose of this study was to examine teachers' perceptions of changes in their instructional practices as related to their own action research. This study investigated teachers' perceptions of the influences of action research on their thinking about instructional practices and the impact of this thinking on teaching practices.

Action research and reflective teaching are forms of staff development. One of the most important factors leading to teacher improvement and ultimately improved student performance is effective staff development. "Effective organizations recognize that their greatest assets are the individuals within them, and so they make human resource development the linchpin for all improvement efforts" (Dufour & Eaker, 1992, p. 11).

Joyce and Showers have contributed to our knowledge base on teacher improvement through their studies on staff development. Joyce and Showers (1988) suggested five components of staff development: (a) presentation of theory or description of a new skill, (b) modeling of a new strategy, (c) initial practice in a protected or simulated setting, (d) prompt, structured and open-ended feedback about the practice, and (e) coaching or follow-up attention while the new skill is being applied. Joyce and Showers stated that professional development positively impacted student performance when it addressed the academic content, the repertoire of teaching strategies, and the amount of practice time students are provided in the targeted areas.

Joyce and Showers (1995) and Showers and Joyce (1996) continued their work and conducted studies with entire school staffs where each staff member was required to be a member of a peer coaching team. As a result of this work, their findings showed that the level of classroom application after high quality training was approximately 5%. In addition, their findings showed that when peer coaching was added to the training designs the level of application increased to 90%. Additionally, with continual review of both the teaching models and coaching skills, classroom application remained at 90%.

Hugh Sockett has also worked on understanding the growth patterns of educators. Sockett (1993) described the coaching role of a teacher educator as one of a critical friend. He described the teacher educator as playing the role of a coach, where the coach brings experiences, insights and ideas into a cooperative relationship of equals. This relationship is significant because both persons are practitioners. Both partners view the task or concern through a practitioner's lens and therefore the coach-practitioner can assist in the processes of learning and growth. Sockett also noted that these critical friendships decreased the normal environment of isolation and through ongoing discussion increased the possibility of the development of reflective thinking.

Educators can be empowered to understand the implications of their teaching practices on student performance by creating a professional learning environment that encourages teacher research, collaboration, reflection and calculated experimentation. A cyclical step-by-step process for guiding teacher research is called action research. Action research engages educators in the process of examining and reflecting on how to improve practice, studying the literature and research related to their inquiries, and then

implementing a strategy intended to improve current practice. McNiff (1997) and Simmons (1995) both noted the significance of action research's impact on teacher empowerment. McNiff stated that applied to the teaching and learning environment, teacher research is an approach to improving education through change by empowering teachers to be aware of their own practice, to be critical of that practice, and to be equipped to change it. Likewise, Simmons wrote that the action research process affects participants' perspectives toward continued professional development and empowerment. Later, McNiff provided more detail to action research's positive effects on teachers by stating that, "[action research] is a powerful method of bridging the gap between the theory and practice of education; for here teachers are encouraged to develop their own personal theories of education from their own class practice" (p. 1).

While the evidence on the effects of engaging in action research is increasing, the research is weak in describing the application of teachers' new knowledge after engaging in the action research process. In other words, what happens to teachers' thinking about instructional practices after engaging in the action research process? The purpose of this inquiry was to explore if and how teachers' thinking and instructional practices are influenced by teacher participation in action research training and process. This study answered four questions: (1) How do teachers describe their perceptions of the *teacher role* as related to action research? (2) What are teachers' perceptions of *their knowledge about teaching* as related to action research? (3) How do teachers describe the changes, if any, in their *teaching practices* as related to their participation in the action research process? (4) How do teachers describe the changes, if any, in the *contents and ingredients of their reflective practices* as related to action research? The findings of this study provide critical information as to how action research may assist educators to measure and improve their own classroom teaching and learning practices.

Significance of the Study

This study contributed to our understanding of teachers' experiences as they progress through the training and implementation cycle of action research in their classrooms and the subsequent effects on instructional practices and student learning experiences. Schlechty (1990) stated, "to improve [schooling], one must invest in people, support people, and develop people" (p. 38). Educational practitioners can be liberated to

improve their profession with opportunities that promote systemic, collaborative teacher research conducted in the authentic setting of the classroom. Educators can use teacher research to uncover explanations to their own questions about the best way to improve teaching and learning practices. Johnson (1993) stated "teacher research will force the reevaluation of current theories and will significantly influence what is known about teaching, learning, and schooling" (p. 3). Likewise, Freeman (1998) stated "[teacher research] is an important step in transforming education from a practice of implementation to a practice devoted to understanding learning" (p. 15).

Johnson (1993) and Freeman (1998) agreed that teachers should be researchers in their own classrooms. This study will help teachers to understand how action research influences the processes of teaching and learning. It is critical that educators base their decisions about teaching and learning practices in data-driven, classroom-based research findings.

Ultimately, what is most important is that studies are conducted that measure how teachers that have engaged in their own data-driven, classroom-based, teacher research transfer their learning to their instructional practices and as a result influence student performance. This information is lacking in the literature and it is therefore not readily available to help inform educational improvement efforts that support better teaching practices and student performance.

Much of the research has focused on teacher growth while participating in staff development opportunities that occur outside the classroom. More recently researchers looked at what is occurring while teachers are working in their classroom. Sparks (2000) stated "a significant portion of the staff development that will lead to improved student learning should occur every day on the job among teams of teachers who share responsibility for high levels of learning for all of the students represented by the teachers on the team" (p. x). Rényi (1996) also recognized the importance of teachers learning from each other during the day and stated:

> The learning that teachers need from each other is learning that continues throughout the day, the school year, and the career. It is the constant improvement of practice based on observation, feedback, reflection, evaluation, and concerted effort to try again with something new. (p. 34-35)

Along with Rényi, Fullan (1993) also emphasized teacher reflection as being a key component to teacher learning and school improvement in his framework for educational change. Therefore, given the premises from the authors above, guiding teacher practice through engaging in action research and reflection provides a means for changes in instructional practices.

This case study investigated action research's impact on teachers' thinking about instructional practices and the impact of this thinking on teaching practices. With this information, this study attempted to add to the knowledge base regarding adult learning in the context of improving teaching practices. It is distinctive in three ways.

First, it was designed to gain an insight into how participating in action research affects and changes the scope of the teacher role. Second, it was designed to document the impact of teacher reflection and thinking on instructional practices as related to action research. Third, this study was designed to gain an understanding of teachers' experiences in regards to implementing action research. The significance of these findings can help guide educators in future decisions about teaching and learning practices.

Limitations

This case study is limited to teachers in one middle school, in one school district. The six participants in this study were not randomly selected, but were selected because of their participation in professional development on action research provided by the staff funded by the Maryland Technology Consortium, a Federal Innovation Challenge Grant. These six teachers had no previous training in action research. Each teacher volunteered to participate in professional development about action research and to conduct his or her own action research. Additionally, it is difficult to generalize the findings of this study, because of a limited non-random sample in a single school.

Definitions

Action Research is characterized by five spiraling steps (a) planning, (b) acting, (c) observing, (d) reflecting, (5) re-planning (Kemmis & McTaggert, 1990).

Teacher Research is characterized by uniting "the doing and wondering" of the practice of teaching (Freeman 1998, p. 3). Kemmis and McTaggert's five step process clarify the specifics of Freeman's thoughts on doing and wondering. Action research and teacher research are used interchangeably throughout this study.

Adult Learning is characterized by self-directed learning, critical reflection, experiential learning, and learning to learn (Brookfield, 1995).

Reflection is characterized by introspective thinking about what one is doing or about what one has done (Schon, 1983).

Organization of Paper

This study is organized into five chapters. Chapter 1 included the context, purpose, significance, limitations, and definitions. A review of the literature relating to adult learning, action research, teacher research, reflective practices and staff development is presented in Chapter 2. Chapter 3 outlines the research methods including context of the case study, participants, questions to be investigated, data collection procedures, data analysis procedures and trustworthiness of the procedures. The findings of the study are described in Chapter 4. Chapter 5 provides a summary, conclusions, implications and recommendations for further research.

CHAPTER 2: REVIEW OF LITERATURE

A review of the literature helps to clarify how the components of adult learning interact with the process of action research. The relationship of action research and its influences on introspective thinking are explained within the context of the components of adult learning.

Adult Learning

Fullan (1990) stated that "those involved in staff development must think and act more holistically about the personal and professional lives of teachers as individuals" (p. 22). In order then to ensure that professional development opportunities are effective, the components of adult learning must be an integral part of the experience. Knowles (1970) is credited with being the first to theorize how adults learn. He described adult learning as andragogy, a process of self-directed inquiry. The four major areas of research on adult learning include self-directed learning, critical reflection, experiential learning, and learning to learn (Brookfield, 1995).

Adult learning is based on the belief that adults need to (a) know the relevancy of why they are learning new information, (b) be self-directed and autonomous, (c) make and have connections between new learning and previous life experiences, and (d) be goal oriented, task centered, and problem solvers (Caffarella & Barnett, 1994; Hacker & Harris, 1998; Hiemstra, 1993; & Knowles, 1970). These assumptions are important considerations when designing differentiated adult learning opportunities. Knowles stated that adults have plenteous life experiences that should be considered as factors in the learning process. Danielson and McGreal (2000) agreed and stated, "The principles of adult learning show that when people use self-assessment and self-directed inquiry in professional development, they are more likely to sustain their learning, in more disciplined ways, than when outsiders impose professional development requirements" (p. 25).

Action Research

The process of action research is similar to the components of adult learning in that it provides educators with the vehicle that enables learning through a disciplined process of critical reflection, meaningful experiences, and self-directed inquiry. The innate systematic action research process helps to guide the adult learning experience

through a cyclical step-by-step process. Teachers that engage in the action research process are immersed in examining "what it means to make disciplined—as opposed to intuitive—statements about teaching" (Freeman, 1998, p. 9). Therefore, the teachers' account is derived from evidence that has been gathered through a systematic and evaluative research process.

"Teaching is highly complex, and most teachers have scant opportunity to explore common problems and possible solutions, or share new pedagogical approaches with their colleagues" (Danielson & McGreal, 2000, p. 24). The action research process is collaborative and investigative where practitioners work together to design and follow through with research on practical problems in their classrooms. Educational practitioners are involved in the process of inquiry to improve educational practice by studying the literature and research related to their questions and then choosing an approach or designing an alternative that might result in refining current practice.

Reflective Practices in Action Research

Action research is a form of staff development that encourages and develops the skills of educators to become more *reflective practitioners*, more methodical problem solvers, and more thoughtful decision makers (Sparks & Simmons, 1989). Sagor (2000) believed that an important purpose for action research was "building the reflective practitioner" (p. 7). He explained that "when reflections on the findings from each day's work inform the next day's instruction, teachers can't help develop greater mastery of the art and science of teaching" (p. 7).

In addition, Danielson and McGreal (2000), Kemmis and McTaggert (1990), McNiff (1997), and Schon (1983, 1987) focused on the importance of teachers critically reflecting on their practice. Each asserted that teacher introspection and on-going discussion about their own practice were very important. The process of action research provides a structured, disciplined approach to reflecting about the teaching and learning process. Danielson and McGreal (2000) stated, "Few activities are more powerful for professional learning than reflection on practice" (p. 24).

Likewise, Schon (1983, 1987) referred to the thinking practices that occurred while in the midst of teaching as reflection in action. He described this reflection in action as thinking about what one is doing while one is doing it. Reflection on action

evokes thinking critically about one's actions after they have occurred. This type of reflection helps us gain a deeper understanding of what we already know. More recently, Danielson and McGreal (2000) elaborated on the importance of reflection for professional growth and stated, "The very act of reflection, it appears, is a highly productive vehicle for professional learning" (p. 48).

Models of Action Research

Three primary models of action research define the steps similarly. These models of action research incorporate a process of five steps. While the models have a variety of differences, they share the steps of data collection and analysis, and taking action on an identified focus. As noted in Table 1, the Sagor Model, Kemmis and McTaggert Model, and Calhoun Model each are a unique variation of a five-step process.

Table 1
Five Step Action Research Processes

5 Step Process	Sagor Model	Kemmis & McTaggert Model	Calhoun Model
Step 1	Problem Formulation	Planning	Selecting the Area of Focus
Step 2	Data Collection	Acting	Collecting Data
Step 3	Data Analysis	Observing	Organizing Data
Step 4	Reporting of Results	Reflecting	Analyzing and Interpreting Data
Step 5	Action Planning	Re-planning	Taking Action

Although each of the above models uses different words, in essence, they each include using data to act or react to a defined problem or area of concern. According to the above models, action research can be summarized as a spiraling process that facilitates planning, acting, collecting, observing, reflecting, analyzing, reacting, and evaluating in a manner that is systematic but flexible in nature. These spiraling cycles of query identification, observation, organized data collection, reflection, analysis, data-driven action, and problem redefinition identify action research.

The Sagor Model. Richard Sagor is an Assistant Professor of Education at Washington State University. Sagor (1992) suggested that the collaborative action research process has five sequential steps: (a) problem formulation, (b) data collection, (c) data analysis, (d) reporting of results, and (e) action planning. Researchers identify the

issues to be studied in the first step. During data collection, the individuals involved in the collection process devise a plan for collecting and assembling three sets of different data. This allows the researchers to compare and contrast the independent sets of data. Sagor believed that data collection is the heart of the five-step process. It is the data that enable the teacher to look at the issue through different lenses. Next the data are analyzed. "If data collection is the heart of the research process, then data analysis is its soul" (Sagor, 1992, p. 11). It is during this step that the researchers look for trends or patterns and draw conclusions. During the fourth step, the researchers communicate their results. It is here that the education profession can benefit and learn the most. "Thus, it is imperative that teams of action researchers find as many appropriate forums as possible to share what they are learning about teaching and learning" (p. 11). The last step is action planning. After completing the action research process, action plans are used to readdress the original problem and to improve schooling practices.

The Kemmis and McTaggart Model. Stephen Kemmis is a professor at Deakin University in Geelong, Australia. Robin McTaggart is the Pro-Vice-Chancellor of Staff Development and Student Affairs at James Cook University in North Queensland, Australia. Kemmis and McTaggart (1990) developed a five-step process of educational action research. Their five spiraling steps were (a) planning, (b) acting, (c) observing, (d) reflecting, and (e) re-planning. Educational researchers use the first step to plan how they will change or how they will address a specific issue of concern. In the first step, the researchers develop their research question(s). The researchers implement the second step to take action and experiment with ways that may lead to solutions. The third step, observing, is important for data collection. It is during this step that the researchers record specific elements for a series of lessons. This allows the researchers to look for trends. The fourth step, reflecting, is used to reflect on the plan, action, and observations. After this guided reflection, the educational researchers re-plan and revise the original plan according to the data, and then continue through the spiral of acting, observing and reflecting. The process of action research is an intentional, results-aligned investigation that is group or personally owned and directed. Kemmis & McTaggart (1990) stated that the uniting of the terms action and research signifies the primary features of action research. Action research is a systematic *research* process for teachers to use to take

action on ideas in practice, to broaden knowledge and improve the processes of instruction, teaching, and learning.

The Calhoun Model. Emily Calhoun is the Director of Phoenix Alliance, which provides long-term support to school districts, state agencies, and regional agencies that are committed to improving student achievement through investing in staff learning at the school level. Calhoun has been a teacher at both the elementary and high school levels. Calhoun (1994) viewed action research as a vehicle to facilitate change through shared-decision making within a school setting. Calhoun's process includes five sequential phases: (a) selecting the area of focus, (b) collecting data, (c) organizing data, (d) analyzing and interpreting data, and (e) taking action.

Calhoun (1994) stated that engaging in action research involves progressing through steps of inquiry: choosing a focus area, collecting and analyzing data, studying professional literature, best practices, and taking action. She also emphasized the importance of teachers studying and researching the professional literature that targets their area of focus. This critical reading provides the teacher researcher with a foundation and framework for further study.

Combining All Three Models

The action research model that the participants in this study used is one that combines and integrates steps from each of the three models described and in addition adds the process of reflection as a deliberate step throughout the process. This action research process is defined in Figure 1.

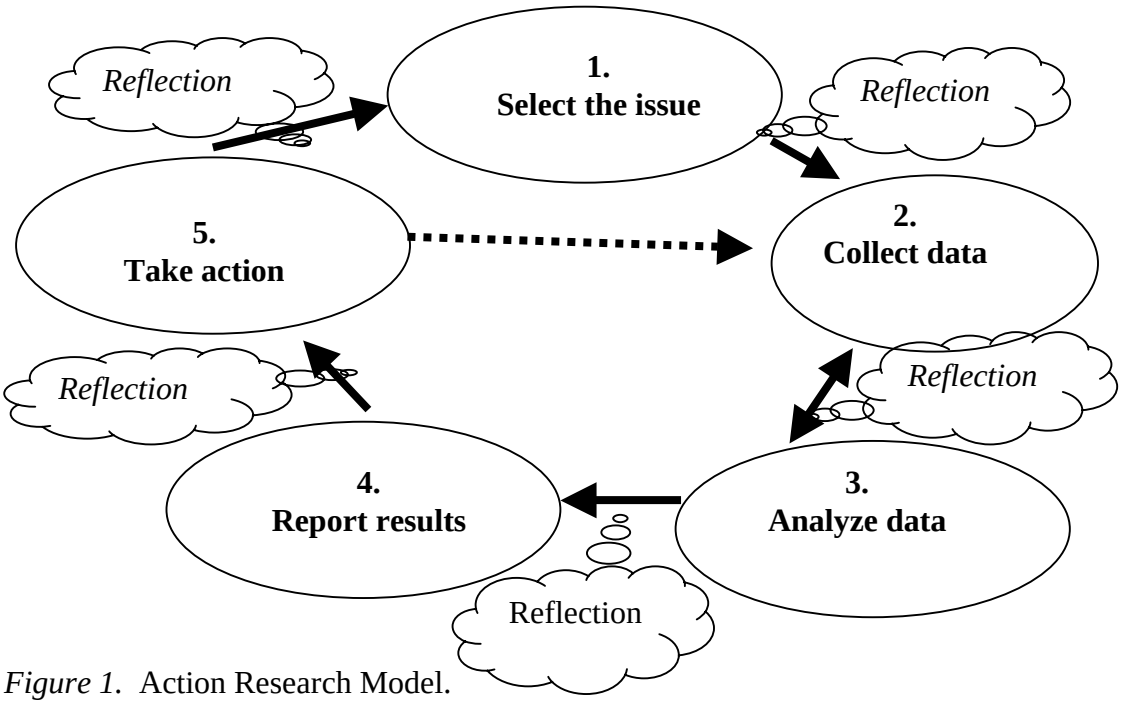


Figure 1. Action Research Model.

The integration of five reflection stages was included to encourage more deliberate reflection. This reflection is intended to help the action researcher make a more informed decision about which direction in the cycle to move, forward to the next step, back to the previous step, or stay within the same step for further collection and analysis.

Disadvantages of Action Research

Although action research can be viewed as a process that guides teachers towards self-improvement, it does have its disadvantages. Several authors (Bailey, 1999; Burns, 1999; & Wong, 1993) cited time as being a significant disadvantage in conducting action research. All noted that engaging in action research requires an increased time

commitment. The additional time needed is inherent within the research procedures necessary for conducting an action research study. As Cochran - Smith and Lytle (1993) pointed out, “Unlike other professions which are organized to support research activities, teaching is a profession in which it is extraordinarily difficult to find enough time to collect data . . . reflect, reread, or share with colleagues” (p. 91).

In the publication, *Action Research* (2000), produced by the Public Education Network, along with time, several other challenges to action research were listed. The issue of distance was described as being a disadvantage because teacher researchers were not able to distance themselves from the situation being researched, and therefore were unable to attain an objective viewpoint.

Another disadvantage that was cited was the issue of the differences in teaching and researching. It was noted that a teacher might begin research on a particular area of need, but find that the research hampers his/her teaching. For example, a teacher that is focused on investigating the impact of a new reading strategy on student learning would spend instructional time teaching that reading strategy, gathering evidence about the students learning, analyzing the collected data for evidence of student growth and reflecting on the strategy’s overall impact on teaching and learning. Subsequently other curriculum and instruction may be ignored or temporarily put to the side in a conscious and methodical attempt to focus and collect sufficient data for research purposes. Focusing on just one strategy to the extent of collecting enough data to analyze may detract from other central points of instruction and curriculum.

Wong (1993) also cited the conflict between researching and teaching. He stated that the purpose of research is to know and understand, while the purpose of teaching is "to do the right thing" (p. 7). Similar to viewing the processes of research and the processes of teaching as conflicting, Foster and Nixon (1978) argued that the role of the teacher is too complex to include a research component. Wong continued to argue that the potential differences within researching and teaching could become "paralyzing" (p. 9).

In summary, three important factors can hinder successful teacher research: (a) increased time commitment, (b) lack of distance from the research situation, and (c) conflicts between researching and teaching roles.

Applications of Action Research

Several studies have been conducted on the use of action research in different settings and for different reasons. The following three studies are directly related and significant to understanding how action research influences teaching practices.

Study One. This study is meaningful in terms of understanding how teachers perceive the influences of action research on teaching practices and student achievement. This study was conducted during the 1997-1998 school year with eight elementary, middle, and high schools that united with a local university in the state of Florida (Benton & Wasko, 2000). Its purpose was to have teachers select an area of interest related to literacy and student performance. This area of interest was used as the focus for the action research study.

A total of 87 teachers from eight professional development schools completed a survey that addressed different aspects of the action research process. Two of the survey questions that directly related to teaching practices and student performance were: "(1) Has the research project you have been involved in changed your teaching practices? If so, how? (2) Do you feel the research and related practices in any way impacted student achievement" (p. 7)? Of the eighty-seven teachers that completed the survey, 70 teachers responded that their teaching practices had been changed through involvement. One teacher responded by saying, "Yes, my teaching has changed as a result of the project. I was able to focus on specific areas of writing that [I] might not have stressed. Frequent discussions with colleagues helped to develop ideas" (p. 7). A different teacher had a similar response. "Since teaching writing isn't one of my strengths, I was able to pick up many pointers and techniques." Another teacher responded, "The action research project has made me more aware of reading mechanics" (p. 7).

Of those surveyed, 11 teachers responded that their practices had not changed as a result of the action research project. Six other teachers responded that their teaching practices had not changed, but these six teachers qualified their answers. They went on to explain that the practices used within the action research project were strategies that they were already implementing. One teacher responded by saying, "No, it is the same belief that most of us started with—guided reading, small groups, etc." (p. 8).

The survey also asked teachers to explain if, and how, the action research and related practices had impacted student achievement. Of the 87 teachers that responded, 71 indicated that the action research projects and related practices had impacted student achievement. Eight indicated that there had been some impact, 6 answered that there was no impact and 2 teachers chose not to respond to this question. One teacher specifically stated, "Since I was able to use better strategies for facilitating learning, my students were better learners." Another teacher wrote, "Absolutely. Look at our scores, up in all areas, and individual improvement as well" (p. 8). Eight of the teachers surveyed responded that the action research process had some impact and one teacher went on to say "perhaps the impact on students would be determined more conclusively later" (p. 8). Six teachers chose no or not really, in regards to answering their thoughts on the action research's impact on student achievement.

Another question that was asked that was indirectly related to teaching practices was how the teachers felt about themselves as researchers and the research piece in general. "Four themes emerged from the teachers' responses: research supporting practice, personal and professional growth, time and uncertainty" (p. 10). Benton and Wasko stated, "some of the teachers mentioned the theme of research supporting practices as they reflected on themselves as researchers" (p. 10). One of the teachers stated, "I have always wanted to be more involved in research and use that research to improve student achievement" (p. 10). Benton and Wasko went on to say "The role of the teacher allowed some teachers the opportunity to make this connection between practice and research" (p. 10).

As reflected in the findings of this study, not all teachers found action research to be entirely beneficial, but for others, participation in the action research helped to validate and improve their teaching practices. " A dominant theme in the final survey remarks of these teachers was the positive connection between action research and their own professional development" (p. 12).

Study Two. This study has significance in understanding how and if adult learners transfer their knowledge about action research to future teaching practices. This study was conducted as a follow-up to a university teacher preparation program at the Ontario Institute for Studies in Education/University of Toronto. Its purpose was to measure the

transfer of skills and knowledge attributed to action research by six graduates of a teacher education program that had an action research focus throughout the program. The researcher spent three years working with and guiding the six students through their university-based action research projects. This follow-up study specifically focused on the year after graduation from the program, which was the teachers' first year of teaching.

Kosnick (2000) stated, "the purpose of this study was threefold: (a) How do the former students view the action research experience now that they are teachers? (b) What was specifically learned through the action research? and, (c) How much of the action research philosophy and process is still being used" (p. 133)? Extensive interviews were conducted with each teacher. These interviews were recorded, transcribed and analyzed. In addition, Kosnick was able to observe each teacher teach and work with students. She was able to examine student work, lesson plans and assessment tools.

The analysis of the data revealed that the value of the action research process could be divided into two different strands: "(a) it provided the teachers with the practical skills needed, and, (b) it gave them an opportunity to develop a philosophy of education" (p. 135). The teachers felt "[action research] blended theory and practice" (p. 135). One teacher stated, "[action research] formalizes a system that good teachers must use on a constant basis" (p. 135). Another teacher expressed, "it was a way to maintain professionalism" (p. 135).

Kosnick also studied the teachers' assessment and reflections on the research they had conducted when they were students. Kosnick noted that the teachers referred back to their research by using the terms, "research, data, and program modification" (p. 135). The students did not use the terms "project or assignment" (p. 135). Kosnick surmised that the use of this terminology may be attributed to the fact that the teachers' thoughts about doing research was part of a "teachers repertoire" and that research was not done by "distant technicians" (p. 136). Although the teachers used these terms to describe their research, Kosnick found that when the teachers were asked to list words that described themselves, they used terms such as energetic, fun, warm, and approachable. These terms are usually associated with teaching, children, and interpersonal relationships. She found that the teachers did not use terms such as teacher researcher, curriculum innovator or skilled evaluator. She surmised that it appeared that the teachers may have "felt their

work was valid research, but did not define themselves as researchers" (p. 136). The teachers may have described themselves as they did because of the way in which Kosnick phrased her question. Generally, if a person is asked to describe himself or herself, they respond with personal characteristics. The teachers may have responded differently if Kosnick had phrased her question to highlight the role of the teacher.

Kosnick noted that after completing several interviews with the teachers, she found that the teachers were very proud of their research and had even mentioned their research during job interviews. Generally, in job interviews teachers are asked to describe their role as a teacher. It appears that when in a formal setting such as an interview, the teachers did recognize the significance of their research.

After completing more observations and interviews Kosnick found "that the action research process had influenced [the teachers'] current practice in many ways" (p. 140). Despite the long hours of work from these teachers, all of them used some of that time to reflect. Each teacher discussed a different method for personal reflection. Examples of the teachers' statements clarify the significance of their reflection. The first teacher stated the ongoing use of journal writing. Another teacher said that he turned off the lights of his classroom and "mentally walked through the day" (p. 140). One of the other six teachers said she jotted notes on her lesson plans. Another teacher said she reflected by talking to colleagues. One more teacher said that her reflecting went in "fits and starts, writing when the tension built up" (p. 140). Another described her reflecting as reflecting on what went well, what did not, and then writing notes to herself about what to do differently. From this data, Kosnick determined, "they realized that being reflective was central to teaching" (p. 140).

Kosnick also found that action research had a significant impact on the assessment practices of the teachers. "All [the teachers] used at least six different methods to gather information on students: tests, projects, group assignments, anecdotal comments, observation checklists, one on one testing, self evaluation, interviews, samples of student work, and observation" (p. 140).

Kosnick concluded that action research had definite influences on the teaching practices of the six teachers. She also concluded that despite the influences, the findings

showed that the teachers never really internalized the action research process in their conception of their practice.

One limitation of this study that should be considered when reviewing its results is the researchers' closeness to the students. This researcher was measuring students' perceptions of (a) the use of action research as practitioners, (b) what they learned through action research and, (c) how much of the action research philosophy and process was still being used. The researcher was a former professor who taught action research to these students. Therefore, the students' responses may have been influenced by the teacher-student relationship. In addition, the researcher's objectivity was possibly compromised.

Study Three. The third study investigated students' reflective practices in regards to their progress as learners and addressed teaching practices that influence student performance. Kathleen Jongsma (1993) conducted this study when she was teaching reading and writing to middle school students. The purpose of her study was to measure how the students' use of portfolios helped them to reflect on their own reading and writing literacy and their progress as learners. Jongsma's specific focus was to measure the impact of student reflection on learning progress.

Data were collected from student reflection journals, student letters to parents about their reading and parent letters to students in response to the students' reading progress. In the student reflection logs, Jongsma found that the students were describing their growth over time. She found that some students wrote about their progress with pride. Other students determined that they did not work hard enough to show much growth. Jongsma wrote, "almost all, however, agreed that portfolios were 'neat' things to keep and share with others, including their parents" (p. 126). One student wrote, "My portfolio is a neat thing to have, to see the work you done [sic] from the first six weeks" (p. 126). Jongsma noted the students' awareness of their own progress. One student wrote at the end one six-week period, "Last 6 weeks I failed my classes because I'd rather go out with my friends then do my work. The way I plan to improve to [sic] by going home after school and spending less time with my friends" (p. 125). Later in the year this same student viewed herself through a different lens: "As I look at my reading and writing, I

see that I've grown to read more and enjoy it. . . . I've learned that Reading [sic] can be fun and it helps you with all your other classes" (p. 125).

The data that Jongsma collected from the letter exchanges between parents and students showed positive aspects of how these letter exchanges helped students to summarize their reading and helped parents to be involved. Jongsma wrote, "In [parents'] letters to their children and in subsequent conversations with me, parents described the pleasure of corresponding about books and class activities" (p. 129). One parent wrote, "I have enjoyed going over my daughter's books and sharing with her on what she brings home to read" (p. 127).

Jongsma also assessed her growth through the action research experience. Jongsma wrote, "as a researcher, I was finding that my research questions were answered affirmatively; as a classroom teacher, I was using the data collected to make daily instructional adjustments based on student need" (p. 126). She went on to say, "Engaging in this piece of classroom research was a positive experience. I learned a great deal from my careful reading of my students' reflective portfolio pieces" (p. 129).

The process of action research provides educators with a vehicle for disciplined study about their profession. As noted, action research has both advantages and disadvantages. The studies described in this chapter provide examples of how teaching practices and student achievement are influenced by teachers working through the action research process. Despite the disadvantages that action research presents, this process can encourage the adult learner to be introspective and work towards self-improvement.

Chapter 3 discusses the methodology that was used to conduct a study that answered questions about four pivotal areas of the teaching profession as related to action research. The four key areas under consideration were (a) teachers' perceptions of the teacher role (b) teachers' perceptions of their knowledge about teaching (c) changes, if any, in their teaching practices, and (d) changes, if any, in the content of their reflective practices.

CHAPTER 3: RESEARCH METHODOLOGY

We are not adequately benefiting from the emerging trends in educational practice because, “process can be neither understood nor measured with the rational or experimental research model” (Caine & Caine, 1994, p.21). Therefore, Caine and Caine elaborated, “We urgently need more qualitative measures in education” (p. 22). Babbie (2001) agreed with Caine and Caine’s proposed need for more qualitative research in education and stated that through observations a breadth and depth of understanding about the human experience were gained. There are research questions where the breadth and depth of educational practice within the classroom setting cannot be appropriately represented with the numbers of quantitative data.

Similarly, Anderson (1998) agreed that studying and interpreting human experiences in authentic settings cannot be best represented quantitatively and stated, “Qualitative research is a form of inquiry that explores phenomena in their natural settings and uses multi-methods to interpret, understand, explain and bring meaning to them” (p. 119). Furthermore, Yin (1989) viewed using the qualitative methodology in case studies as being the preferred strategy for research studies dealing with contemporary phenomena within a real life context. He also viewed case studies as being the preferred methodology for studies focusing on "how" or "why" questions.

Considering these ideas, the most appropriate method for conducting a study on the impact of action research on classroom teaching practices is to use qualitative methodology. Because this study of the influence of action research was narrowly focused in one school setting with six teachers, a case study methodology was used.

Merriam succinctly explained the significance of using case study methodology and stated, “By concentrating on a single phenomenon or entity, this approach aims to uncover the interaction of significant factors characteristic of the phenomenon” (Merriam, 1991, p. 10). Using case study methodology helped provide a means to understand the essence of the action research experience. Understanding the experience of action research helped to document the experience more precisely. The phenomena were interpreted and explained through both the participants’ lens and through the theoretical framework of adult learning and action research.

Context of the Case Study

A public middle school located in Silver Spring, Montgomery County, Maryland was selected as the site for this study. This middle school is part of the Maryland Tech Consortium, a Federal Innovation Challenge Grant. Action Research is a professional development component of the Maryland Technology Consortium. The school has a total student population of 884 students that consists of 29 % African Americans, 8 % Asians, 34.5 % Hispanics, and 28.2 % Whites. Nine percent of the students do not use English as their native language. Thirty-seven percent are living in poverty as defined by the federal Free and Reduced Meals Program. The student mobility rate is 21 %. Sixteen percent of the students were born in countries other than the United States. Thirteen percent of the students receive special education services. There is a total of 75 professional staff.

Participants

Tellis (1997) stated the selection of participants in a case study does not have to be done through random selection, but the researcher is to handle the selection within the condition that is available. Keeping Tellis' statement in mind, the six participants were selected to participate in this case study for the following reasons. First, the six participants were classroom teachers at one middle school. The years of teaching experience for the six participants spanned between four years of teaching and twenty years of teaching. In addition, these six classroom teachers participated in the action research training and were provided follow-up support by the same instructional specialists from the Maryland Tech Consortium. Lastly, these teachers participated in two all day introductory staff development sessions on October 6, 2001 and October 13, 2001 and participated in the same follow-up work sessions through February 2002. The staff development sessions provided teachers with information on implementing the action research process while integrating technology with reading and writing strategies.

The original plan included the selection of seven participants. In the middle of November, one participant chose not to conduct action research. There were no specific reasons given to the researcher as to why the decision was made to cease completion of the action research project.

Although the teachers attended the two days of training as a school-team, each teacher worked individually to conduct action research. The teachers that were studied

each teach a specific content area: (a) English, (b) science or, (c) social studies. The teacher information gathering form that was used to gain foundational information is presented in Appendix A.

Questions to be Investigated

A case study was conducted to examine the changes, if any, in teachers' instructional practices as related to their participation in action research. A comparative analysis across each case provided a broader understanding and explanation of the four areas of investigation. The four specific areas of investigation were (a) the overall teacher role, (b) teachers' knowledge about teaching, (c) teaching practices, and (d) reflective practices. Therefore, four specific research questions guided this study: (1) How do teachers describe their perceptions of the *teacher role* as related to action research? (2) What are teachers' perceptions of *their knowledge about teaching* as related to action research? (3) How do teachers describe the changes, if any, in their *teaching practices* as related to their participation in the action research process? (4) How do teachers describe the changes, if any, in the contents and ingredients of their *reflective practices* as related to action research?

Data Collection Procedures

Typically in case study research, strategies for data collection include interviewing, observation and document analysis (Merriam, 1998). The use of different data sources helps the researcher to "validate and crosscheck findings" (Patton, 1990, p. 244). In this case study, different types of qualitative data were collected from interviews of participant teachers, classroom observations, student work samples, teachers' documents and records and researcher field notes.

Informal Participant and Researcher

The researcher in this study was actively involved in the professional lives of the individuals being researched. In conducting qualitative research, Merriam (1991) stated, "the researcher is the primary instrument for data collection and analysis" (p. 52). The researcher played a dual role of an informal participant and researcher. Stoddart (1986) stated that being non-obvious is simplified by taking part in the ongoing activities of the participants, without bringing specific attention to oneself. Being a non-obvious informal

participant and researcher provided the researcher with a unique lens that was influenced by the expertise and background of the researcher.

The researcher has expertise in both instructional technology and action research. Prior to conducting this study, as an employee of Montgomery County Public Schools, the researcher used this expertise to teach teachers best practices in instructional technology and how to conduct action research. The participants in this study conducted action research about how using instructional technology can support reading and writing instruction. Therefore, the researchers' expertise enabled her to fulfill the role as an informal participant and researcher with more ease than someone without this expertise.

The researcher attempted to be as non-obtrusive as possible by active involvement in three of the participants' formal work sessions. At these work sessions the researcher responded to questions that were directly related to the action research process. In addition, the researcher conducted informal observations on an average of three times per week. During these informal observations the researcher answered questions about action research and in a few cases about the use of instructional technology. The researcher's consistent attendance at the school allowed for a more trusting relationship with the participants. This acceptance allowed the researcher to gather more authentic data from the participants.

The researcher does have a bias in that she does believe that the effective infusion of instructional technology does positively support student learning. The researcher also believes that more differentiated staff development opportunities should be available for teachers. For that reason, the researcher chose this study to investigate the influence of action research, to better understand if and how this type of professional development can be considered as an option for more differentiated staff development. Therefore, given the focus of many educational reform efforts on accountability and measurements of student performance, the researcher does believe it is important that action research be investigated to measure its realistic worth in promoting professional improvement.

In addition, it is possible that because the researcher played a dual role as an informal participant and researcher, the findings may have been influenced. On that account, the researcher paid close attention to the biases these expertise and beliefs presented. The researcher sought consultation about evidence of bias with her committee

chair, a committee member and two colleagues. In addition, the researcher sought the expertise of her committee chair, a committee member and a colleague to verify coding of the data for identification of themes.

Interviews

Conducting interviews was one method the researcher used to gain an understanding of the participants' perceptions of changes in their teaching, instructional and reflective practices. Seidman (1998) states, "If a researcher's goal . . . is to understand the meaning people involved in education make of their experience, then interviewing provides a necessary, if not always completely sufficient, avenue of inquiry" (p. 4). The researcher's goal was to understand the meaning of teachers' experiences with instruction, as related to action research.

Framing questions for conducting the structured interviews are presented in Appendices B and C. The structured interview questions corresponded with the research questions and were aligned with the action research process. The interview prompts were open-ended. Follow-up questions were used when needed for clarification or to invoke further response to the question.

The interview questions were reviewed for clarity and content by members of the dissertation committee, individuals versed in action research and doctoral students from Virginia Tech. In addition, pilot interviews were conducted to ensure clarity and alignment with research questions. The pilot interviews were conducted with teachers that were conducting action research at other schools. After the pilot interviews, there were no changes made to the interview questions because the teachers being interviewed and the researcher found them to be clear.

Two formal and structured interviews were conducted with the six participants. Each interview was conducted individually. Interviews were conducted both at the beginning and end of the study. The interview meetings accommodated the schedules of the participants, which included time slots that were before, during and after school. Therefore, these interviews were conducted between 6:15 A.M. and 5:00 P.M. The interviews provided data to answer all four of the study's questions.

The two structured interviews were audio recorded by the researcher. Each interview was transcribed by either the researcher or by a professional transcriber.

Following the transcription of each interview, each participant was asked to review the transcription of his or her interview. This member check helped to ensure the accuracy of the data. The interviews provided the researcher with a context and therefore a better understanding of the behavior being discussed.

Observations

Observations were conducted to gather supporting evidence to the teachers' interview responses. In addition, the researcher used these observations to gather evidence to support the four areas in which this study focused: (a) the overall teacher role, (b) teachers' knowledge about teaching, (c) teaching practices, and (d) reflective practices. The original plan was for the researcher to conduct formal observations as a follow-up to the formal interviews. For example, if a teacher stated in an interview that they were analyzing student work to make decisions about changing teaching practices, the researcher would attempt to observe that specific action during the formal observation. To record specific observation data related to the formal interviews, the researcher created a classroom observation instrument. This classroom observation instrument is presented in Appendices D and E.

The researcher conducted three formal observations and found that the formal observations were not providing the researcher with authentic data. The researcher observed that the teachers were not behaving in a comfortable manner, but were more or less performing while the formal observations were being conducted. Because of this reaction from the teachers, the researcher changed from formal observations to more frequent and shorter informal observations. This change provided the researcher with more authentic data. The teachers became accustomed to the researcher's observations, which helped to support the researcher's role as a non-obvious participant and researcher.

In addition, the researcher found that the classroom observation instrument did not support the data collection for the informal observations. The researcher found the instrument to be too restrictive. The researcher found that she was attempting to fit the observation data into the format of the instrument. The researcher became concerned with losing the data that did not fit into the instrument. Therefore, instead of using the observation instrument, the researcher recorded her observation data in an observation

and field notes journal. This allowed the researcher to record all the information observed more completely and without restriction.

Researcher Observation Field Notes

The researcher kept a journal of observation field notes and discussions. After each informal observation the researcher recorded her observations in her journal. Maykut and Morehouse (1994) corroborated this data collection technique. They stated, "The keen observations and important conversations one has in the field cannot be fully utilized in a rigorous analysis of the data unless they are written down" (p. 73). The descriptions of the setting and informal discussions were recorded as specific examples of observed behaviors, quotations, and pictures.

Artifacts

Artifacts were used as evidence of common themes from field notes, observations and interviews. The field and observation notes helped the researcher to collect noted artifacts. Also, artifacts were collected in a spontaneous manner. For instance, if a teacher stated that he or she created a system to record and analyze student work data, the researcher asked the teacher for an example of this record system. This artifact was then used as evidence to support the data collection and analysis. In some cases, pictures of these artifacts are included in Chapter 4. Another example of using artifacts to support data collection was when an artifact helped to further define and clarify a participant's statement about student performance. Artifacts illustrating student work progress were also collected and are included in Chapter 4.

Data Analysis Procedures

The data collected from this case study were analyzed on an ongoing basis using the constant comparative method (Glaser & Strauss, 1967). This non-mathematical data analysis process was used to guide the researcher through identifying themes and patterns within individual cases and across the six cases (Maykut & Morehouse, 1994). Similarly, Yin (1994) suggested using a case-oriented replication strategy for analyzing the results of case study data. These approaches provide the researcher with the means to analyze each individual case for emerging themes and patterns and then compare those results with additional cases to identify emerging themes and patterns.

In preparation for using Glaser and Strauss' constant comparative method and Yin's replication strategy, results from the participant interviews and student and teacher artifacts were organized separately for each case. The data collected were organized and assembled by date, data collection method, study question, interview question. This helped the researcher to identify change and growth. These results were compared and analyzed for emerging themes and patterns.

In addition, results from each case's participant interviews, classroom observations, researcher field notes and student and teacher artifacts were combined, compared and analyzed across all six cases for emerging themes and patterns. This was done by listening to the audiotapes of the scripts for key words and phrases. This step was completed by initially listening to each participant's tape from beginning to end on two separate occasions. Then the tapes were listened to according to each individual question. Next the researcher read the interview transcripts according to each individual question. During each of the listening and reading steps common words and phrases and potential themes were recorded. Themes were categorized using the research questions as a framework from which to start. Using the defined themes and their synonyms, word searches were performed in Microsoft Word's Find feature. Upon identification, the themes were color-coded. The color-coded themes were further analyzed for common patterns, similarities and differences. To help ensure the reliability of the data, themes and patterns were distinguished if they were evidenced from two different participants and when appropriate two different sources. To help organize this process, a matrix was designed around the identified themes to illustrate frequency of responses and different data sources (Miles & Huberman, 1994). The matrix's design was specifically organized to identify and categorize each data source by teacher and theme. Dates were used to identify when specific data sources were recorded. The mark of an "X" was used to identify an artifact. The matrix is presented in Appendix F.

Trustworthiness of the Findings

Researchers Lincoln and Guba (1985) use the term trustworthiness to account for credibility and dependability in qualitative research. They suggested using a variety of strategies for improving the likelihood that findings and interpretations are trustworthy. There are three formal subjectivity checkpoints within this study, including (a)

dissertation committee members, (b) participant review, and (c) peer review. These checkpoints helped to ensure the credibility and accurate representation of the data.

Dissertation Committee and Peer Review

Throughout the data collection and data analysis processes the researcher sought the expertise of the dissertation committee members. The researcher also requested analysis assistance from two educators and one non-educator employed in the field of research science. These external checks were incorporated to obtain the viewpoint of the devil's advocate (Lincoln & Guba, 1985).

Participant Review

At the end of the final analysis the findings were shared with the participants. The participants were asked to further assess the validity of the findings. Lincoln and Guba (1985) suggested that having participants in the study check the data helps to verify the data collected and the interpretations of that data. Data collection strategies are summarized in Table 2.

Table 2

Summary of Data Collection for Study

Question	Data Collection Strategies
How do teachers describe their perceptions of the teacher role as related to action research?	Interviews Observations, Field Notes
What are teachers' perceptions of their knowledge about teaching as related to action research?	Interviews Observations, Field Notes
How do teachers describe the changes, if any, in their teaching practices as related to their participation in the action research process?	Interviews Observations, Field Notes Teacher Artifacts Student Artifacts
How do teachers describe the changes, if any, in the contents and ingredients of their reflective practices as related to action research?	Interviews

Timeline for Study

This study was conducted from November 2001 through February 2002. This study can be used to inform practitioners of how educators' teaching practices are influenced by the process and training of action research. A timeline for the preparation

and the implementation of the study is illustrated in Table 3. Presentation of the findings follows the timeline in Chapter 4.

Table 3

Timeline for Study

Outcome	Date
Identified parameters for study	July 2001 and September 2001
Designed Interview Questions	July 2001 and August 2001
Tested interview questions	July 2001 and September 2001
Revised interview questions	July 2001 and September 2001
Identified participants	October 2001
Signed release forms – teachers	October 2001
Identified Interview candidates	October 2001
Approval from VT Review Board	October 2001
County Permissions to conduct study	November 2001
Teachers designed, implemented, and completed Action Research project	October 2001-March 2002
Completed 1st interview	November 2001-December 2001
Analyzed Data	November 2001-December 2001
Conducted classroom observations	November 2001-January 2002
Collected teacher and student artifacts	November 2001-January 2002
Analyzed Data	December 2001-January 2002
Completed 2nd interview	January 2002 - February 2002
Analyzed Data	January 2002 - February 2002
Conducted classroom observations	January 2002 - February 2002
Collected teacher and student artifacts	January 2002 - February 2002
Analyzed Data	January 2002 - February 2002
Validated Results with Participants	February 2002
Re-evaluated if necessary	February 2002
Completed final draft of report	March 2002
Conduct peer evaluation of final report	March 2002
Completed final report	March 2002

CHAPTER 4: THE RESULTS

"We think we know great teaching when we encounter it, yet we find it impossible to say precisely what has gone into making it great" (Banner and Cannon, 1997, p. 3). This study was conducted in an attempt to learn more about how and if the influences of action research contribute to great teaching. The purpose of this chapter is to report the analysis and interpretations of the data collected for this study and to provide a description of how the process of action research informs and influences teachers' thinking and instructional practices.

Anderson (1998) suggested a general qualitative research approach for analysis of cases, which "organizes the data into descriptive themes" (p. 158). This case study is organized to facilitate this strategy suggested by Anderson. The descriptive analysis of data was from transcribed interviews, researcher field notes, classroom observations and supporting teacher and student artifacts.

The data were grouped and matched based on the themes and patterns that emerged through the analysis process. A total of nine themes were identified with supporting data. Seven of the themes were directly related to the research questions. In addition, two themes emerged that were not necessarily disconnected from the research questions, but more relevantly addressed the overall picture of engaging in action research.

By referring back to the original research questions, a framework is provided for this summary of findings. The findings were reported by organizing the chapter into the following main parts that reflect the essence of the research questions: perceived changes in the teacher role, perceived changes in knowledge about teaching, changes in teaching practices, and changes in the contents of reflective practices. Table 4 illustrates the relations of research questions and emerged themes.

Table 4
Relations of research questions and emerged themes

Research Questions	Themes
How do teachers describe their perceptions of the teacher role as related to action research?	Structure Collaboration
What are teachers' perceptions of their knowledge about teaching as related to action research?	Improving teaching practices for improved student learning Using student work data Planning Deliberate reflection
How do teachers describe the changes, if any, in their teaching practices as related to their participation in the action research process?	Improving teaching practices for improved student learning Using student work data Planning Deliberate reflection
How do teachers describe the changes, if any, in the contents and ingredients of their reflective practices as related to action research?	More detailed reflection
Additional Themes	Time – restraining force Continuation of action research practice

Definition of Themes

For the purpose of this study the researcher defined the following terms.

Structure refers to a more conscious guide or framework that teachers adopted to follow in their daily thinking and work day. They chose to follow this rather than a more random way of doing things.

Collaboration refers to discussing and working with other teachers in a more collegial manner.

Improving teaching practices for improved student learning refers to teachers' conscious effort to better their teaching practices and to increase student performance.

Using student work data refers to teachers' reviewing and analyzing student work to inform their teaching practices.

Planning refers to the process and blueprint teachers use to design their daily lessons and activities.

Deliberate reflection refers to teachers' conscious and intentional inner thinking practices.

More detailed reflection refers to the degree of depth and the extent of contents within their conscious thinking practices.

Time – restraining force refers to the amount of time engaging in the process of action research entails.

Continued practice of action research refers to the intent for ongoing and sustained engagement in the process of action research for the future

Teacher Role

Research Question #1: How do teachers describe their perceptions of the teacher role as related to action research?

Hord (1994) stated that a purpose of professional growth is "change in individuals' knowledge, understanding, behaviors, skills—and in values and beliefs" (p. 1). When teachers were each asked their perceptions of how they had evolved as a teacher as related to engaging in action research, two themes emerged from the data, a more structured process for teaching, and colleague collaboration. These themes are in alignment with Hord's thinking in that both new behaviors lead the teachers to gain more understanding about their teaching practice.

Structure

The data revealed that the teachers perceived that action research provided them with a structure for accomplishing the processes involved in teaching. Cooper (1990) described that the focus of educator research is to broaden the educator's role to that of an analyst of teaching and learning through methodical classroom research. Five of the six teachers interviewed responded with how the planned structure of the action research process encouraged them to think about their teaching practices more regularly and more closely. Teacher 2 said, "It [action research] is all about results and making changes to maximize the results at your next implementation. So I believe that it has helped me to be more logical and structured in my process" (Transcript 2, p. 2). Teacher 4 stated, "This school year, is truly the first time I came across a defined structure for action research, and this being my first experience with this I think it's challenged me to think about improving my teaching practice with the use of technology" (Transcript 2, p. 1). The researcher observed that the teachers were able to follow the five-step process of action research carefully and consciously with little need for additional support (Field Notes, December 9, 2001). The data revealed that the teachers were assessing their teaching practices in a more systematic manner. The researcher also observed that the teachers' ongoing assessments

> Teacher 3 stated, "I think that it gives me more support for who I am as a teacher and it helps give a focus" (Transcript 2, p. 1).

were focused directly on whether their technologically enhanced writing intervention was enhancing their instructional practices (Field Notes, November 9, 2001). For example, many of the students organized their information using a graphic organizer that each student created using a specific computer program. When assessing student work, teachers specifically evaluated if and how each student's writing improved as related to the electronically created graphic organizer.

In many cases the teachers implemented the technologically enhanced writing intervention up to five consecutive times. This consistent structure enabled teachers to measure student growth from assignment one to assignment five.

Collaboration

The second theme that emerged from the data was the benefits of collaborating with colleagues. In support of colleague collaboration, Dufour and Eaker (1998), Fullan (1999), and Schmoker (1999) confirmed that an environment that promotes collaboration between teachers would lead to student achievement. Three of the six teachers thought that collaboration was a key attribute encouraged by action research. Teacher 3 stated, "Teaching can be very isolating on itself. … So it helps me professionally to be with other people that are doing action research so I can learn from them" (Transcript 2, p. 2). The researcher noted that throughout the study she observed ongoing collaboration and several informal collaborative work sessions between many of the staff members at the school (Field Notes, February 7, 2002). For example, on one occasion a few teachers briefly gathered to plan and discuss a specific class project. This impromptu meeting began in the hallway at dismissal time and continued for a brief moment in a teacher's classroom. On another occasion, a few teachers briefly discussed and shared instructional materials and then moved on to work independently. These impromptu meetings would sometimes begin with two teachers and then quickly include more teachers. These observations prompted the researcher to also note that it appeared that collaboration could be something that some of the teachers involved in this study do frequently without the influence of action research.

> Teacher 6 stated, "I think that action research could be a way that teachers could work together, collaborate in a non-extra way. I am into planning together anyway as you saw, but I just think that instead of people being so isolated and doing their things …it would up our profession" (Transcript 2, p. 6).

The researcher also noted that several staff at this school had been involved in a breach of standardized test security last year. As a result, it appeared that the teachers had created an emotional and professional support network that continued to provide a fertile collaborative network. The researcher obtained this information from unofficial comments that the teachers sometimes made.

In addition, the previous year's violation of test security was the cause for many teachers' finding positions in other schools. As a result, there had been a relatively high increase in new staff. These new staff members have been provided with a great amount of informal support from their peers. The support provided helped to inform the new staff of overall managerial procedures and in some cases learning new curriculum. Again, the collaboration may have occurred for a variety of reasons.

Some of the collaborative sessions that the researcher noticed were about overall management of the school (Field Notes, February 25, 2002). For example, the researcher noted that impromptu discussions or side conversations in the halls focused on how to better manage behavior, low performing students, and after school activities. This perhaps was an explanation for Teacher 6's statement that action research could help teachers to collaborate in a "non-extra way." Teachers must be given the opportunities to work collaboratively in authentic settings that promote learning. For some teachers it was apparent that learning was so profoundly embedded in their daily profession, that possibly it was hard for them to see where work and learning begin and end.

The researcher observed on several occasions three teachers involved in the study making specific arrangements to support new staff members with various management and teaching tasks (Field Notes, November 15, 2001). For example, teachers would meet informally after school to support several new teachers in the process of inputting report card grades into an electronic grading system. This support appeared to be a very "normal" part of the school's professional culture. This, perhaps, was why some of the teachers interviewed did not mention that action research helped to encourage collaboration. These educators had created a somewhat nourishing context for learning for the new teachers and themselves. Collaboration appeared to be a healthy part of this school's culture.

Change in Teaching Practices

Research Question #2: What are teachers' perceptions of their knowledge about teaching as related to action research?

Research Question #3: How do teachers describe the changes, if any, in their teaching practices as related to their participation in the action research process?

When teachers spoke about how they perceived themselves as growing professionally and in some cases the differences in how they made decisions about instruction, four themes emerged from the data: (a) improving teaching practices and student learning, (b) using student work data, (c) improved planning, and (d) deliberate reflective practices. The data revealed that as the teachers changed their teaching practices, their knowledge about teaching also changed. And at the same time, the data revealed that as the teachers' knowledge changed, so did their teaching practices.

The nature of teaching is a never-ending process of change. As Teacher 3 aptly stated, "Yes, we are always continually changing things as a teacher, but it gives a focus for how you are doing it as opposed to where just in your mind you are continually changing" (Transcript 2, p. 1). The data revealed that teaching practices and knowledge seemed to work to promote or force change in each other. In many cases it was hard to assess which came first, the change in knowledge about teaching practices or the change in teaching practices. The data from these two questions were interrelated. For this reason, the data that supports these two questions are presented together in this section. Figure 2 provides a visual representation of the relationship.

> Teacher 6 stated, "I'm more informed about the process, I've read the books, I am doing a lot more of taking information before I do something to see if it really makes a difference" (Transcript 2, p. 2)

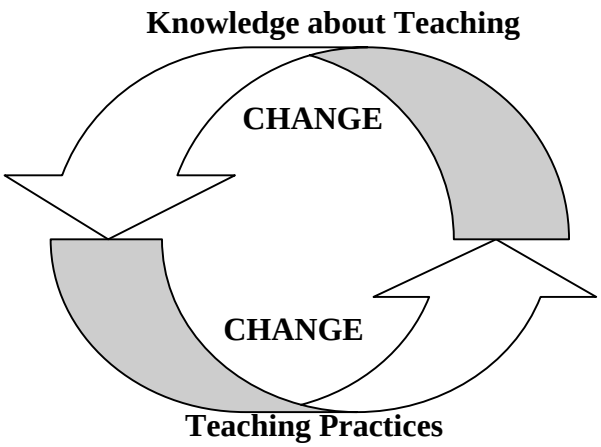


Figure 2. Relationship Between Change in Knowledge and Change in Teaching Practices.

Improving Teaching Practices for Improved Student Learning

When this study began, six of the six teachers stated that they expected or hoped that the action research process would help them to improve their teaching practices and ultimately improve student learning. Teacher 1 simply stated, "[I want] better ways to teach my students. … I just want them to be successful" (Transcript 1, p. 3) Teacher 2 stated, "I think it helps us to look at the journey that children take in growing, seeing the way they start, seeing the way they end, and measuring that growth because that's really what we're looking for. And that's what we're looking for in ourselves as teachers" (Transcript 1, p. 11). Likewise, three of the six teachers specifically expressed how they hoped that working with the action research process and implementing various instructional interventions would help them to monitor, improve and tailor their teaching practices. This they hoped would lead to visible progress in student learning. Teacher 5 stated, "That's my main goal. I hope to see benefits of student improvement. Also, just the ability to take [that] information [data] and plan" (Transcript 1, p. 4). Ultimately, the teachers' hopefulness for improvement

> Teacher 4 stated, "I'd like to improve my teaching skills ultimately. I'd like to gather some data and go through the whole process …to see whether or not teaching can be improved or is it just, you know, something that we do on the run day in and day out" (Transcript 1, p. 3).

convinced them to move forward in conducting action research to identify principles of effective practice for improved student learning.

Using Student Work Data

As the study progressed, the teachers became more aware of their students' performance. The teachers had monitored student performance on an ongoing basis and after assessing student work were able to cite specific examples of student progress. These teachers were beginning to build the knowledge base on how to assess whether their changed instructional strategies worked and as a result their confidence began to rise to meet the present high standards of accountability.

> Teacher 6 stated, "They're taking information from the text and putting it into their answer consistently, because they're cutting and pasting. . . .They [students] are getting better. They have four part answers which is really good. . . .That's what I have been looking for" (Transcript 2, p. 4).

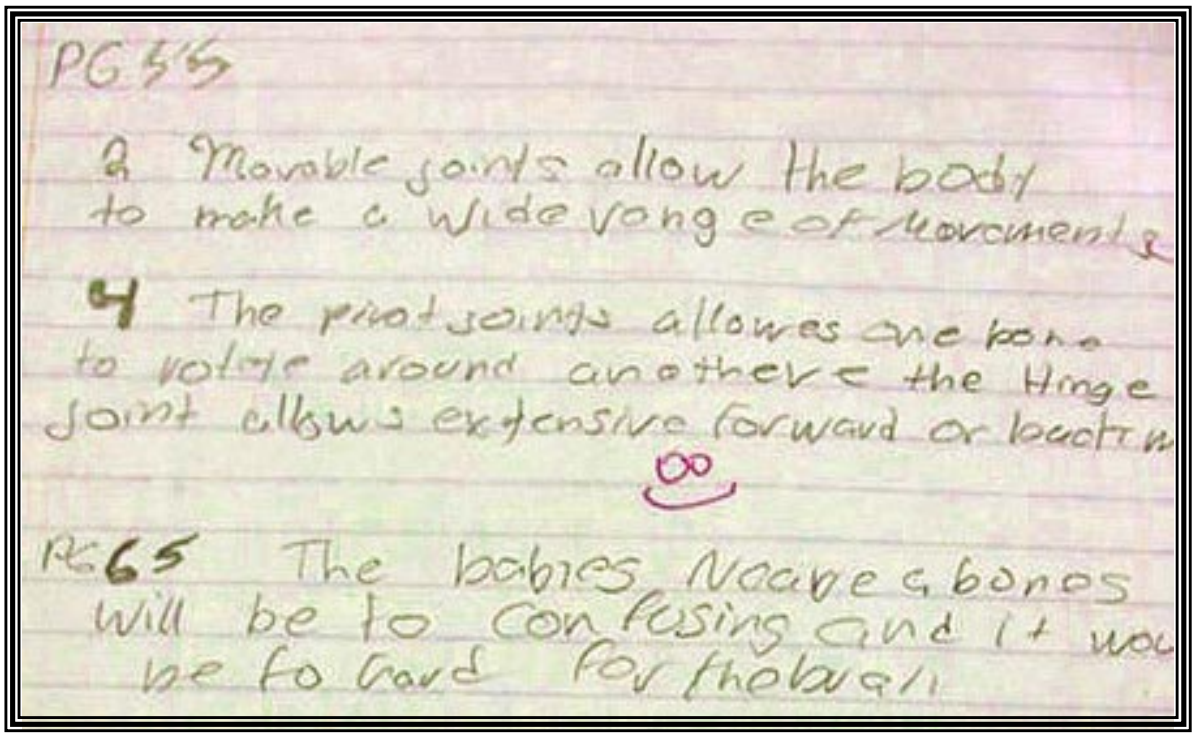
The researcher noted that the teachers on several occasions expressed their enthusiasm about seeing concrete results in their students' work (Field Notes, January 15, 2002). The ownership of their data provided the teachers with further eagerness in collecting and analyzing data, ultimately resulting in influencing teaching practices. As Teacher 2 stated, Decisions are made "less intuitively" (Transcript 2, p.1). Freeman (1998) confirmed this "disciplined" approach rather than an "intuitive" approach to decision making.

Data-based decisions became more the norm when considering teachers efforts towards student performance. Teacher 3 stated, "Well, certainly being able to work [with] numbers. …That gives [me] a way [to measure] that is very concrete. I can look at it. I can see that this is what they did before and this is what they do now. While before it might be somebody had, you know, a C or D or something, and now they have an A or a B. But now I know specifically. It [action research] was good at focusing me on something very specific" (Transcript 2, p. 5).

Although data analysis is such an important skill for teachers to have, little staff development and follow-up support are provided for teachers to learn these skills. The researcher noted that all six teachers needed support with their data collection and data

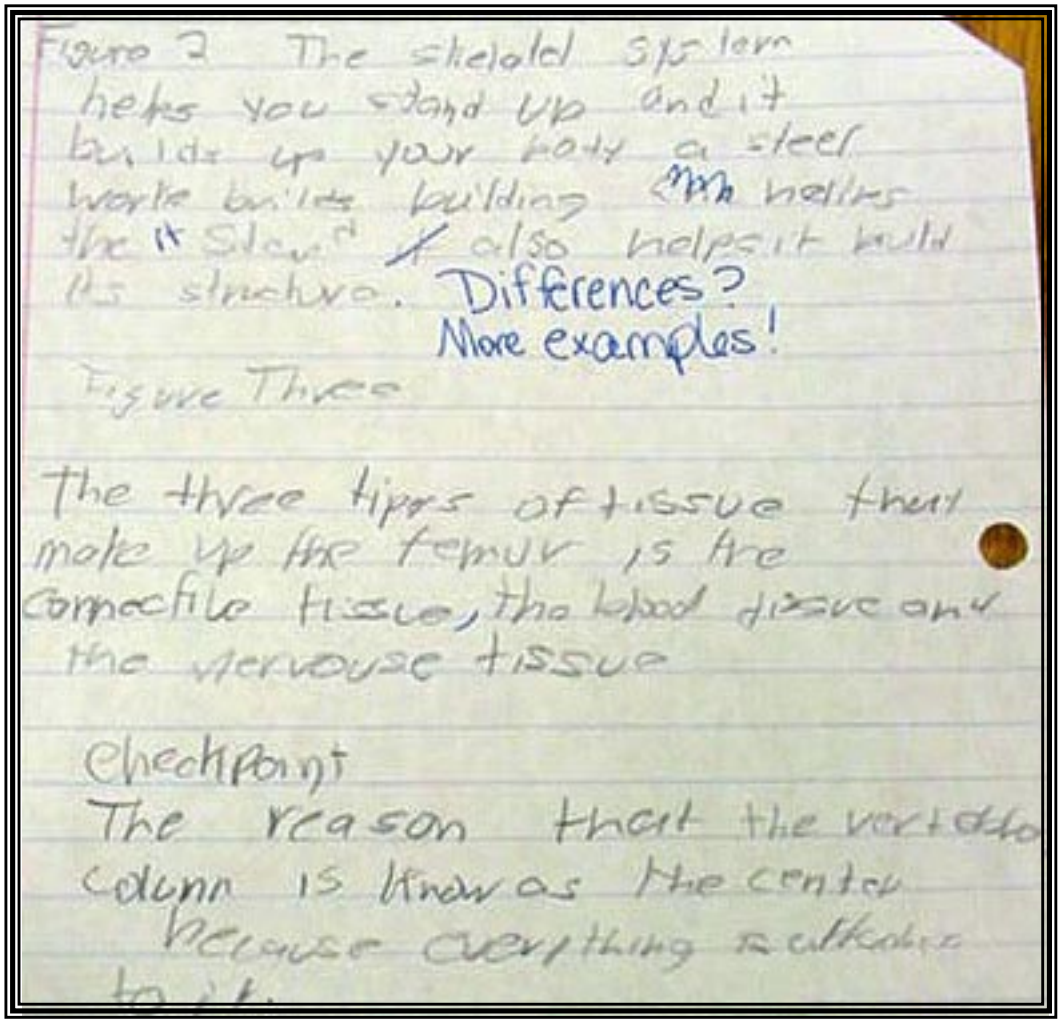
analysis (Field Notes, January 7, 2002). The researcher noted that questions from teachers revolved around how to collect the data, how to organize the data collected and finally how to analyze the data (Field Notes, January 18, 2002). Teacher 1 expressed, "The analyzing of the data, I dread it. I dread it" (Transcript 2, p. 6). A few weeks later and after some coaching on data collection and analysis, Teacher 1 stated with enthusiasm, "Yesterday, I compared my baseline assignment with the first one using the Inspiration outline--and the scores were so awesome after the outline. So, I can't wait to see today's answers from the next outline we did" (Field Notes, Feb. 22, 2002).

As evidenced by Teacher 1's experience, once the teachers were provided with some coaching on these topics, they moved forward with confidence and expertise. This corroborates what Joyce and Showers (1988) found with the importance of follow-up coaching as being a crucial component of staff development. They found that the inclusion of this component increased the teachers' successful implementation of the new knowledge 90% compared to 5% if follow-up coaching was not present. Teacher 1, in particular, went from claiming with a tone of complete frustration that she was dreading the data analysis to later stating her eagerness to get more results. After claiming her frustration about analyzing data, she received the additional data analysis support she needed. Using her new skills in data analysis eliminated her frustration. Her new level of understanding about how to analyze the data empowered her to move forward with eagerness and confidence. Teacher 1 changed her teaching practices to analyze student work data on a more regular basis, and as a result her knowledge about teaching changed. Similarly, when she gained more knowledge about data analysis, she became more aware of how her interventions were affecting student learning in a positive manner. Pictures 1, 2 and 3 provide an example of visible growth in student work.



Picture 1. Writing Assignment 1

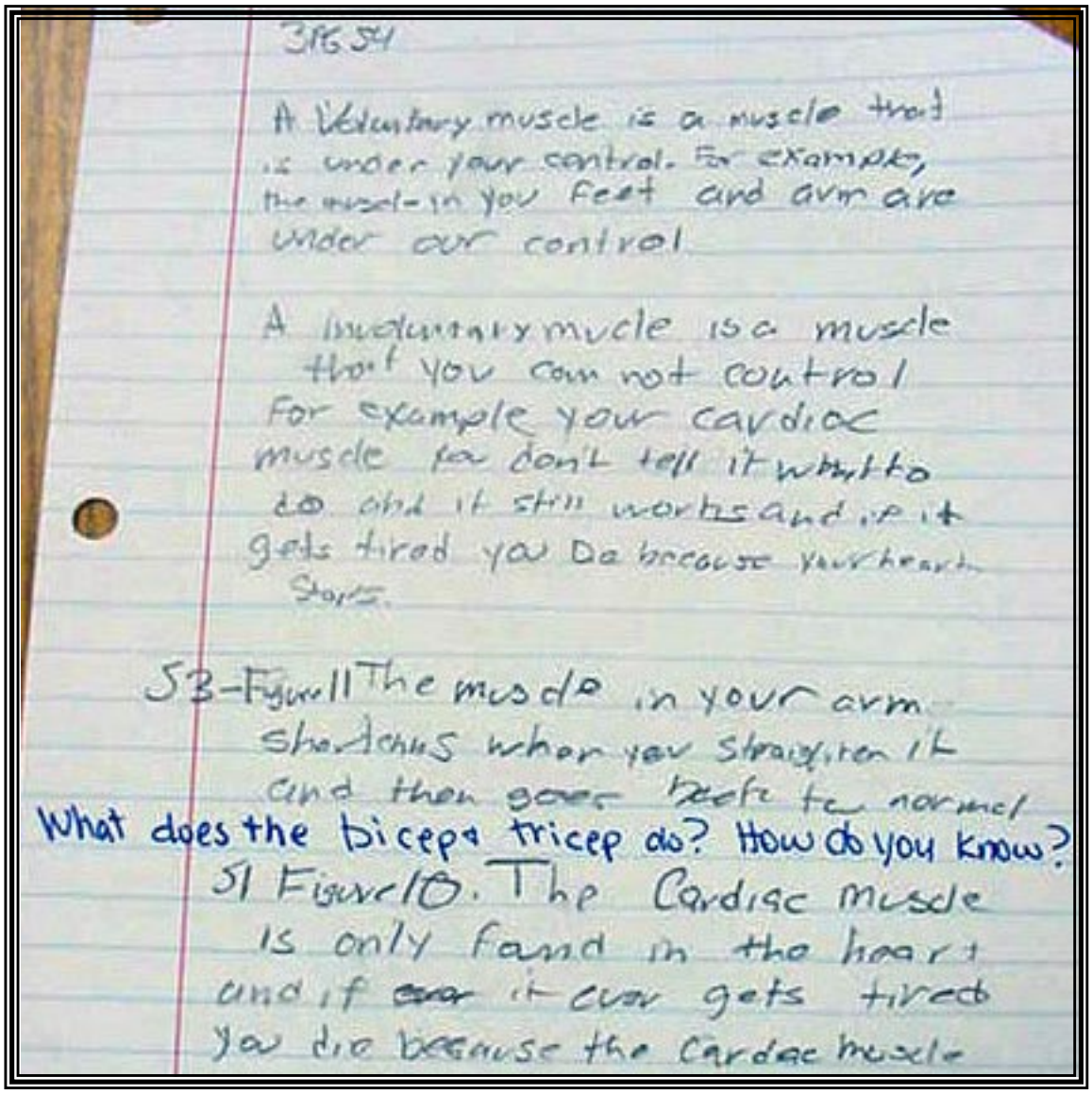
Picture 1 illustrates the results of an initial writing assignment given to students. This is a student's response to three questions. To complete each question and earn full credit, the student was asked to use the RACE strategy: (1) **R**estate the question, (2) **A**nswer the question, (3) **C**ite specific evidence from the text, and (4) **E**xplain why the answer provided was given. In giving this assignment the teacher made no mention of organizational writing strategies. This assignment was given with the intention of gathering baseline data. In analyzing this piece of student work the teacher was able to see that this student was successful at including step 2; **A**nswer the question.



Picture 2. Writing Assignment 2

Picture 2 illustrates the results of the second writing assignment given to students. This is the same student's response to three different questions. In giving this assignment the teacher enabled the students to create organizational webs using a specific piece of graphic organizer development software called Inspiration (Inspiration Software 6.0, 1999). First, the teacher used a computer and projection device to model this graphic organizer activity. This modeling provided the students with a concrete example of the teachers' expectations. Following this teacher model, the students worked independently in a computer lab to create their own electronic graphic organizer of information to include in each answer to the three questions. Each graphic organizer was printed, so that the students could return to the classroom and write their responses to the questions. Again, the RACE writing strategy was also required. In analyzing this piece of student

work the teacher was able to see that this student was successful at including step 2; **A**nswer the question and also attempted to provide a **R**eason in two of the questions.



Picture 3. Writing assignment 3

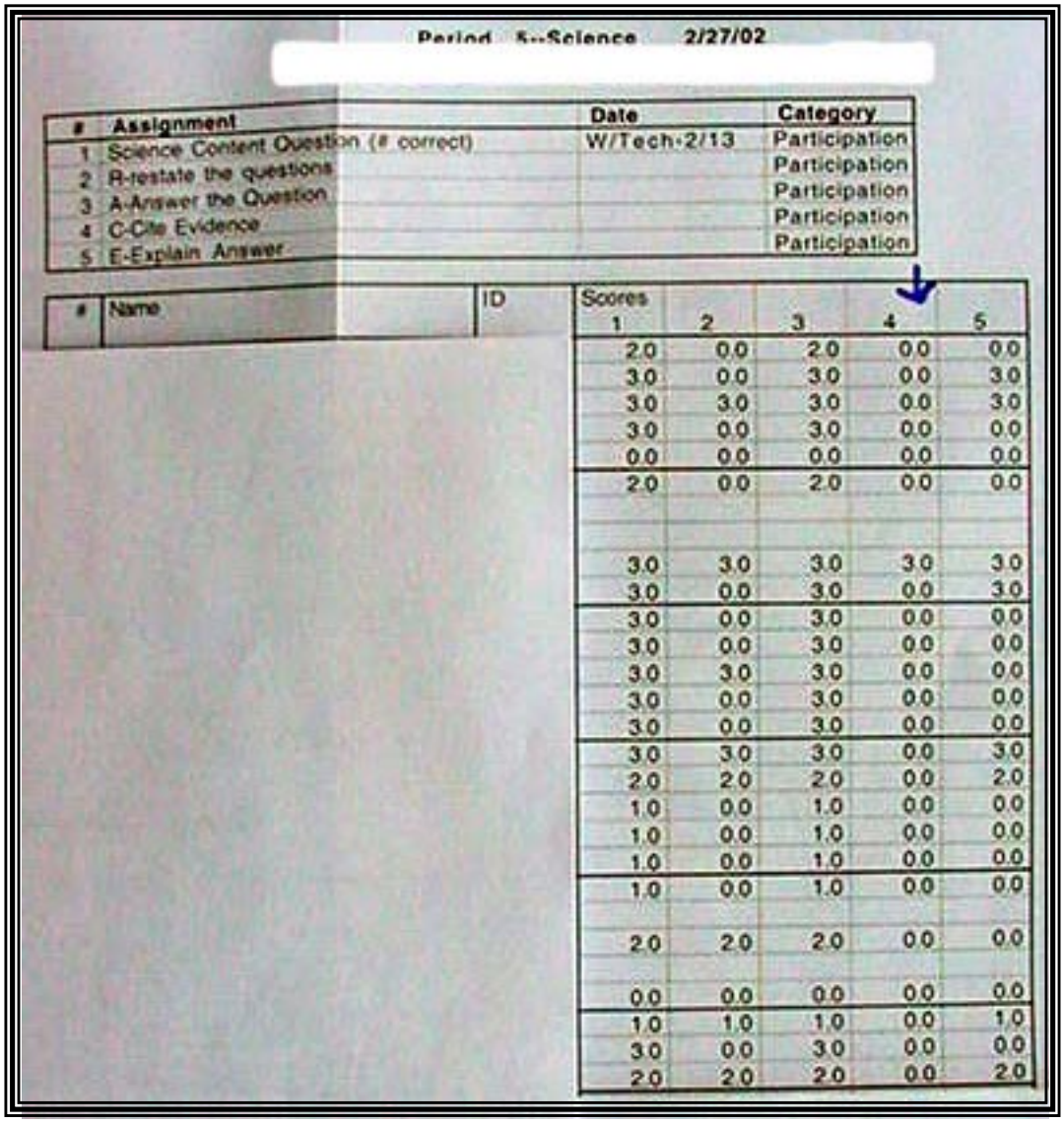
Picture 3 illustrates the results of the third writing assignment given to students. This is the same student's response to three different questions. Again, the teacher enabled and required the students to create an organizational web using a specific piece of graphic organizer software called Inspiration (Inspiration Software 6.0, 1999). Again, the RACE writing strategy was also required. On this student's third piece of written work there is evidence of even more growth. The student was successful at including:

step 1, **R**estating the question in two of the answers; step 2, **A**nswer the question and also attempted to provide a **R**eason in two of the questions.

The researcher observed the teacher's enthusiasm and increased positive energy as she reviewed and analyzed each piece of student work (Field Notes, February 25, 2002). At the same time, she could define the students' areas of growth, she was also able to immediately decipher what she needed to reteach. Sagor (2000) explains that teachers can be "vitally" energized by data that show that their persistence and perseverance have made a difference (p. 10).

Ultimately, four of the six teachers stated that they used student work data to inform them and make decisions about the teaching and learning process. The researcher observed that after teachers had gathered student work and had begun the analysis process, more and more decisions were influenced by what they found. In her observation field notes the researcher noted, "it was interesting listening to Teacher 3 talk about what she planned to do next to support her students that were still not understanding the concept" (Field Notes, January 8, 2002). Picture 4 provides an illustration as to how two of the teachers recorded and organized their student work data.

> Teacher 2 stated, "I think that by doing action research and really measuring in a very concrete way the impact of your decision, I think that it helps you to be in a way more ruthless about things" (Transcript 2, p. 3).



Period 5--Science 2/27/02

#	Assignment	Date	Category
1	Science Content Question (# correct)	W/Tech-2/13	Participation
2	R-restate the questions		Participation
3	A-Answer the Question		Participation
4	C-Cite Evidence		Participation
5	E-Explain Answer		Participation

#	Name	ID	Scores 1	2	3	4	5
			2.0	0.0	2.0	0.0	0.0
			3.0	0.0	3.0	0.0	3.0
			3.0	3.0	3.0	0.0	3.0
			3.0	0.0	3.0	0.0	0.0
			0.0	0.0	0.0	0.0	0.0
			2.0	0.0	2.0	0.0	0.0
			3.0	3.0	3.0	3.0	3.0
			3.0	0.0	3.0	0.0	3.0
			3.0	0.0	3.0	0.0	0.0
			3.0	0.0	3.0	0.0	0.0
			3.0	3.0	3.0	0.0	0.0
			3.0	0.0	3.0	0.0	0.0
			3.0	0.0	3.0	0.0	0.0
			3.0	3.0	3.0	0.0	3.0
			2.0	2.0	2.0	0.0	2.0
			1.0	0.0	1.0	0.0	0.0
			1.0	0.0	1.0	0.0	0.0
			1.0	0.0	1.0	0.0	0.0
			1.0	0.0	1.0	0.0	0.0
			2.0	2.0	2.0	0.0	0.0
			0.0	0.0	0.0	0.0	0.0
			1.0	1.0	1.0	0.0	1.0
			3.0	0.0	3.0	0.0	0.0
			2.0	2.0	2.0	0.0	2.0

Picture 4. Teacher's Record Sheet of Student Work

When the researcher discussed this type of student work recording method with Teacher 1 and Teacher 3, they explained how this type of spreadsheet enabled them to view overall class results and individual student results (Field Notes, February 15, 2002). For example column 4 shows that students were not performing well on this specific skill. The data illustrated that only one student understood and performed well on that specific concept. At the same time, the teacher could see that the student in row 1 received a score of 2 out of 3 points in only two areas. The teachers explained that they were able to see growth or lack of growth over time by printing and or merging several of

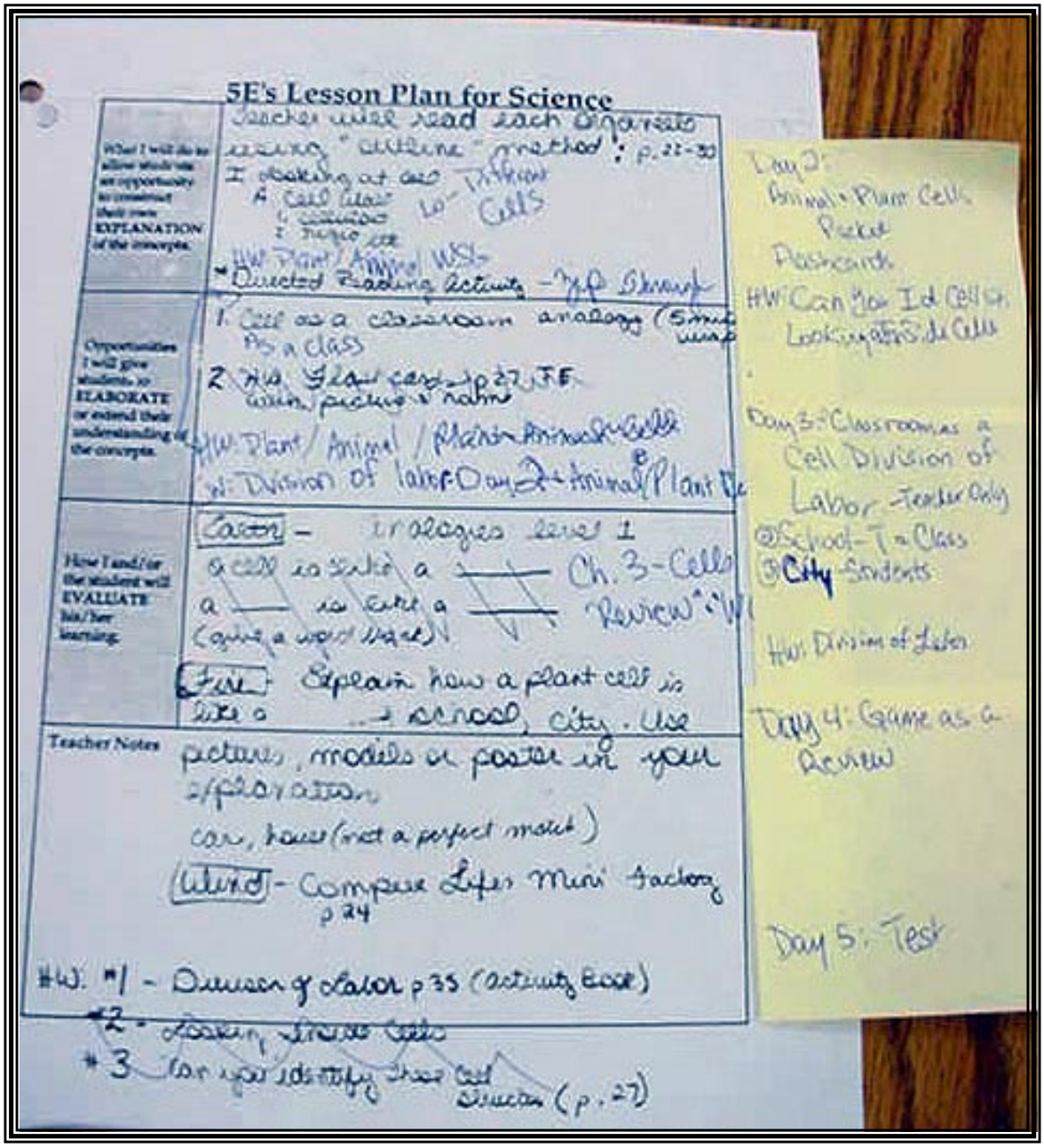
these record pages. This provided the teacher with valuable information for which skills needed more attention and which individual students need more support.

Planning

Another theme that emerged from the data was the effect action research had on teachers' planning. Four of the six teachers discussed how action research had encouraged a more critical eye in regards to lesson planning. Having a more focused approach to planning encouraged one teacher to pay more attention to differentiating instruction. One teacher spoke to how her planning was impacted by post reflection practices as evidenced in what Teacher 1 had to say. The researcher noted that when discussing with Teacher 1 her method of post-planning, she explained how she would spend time by herself thinking about what went well or what went wrong throughout the day (Field Notes, January 16, 2002). As she spent this time reflecting, she would simply jot down notes to herself on sticky notepads and post them in her plan book. This she hoped would help her remember her thoughts next year when she was preparing to teach the same concept to a set of new students. Picture 5 illustrates Teacher 1's method of recording her post reflections.

> Teacher 2 describes, "I think it's helping me just in overall planning as a teacher, and I also think it's helping me to differentiate and to individualize instruction" (Transcript 2, p. 1).

> Teacher 1 stated, … "my lesson plan book has got just tons of notes on it, what I could do differently for next year, … especially my lessons that I have technology in it. They're totally re-written, because I keep thinking of different things to do" (Transcript 2, p. 3).



Picture 5. Teacher's planning book with action research post reflection

Deliberate Reflection

Similarly, this same post reflection strategy of jotting down notes in a plan book was formerly noted in a study conducted by Kosnick (2000). The teachers changed their reflective practices from being more random in nature to deliberately making time to reflect on their instruction. This allowed them to rethink, make new connections and as a result improve their previous instructional practices

Reflection emerged as being a significant theme in this study. All six of the teachers in this study referred to reflection as being an important piece of their teaching practices. The teachers stated that reflection supported changes in their teaching practices in different ways, planning, focusing, and assessing. Teacher 2 stated, "You do that [reflection], almost instinctively, but in terms of really formal reflection, sitting down and writing reflection, I would say that I do that probably in a way every time I write a new lesson plan" (Transcript 2, p. 4). Likewise, Teacher 3 stated, "I can reflect on not just if they are doing it [the work], and how much they're doing it [the work]. . . . . So I can see kids as they make progress" (Transcript 2, p. 5). Both Kibourne (1998) and Schon (1987) confirmed that reflecting on one's experience was a means of building a repertoire of professional knowledge. Becoming more critical of one's practices helps to assess actions in order to improve practices. Teacher 6's realization of "thinking about what you thought about," as being a form of reflection is specifically validated by Sagor (2000). He explained, "when reflections on the findings from each day's work inform the next day's instruction, teachers can't help develop greater mastery of the art and science of teaching" (p. 7).

> Teacher 6 stated, "When I plan the next time, I think about what worked and what did not. I think about what I thought about. So I guess that's reflection, thinking about what you thought about" (Transcript 2, p. 2).

Contents of Reflective Practices

Research Question #4: How do teachers describe the changes, if any, in the contents and ingredients of their reflective practices as related to action research?

All six of the teachers referred to how their reflective practices had changed. Reflecting in detail was a significant theme that emerged from the data. All six teachers spoke specifically about how, as a result of engaging in action research, they reflected in more detail about how they could change and improve instructional practices. The teachers stated that their reflections targeted the three areas of planning, focusing, and assessing. Teacher 5 stated, "It [reflection] has helped with my planning. . . . Instead of giving homework at the end of class I give it at the beginning of class and can relate back to it throughout the class" (Transcript 2, p. 3).

> Teacher 4 stated, "I think about the students' performance on an individual basis, I think about how to improve the grouping of these cooperative learning environments. Also, I think about what worked most recently and what did not work and why it failed to work to try to make amendments for the next sessions" (Transcript 2, p. 3).

Along with more deliberate and detailed reflective practices, teachers talked about how reflection had helped them to change their teaching practices. In addition, the researcher noted that while informally talking with three of the teachers about their data, the teachers discussed how they had thought about what steps to take next to improve their instructional practices (Field Notes, January 15, 2002). The teachers stated that this thinking was prompted when they reviewed the data that showed some students' failure to meet their instructional expectations. Sagor (2000) described this analysis and reflection when he stated, "When individual teachers make a personal commitment to systematically collect data on their work, they are embarking on a process that will foster continuous growth

> Teacher 1 stated, "[Before] I wouldn't think about each individual part of the lesson, and what I could have changed to make it better. I found myself doing that more and more" (Transcript 2, p. 1)

and development" (p. 7). Sagor believes that one of the main purposes of action research is to build the reflective practitioner.

Additional Themes

Time- Restraining Force

Time was one of the most significant themes to emerge in this study. This finding of time as being a disadvantage of action research was in direct alignment with the findings of authors, Baily (1999), Burns (1999) and Wong (1993). All six teachers mentioned time as being a restraining force in essentially all aspects of engaging in action research. Teacher 4 stated, "Time, time, time. Having time, there never seems to be enough time" (Transcript 2, p. 5). Teacher 2 stated, "Well, I think the challenge really is to find the time and the drive to go back and double-check yourself" (Transcript 1, p. 8). Cochran-Smith and Lytle (1993) agreed with the need for more time, if teachers were to undergo research activities. They stated, "Teaching is a profession in which it is extraordinarily difficult to find enough time to collect data and it is almost impossible to find time to reflect, reread, or share with colleagues" (p. 91).

> Teacher 5 stated, "I haven't had time to do it [action research]. That is really what it is" (Transcript 1, p. 5).

When teachers spoke in terms of conducting action research from the beginning steps through to the final steps, time was the biggest issue with which teachers had to contend. Some teachers viewed action research as replacing or taking away from other things that usually take place. The researcher noted that on several occasions time was the biggest concern teachers had about action research (Field Notes, January 11, 2002). For example, when teachers were asked about challenges they faced in conducting action research, the teachers spoke about time being the main reason they were not as far along in the process as they had expected to be or wanted to be. Two teachers were more specific about the need for more time to address the steps involving data. Teacher 1 said, "The data itself, reading all the papers, grading all the papers, you know all that's time consuming and overwhelming along with the million other things that we have to do" (Transcript 1, p. 5).

Continuing the Practices of Action Research

In closing the last interview, teachers were asked if they planned to make action research a part of their practice. Despite the issue of time, five of the six teachers said that they felt that they would continue to include action research as part of their teaching practices. All six teachers viewed action research as helping them to improve as teachers. Teacher 2 stated, "You hope you are being effective, but you don't really know. This [action research] is a way of assuring yourself, maybe not completely, but to a much greater extent. You are able to measure yourself. And if you can measure yourself, then you can stand up to someone else's scrutiny" (Transcript 2, p. 5). Five teachers were far more committed to following the five-step process of action research, while Teacher 1 stated, "The reflection and planning, always. It just becomes a part of who I am now and I like it. It works for me" (Transcript 2, p. 5). Teacher 1 felt that although the planning aspect and the ongoing reflection were very helpful in improving her teaching practices, the data collection and data analysis were too time consuming. She also realized that she did not have enough expertise in working with data. This lack of expertise resulted in her becoming frustrated with the time involved in completing these two steps.

> Teacher 4 stated, "I hope to develop, to commit action research to my teaching repertoire for future years because I think it's really important to go ahead and use that data, that baseline data, to help impact instruction" (Transcript 1, p. 3).

At the same time, other teachers saw the value of engaging in all five steps. One of the reasons cited by three teachers was that action research gave them a way of measuring themselves and their work. It gave them the validation they wanted and needed to prove their teaching practices were worthy. Their thoughts revolved around proof that what they were doing instructionally was worthwhile which in turn lead to self-efficacy. Teacher 2 stated, "This [action research] is a way of assuring yourself, maybe not completely, but to much greater extent, you are able to measure yourself. If you can measure yourself, then you can stand up to someone else's scrutiny. There is so much

> Teacher 6 stated, "It [action research] seems that it is the perfect way to prove that what you've doing is good, or find something else you see is working" (Transcript 2, p. 3).

pressure on teachers these days, way more than 20 years ago. We're held up to so many standards, [both] local and national. . . . So, I think in a way, it's a way for us to feel confident about ourselves and a way for us also to protect ourselves" (Transcript 2, p. 8). The action research process enables teachers to actively participate in the development of practical knowledge about teaching. Authors Cochran-Smith & Lytle, (1990, 1999) and Noffke, (1997) explained that action research could be an effective method of professional development that leads to increased self-efficacy in teachers.

The researcher found that the patterns in the teachers' references and non-references to themes were distributed evenly across all themes. Table 5 provides an overall profile of teachers' interview responses. The information in Table 5 supports two areas of content analysis: (a) an overview of the relations between the six teachers and the number of corresponding references to the specific theme and (b) the number of teachers responding to each theme.

Table 5
Interview Responses and Relations to Themes

Themes	Teacher Responses Per Theme						Teacher Responses / Total Teachers
	T 1	T2	T3	T4	T5	T6	Total = 6
Structure	1	1	2	2	2	0	5/6
Collaboration	0	0	1	1	0	1	3/6
Improve Teaching Improve Student Learning	2	2	3	2	2	4	6/6
Student Work Data	1	2	2	0	1	2	5/6
Planning	3	1	0	1	2	0	4/6
Deliberate Reflection	1	2	1	1	2	2	6/6
Reflection Contents	2	2	1	2	2	2	6/6
Continue Action Research	2[a]	4	3	4	2	3	6[b]/6
Totals	12	14	13	13	13	14	

Note: [a]Teacher 1 responded in the negative both times. [b] One teacher responded negatively and 5 teachers responded in the affirmative both times.

Chapter 4 has presented the results of the study. Chapter 5 presents conclusions and recommendations for further study.

CHAPTER 5: CONCLUSIONS AND RECOMMENDATIONS

The intent of this chapter is to summarize the findings of this research study that investigated if and how teachers' thinking and instructional practices are influenced by teacher participation in action research. This chapter is presented in three parts: (a) summary and discussion of results, (b) conclusions and implications for practice, and (c) recommendations for further study.

Summary and Discussion of Results

Terry Carson (1990) made an interesting point that helped to verify some of the findings in this study. He stated that the main object of action research was to offer teacher researchers "the belief that we may develop our understandings while at the same time bringing about change in concrete situations" (p. 167). Action research is a means by which teachers are enabled to actively engage in combining the practice of teaching and the practice of research. The intricate weave of these two components embodies the art and science of teaching. This was especially evident when analyzing the data and common themes in the research questions targeting "knowledge about teaching" and change in "teaching practices." Themes that emerged from the data within those two areas were tightly interwoven. Additionally, the data revealed that as change occurred in any of the three areas of (a) teaching practices, (b) contents within reflective practices, and (c) knowledge about teaching, a motion of growth began and dispersed into all areas which ultimately influenced the underlying role of the teacher. Figure 3 provides the reader with an illustration of how the momentum of change in one area inspired change within the other three areas studied.

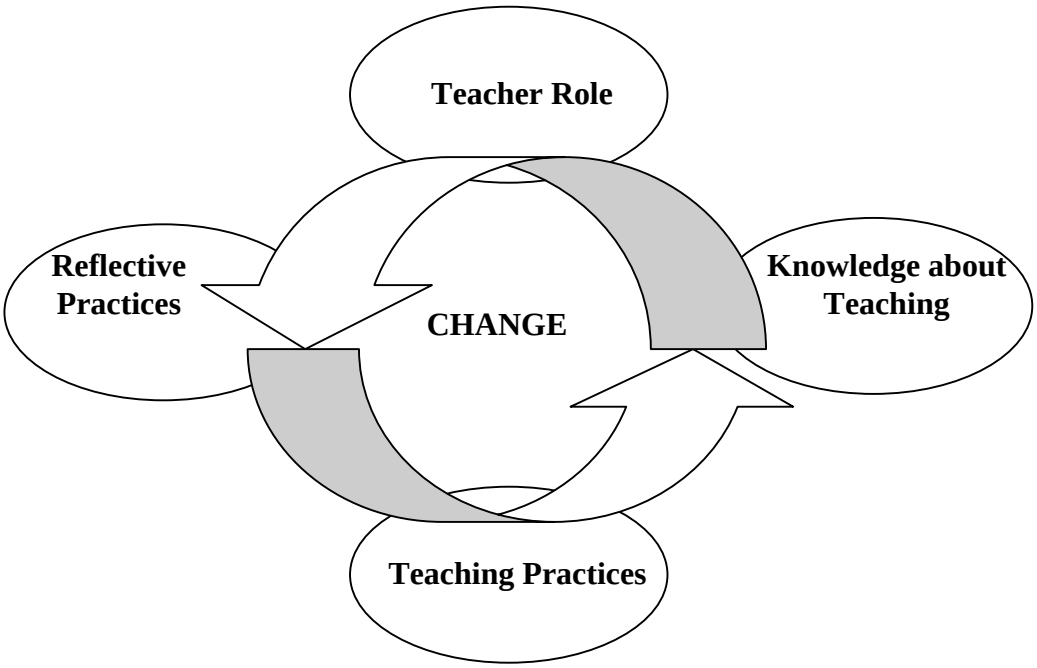


Figure 3. Change in One Area Inspired Change within the Other Three Areas.

The above figure illustrates teachers' perceptions about change in the four areas of investigation. The data revealed that each area played a part in changing the teacher role and as the teacher role changed, so did teachers perceptions about their knowledge about teaching, teaching practices and reflective practices. The changes that occur as a result of participating in action research do not occur in a vacuum. They are influenced by many other factors that make up the role of the teacher.

This study investigated three of those factors: teachers' actions as thinkers, learners and practitioners. For example, when a teacher's role was influenced through more structured planning, this was the impetus for the amount of deliberate reflection that occurred to improve the next day's plan. The contents of the next day's plan and the deliberate reflection were inspired by the new knowledge gained from a previous instructional intervention, which resulted in improved teaching practices. Therefore, the momentum of change continued to generate more change.

Conclusions and Implications for Practice

Teacher Role

The data revealed that the stages of action research provided teachers with a methodical structure for implementing and analyzing the teaching and learning process. This structure for professional practice offered teachers a valuable framework on which to hang their expanding teaching repertoire. As teachers used the steps of action research they found it provided a defined process of action. Therefore, they were more systematic and conscious of data collection, data analysis, and reflection.

Implication. The implication of this finding is that the elements of teaching are more consciously practiced when provided with a systematic structure. The methodical process of action research should be tailored and retooled so that more teachers would be encouraged to follow its path. Retooling the process to include a more in depth focus on the analysis of student data before finalizing the research question would help teachers to concretely identify steps for data collection and analysis.

As mentioned before, teachers' number one barrier in conducting action research was the lack of time. If a methodical process that involved the collection, monitoring and analysis of student work data became the norm in classrooms, teachers would be empowered to make their decisions about instruction in a more systematic manner. The methodical process of action research encouraged teachers in this study to make more informed, premeditated and purposeful decisions about teaching practices.

New Knowledge and New Practices

Teacher researchers changed their teaching practices because of what they learned about student learning while engaging in action research. In this study, teachers regularly aligned their instructional practices to what students needed to learn. This alignment was a direct result of what was learned after their analysis of student work data. These teachers saw the power of their new knowledge about student learning and acted on that new knowledge. This resulted in strategically targeted instruction designed to minimize student needs. Saphier and Gower (1997) stated that when teachers believe that there is "no real knowledge base on teaching, then it is easy to cruise on intuition…." (p. 579). In this study teachers had more than their intuition on which to rely.

The teachers in this study embraced the complexities of teaching and learning by their committed work towards improving their individual teaching practices. Their new understandings lead them to want to measure the effects of their efforts and the impact on student learning. Schmoker (1999) reported that, "data and results can be a powerful force for generating an intrinsic desire to improve" (p. 42). Based on student data, the teachers were able to synthesize their new knowledge and their prior knowledge about their students' performance and apply this new learning to new teaching practices. This cycle was previously illustrated in Figure 3.

Implication. The data from this study revealed that the lack of staff development for teachers in classroom data collection and analysis inhibits classroom teachers from being results focused and data-driven. This conclusion is in direct alignment with what Grant Wiggins had to say about teachers and data-driven results and what Michael Fullan had to say about monitoring and evaluating student results. Wiggins (1994) stated that a serious issue undermining the processes of teaching and learning is "the failure of classroom teachers … to be results focused and data-driven" (p. 18). Fullan (1991) not only encouraged using data to evaluate student progress and results, but just as important, using data to monitor student progress and results.

This finding implies that if the expectation for teachers is to make data-based decisions, then professional development targeting the effective means in which teachers can collect and analyze student work must be included in the schema of school improvement efforts. Similarly, Joyce and Showers (1995) stated, "if a staff development program is to have an impact, teachers and administrators must continuously study what they are implementing" (p. 4).

Teachers work with students in classrooms. It is in the classroom where teachers can collect performance data from student work. Therefore, teachers must be taught to effectively and efficiently collect and analyze both quantitative and qualitative classroom data. Schlectly (1990) also, supported the notion of providing teachers with the support they need when he emphasized, "to improve [schools], one must invest in people, support people, and develop people" (p. 38).

Reflective Practices

Engaging in action research influenced teachers' reflective practices. Deliberate and more detailed reflection furnished the teachers with the learning and growing that ultimately lead to changed and improved instructional practices. The process of action research encouraged the teacher researchers to reflect about the art and science of teaching. Sagor (2000) believed that an important purpose for action research was "building the reflective practitioner" (p. 7). Reflection empowers educators to interrogate the teaching practice in a more systematic and intentional manner. Agreeably, Danielson and McGreal (2000) viewed reflection as a critical aspect of professional growth.

Implication. The implication of this finding is that learning through reflection enables teachers to grow from previous experiences. The teachers in this study found that the action research was the motive for their increased, more detailed and methodical reflective practices. As a result, reflection became a natural part of their professional practice. Both Sagor (2000) and Schon (1983) explained that reflection on previous experiences makes possible thinking more critically about one's actions after they have taken place. When teachers are encouraged to promote continuous growth through reflective practices, the continual process of engaging the mind through self-reflection will become a habit of mind.

Time

It was found in this study that teachers' engagement in the action research process was highly contingent on available time. Time was found to be a significant constraining force for teachers engaging in action research. As Schlechty (1990) confirmed, "the one commodity that teachers … say that they do not have enough of, … is time" (p. 73). The teachers in this study referred to the lack of time as being the biggest obstacle they encountered while working through the action research process. Similarly, Cantor (1992) suggested that time was one of the barriers attributed to adult learning. Likewise, teachers suggested that time was a restrictive factor in mastering each of the five stages of action research.

The lack of time discouraged teachers throughout the process. Despite the fact that the teachers emphasized their lack of time, they continued to advance through the process with devotion.

Implication. Considering the reality of time in a teacher's work day, the implications of these findings for practice are important. The nature of a teacher's schedule does not easily allow for teachers to engage in action research. Careful examination of other teachers' duties such as clerical work, bus duty, and lunch duty should be considered. Fostering an environment that promotes ongoing professional learning may help to encourage restructuring time to be used in a different way.

Recommendations for Further Research

There are specific areas from this study that warrant further study. Given the small number of staff from which data were collected, this case study yielded limited data.

Add to These Findings

Further study of how action research influences teachers' thinking and teaching practices will be needed to add to these findings. Efforts should be made to expand the pool of teachers to other schools and other districts. Additionally, because all the participants in this study were from middle school, efforts should be made to study teachers conducting action research at both the elementary and high school levels.

Longitudinal Study

Future longitudinal studies will be needed to investigate the long-term changes in teachers' knowledge and practice as related to action research. The teachers in this study all changed their teaching practices while engaging in action research. The findings were interrelated in that a change in any one of the following, (a) reflective practices, (b) instructional practices, or (c) knowledge about teaching influenced change in all three of those components. The findings showed that teachers found action research helped them to critically assess their practices. Therefore, a longitudinal study that investigates the long-term influences of action research on teaching practices would be beneficial to education.

Time

All six of the teachers in this study referred to time as being a constraining force. The lack of time discouraged teachers throughout the action research process. Future studies will be needed to investigate possible alternative ways of structuring time and reallocating resources to better support action research efforts by classroom teachers.

Summary

Educators must become actively involved in initiating scholarship that guides their craft. This study of six teachers provides evidence that action research is one way in which educators can study teaching and learning practices that can guide the art and science of teaching. Action research provides a time consuming, structured and focused approach to looking at a teaching and learning process. As teachers engage in studying schooling they will increase their knowledge about the teaching and learning process.

Professional development based in action research encourages teachers to involve themselves as learners. Educators can use action research to uncover explanations to questions about the best way to improve their own teaching and learning practices. Action research engages educators in the process of examining and reflecting on how to improve practice, studying the literature and research related to their inquiries, and then implementing a strategy intended to improve current practice.

This study provided evidence showing that reflection is a key element of teacher development. Critical reflective thinking can be a vehicle that helps teachers progress from a level where they are largely guided by intuition to a level where their actions are guided by reflection and self-inquiry. Action research encourages educators to be reflective of their own practice to enrich the quality of education for themselves and their students. It facilitates teachers' use of research-based teaching strategies appropriate to their instructional outcomes and their students. Teachers can use action research to both improve their own teaching and learning process and may also make significant contributions to the development of the teaching profession.

The potential for teacher empowerment for the purpose of improving the quality as well as effectiveness of instruction through action research was evident throughout this study. Empowering teachers to conduct research and to connect that research to the implementation of new teaching approaches can ultimately equip them with the strategies that promote improved teaching and learning practices. It was also evident that action research requires a commitment of time and resources. Studies that investigate and compare the impact of time in relation to a teacher's level of expertise in conducting action research will help provide ideas on how to effectively conduct teacher research within the confines of a teacher's workday.

The systematic and methodical process of action research promotes the change of instructional methods that school reform advocates have for so long sought. Specific skills concerning data collection, collaboration, and the reflection process are needed in pre-service, on-going staff development, and post-service programs. Additionally, tools such as technology, audio-video equipment, and qualitative analysis are essential for teachers to observe, collect data, connect information, and apply the generalizations to classroom practice.

A primary implication of this study is the potential of action research to promote teacher effectiveness, professionalism, and empowerment. However, further studies concerning the implementation, and on-going impact of action research are needed for the field of education to fully embrace this process. Studies that measure how teachers that have engaged in their own data-driven, classroom-based teacher research transfer their learning to their instructional practices and as a result influence student performance will help inform educational improvement efforts about teaching and learning practices.

To meet the demands of a swiftly changing society, it is important that teachers actively study the practice of teaching. Action research allows educators to study and improve the teaching and learning process. It bridges the gap between theory and practice. Because of this connection, the process of action research allows the teaching profession to take a zealous lead in determining the future of educational practices. Educators must embrace the responsibility to effectively study the way in which we teach and learn. It can not be expected that teachers will have the knowledge to effectively infuse innovative strategies into their instructional programs without actively pursuing effective means to conduct teacher research.

The findings of this study can help guide educators in future decisions about teaching practices and student performance. Through teacher research educators can begin to shift the paradigm of routine instructional customs to more innovative instructional practices that are grounded in practitioner research. Action research can provide a vehicle that broadens the arena in which educators learn and succeed.

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Appendix A

Action Research Study
General Information Questionnaire

Dear Action Research Study Participant: It is important that the researcher have general information about the participants. The information you provide will help to ensure that accurate information is written in the final report.

Your Name: _____

School Name: _____

Grade(s) Taught: _____

Subject(s) Taught: _____

Total Years Teaching: _____

Email address: _____

Phone number: _____

Please place a check by the most appropriate response.

I am participating in the Maryland Tech Consortium Action Research Initiative because,

- I volunteered to participate.
- An administrator selected me.
- Another person selected me in my school building.
- I was told I had to participate.

Appendix B

First Interview Questions

1.Talk to me about what you have learned from engaging in the beginning steps of the action research process.

1a.Talk to me about where you are in the action research process.

2.You've decided to focus on a specific issue for your action research project. What kinds of information did you use to select this issue?

2a. How did you decide to use the information you did?

3. What do you hope to gain from engaging in this action research?

3a. Do you foresee any challenges or obstacles? If so, what are they?

4. General Question: Can you give me a specific example?

Appendix C

Second Interview Questions

1. Talk to me about how you have evolved as a teacher as is related to engaging in action research.

1a. I am interested in knowing about the differences you see in yourself as to how you make decisions about instruction.

1b. Talk to me about your professional growth in the past year.

2. You have spent time thinking and reflecting about your instructional practices. I am interested in hearing about the impact of this reflection.

2a. I am interested in hearing about what specific things you reflect about in regards to teaching and learning.

2b. I am interested in knowing about how regularly you reflect about your decisions about instruction.

3. Tell me about those things that you feel as a teacher have the greatest influence on student learning.

3a. Tell me about the things that you have done in the past month that will affect student learning.

Special instructions: *Participant's will be asked questions 3 and 3a while looking at student work.*

4. Will action research continue to be part of your practice? If so, why? If not, why not?

4a. What factors or conditions contributed to your decision to make action research a continued part of your practice?

4b. What factors or conditions contributed to your decision *not* to make action research a continued part of your practice?

5. General Question: Can you give me a specific example?

6. General Question: Is there a question that I did not ask, that you think I should have asked?

Appendix D

Classroom Observation Instrument
First Interview

Teacher Name: _____Code: _____Date: _____

Study Questions: 1. How do teachers describe their perceptions of the *teacher role* as related to action research? 2. What are teachers' perceptions of *their knowledge about teaching* as related to action research?
Interview Questions: (1-1b) 1.Talk to me about what you have learned from engaging in the beginning steps of the action research process. 1a.Talk to me about where you are in the action research process. General Question: Can you give me a specific example?
Response: (To be completed after interview) . The four specific areas of investigation were (a) the overall teacher role, (b) teachers' knowledge about teaching, (c) teaching practices, and (d) reflective practices.
Observable: Yes No **Domain:** Role Knowledge Practices Reflection **Additional Data:** *Student Artifact* *Teacher Artifact* *Field Notes*
Observed Behavior: (Checklist to be created according to interview response.)
Response: (To be completed after interview)
Observable: Yes No **Domain:** Role Knowledge Practices Reflection **Additional Data:** ***Student Artifact*** ***Teacher Artifact*** ***Field Notes***
Observed Behavior: (Checklist to be created according to interview response.)

Classroom Observation Instrument
First Interview

Teacher Name: _____ Code: _____ Date: _____

Study Questions: 1. How do teachers describe their perceptions of the *teacher role* as related to action research? 2. What are teachers' perceptions of *their knowledge about teaching* as related to action research?
Interview Questions: 2.You've decided to focus on a specific issue for your action research project. What kinds of information did you use to select this issue? 2a. How did you decide to use the information you did? General Question: Can you give me a specific example?
Response: (To be completed after interview)
Observable: Yes No **Domain:** Role Knowledge Practices Reflection **Additional Data:** *Student Artifact* *Teacher Artifact* *Field Notes*
Observed Behavior: (Checklist to be created according to interview response.)
Response: (To be completed after interview)
Observable: Yes No **Domain:** Role Knowledge Practices Reflection Additional Data: ***Student Artifact*** ***Teacher Artifact*** ***Field Notes***
Observed Behavior: (Checklist to be created according to interview response.)

Appendix E

Classroom Observation Instrument
Second Interview

Teacher Name: _____Code: _____ Date: _____

Study Questions: 1. How do teachers describe their perceptions of the *teacher role* as related to action research? 2. How do teachers describe the changes, if any, in their *teaching practices* as related to their participation in the action research process? 3. How do teachers describe the changes, if any, in the *contents and ingredients of their reflective practices* as related to action research?
Interview Questions: 1. Talk to me about how you have evolved as a teacher as is related to engaging in action research. *1a. I am interested in knowing about the differences you see in yourself as to how you make decisions about instruction.* *1b. Talk to me about your professional growth in the past year.* General Question: Can you give me a specific example?
Response: (To be completed after interview)
Domain: Role Knowledge Practices Reflection **Additional Data:** ***Student Artifact*** ***Teacher Artifact*** ***Field Notes***
Observed Behavior: (Checklist to be created according to interview response.)
Response: (To be completed after interview)
Observable: Yes No **Domain:** Role Knowledge Practices Reflection **Additional Data:** ***Student Artifact*** ***Teacher Artifact*** ***Field Notes***
Observed Behavior: (Checklist to be created according to interview response.)

Classroom Observation Instrument
Second Interview

Teacher Name: _____Code: _____Date: _____

Study Questions: 1. How do teachers describe the changes, if any, in their *teaching practices* as related to their participation in the action research process? 2. How do teachers describe the changes, if any, in the *contents and ingredients of their reflective practices* as related to action research?
Interview Questions: 2. You have spent time reflecting about your instructional practices. I am interested in hearing about the impact of this reflection. 2a. I am interested in hearing about what specific things you reflect about in regards to teaching and learning. 2b. I am interested in knowing about how regularly you reflect about your decisions about instruction.
Response: (To be completed after interview)
Observable: Yes No **Domain:** Role Knowledge Practices Reflection **Additional Data:** ***Student Artifact*** ***Teacher Artifact*** ***Field Notes***
Observed Behavior: (Checklist to be created according to interview response.)
Response: (To be completed after interview)
Observable: Yes No **Domain:** Role Knowledge Practices Reflection **Additional Data:** ***Student Artifact*** ***Teacher Artifact*** ***Field Notes***
Observed Behavior: (Checklist to be created according to interview response.)

Classroom Observation Instrument
Second Interview

Teacher Name: _____Code: _____Date: _____

Study Questions: 1. How do teachers describe the changes, if any, in their *teaching practices* as related to their participation in the action research process? 2. How do teachers describe the changes, if any, in the *contents and ingredients of their reflective practices* as related to action research?
Interview Questions: 3. Tell me about those things that you feel as a teacher have the greatest influence on student learning. 3a. Tell me about the things that you have done in the past month that will affect student learning. General Question: Can you give me a specific example?
Response: (To be completed after interview)
Observable: Yes No **Domain:** Role Knowledge Practices Reflection **Additional Data:** ***Student Artifact*** ***Teacher Artifact*** ***Field Notes***
Observed Behavior: (Checklist to be created according to interview response.)
Response: (To be completed after interview)
Observable: Yes No **Domain:** Role Knowledge Practices Reflection **Additional Data:** ***Student Artifact*** ***Teacher Artifact*** ***Field Notes***
Observed Behavior: (Checklist to be created according to interview response.)

Classroom Observation Instrument
Second Interview

Teacher Name: _____Code: _____Date: _____

Study Questions: 1. How do teachers describe their perceptions of the *teacher role* as related to action research? 2. What are teachers' perceptions of *their knowledge about teaching* as related to action research? 3. How do teachers describe the changes, if any, in their *teaching practices* as related to their participation in the action research process? 4. How do teachers describe the changes, if any, in the *contents and ingredients of their reflective practices* as related to action research?
Interview Questions: 4. Will action research continue to be part of your practice? If so, why? If not, why not? 4a. What factors or conditions contributed to your decision to make action research a continued part of your practice? 4b. What factors or conditions contributed to your decision not to make action research a continued part of your practice?
Response: (To be completed after interview)
Observable: Yes No **Domain:** Role Knowledge Practices Reflection **Additional Data:** ***Student Artifact*** ***Teacher Artifact*** ***Field Notes***
Observed Behavior: (Checklist to be created according to interview response.)
Response: (To be completed after interview)
Observable: Yes No **Domain:** Role Knowledge Practices Reflection **Additional Data:** ***Student Artifact*** ***Teacher Artifact*** ***Field Notes***
Observed Behavior: (Checklist to be created according to interview response.)

Appendix F

COMPARATIVE-CASE MATRIX								
STRUCTURE			**T 1**	**T2**	**T3**	**T4**	**T5**	**T6**
Interview			Interv---Page	Interv---Page	Interv---Page	Interv---Page	Interv---Page	Interv---Page
			2---1	2-- 2	2---1, 2, 3	2---1, 2	2---1	
Observation/Field Notes			Date 12/9	Date 1/16	Date	Date	Date 1/14	Date
Teacher Work			X	X	X		X	
Student Work			X					
COLLABORATION			**T 1**	**T2**	**T3**	**T4**	**T5**	**T6**
Interview			Interv---Page	Interv---Page	Interv---Page	Interv---Page	Interv---Page	Interv---Page
					2---2	2---1		2---6
Observation/Field Notes			Date 11/15, 1/11	Date 11/15, 2/7	Date 11/15, 1/11, 2/7	Date 1/11	Date 11/15, 1/11	Date 1/11, 2/7
Teacher Work								
Student Work								
IMPR. TEACH/STL & Concr st.ud learn			**T 1**	**T2**	**T3**	**T4**	**T5**	**T6**
Interview			Interv---Page	Interv---Page	Interv---Page	Interv---Page	Interv---Page	Interv---Page
			1---3, 4	1----1 & 1---11	1---1 & 2---3	1---1, 3	1---1, 4	1---1, 3 & 2---2, 3
Observation/Field Notes			Date 1/7	Date 1/3	Date 1/8	Date	Date	Date 1/8
Teacher Work			X		X			
Student Work			X				X	X
Stud Work Data			**T 1**	**T2**	**T3**	**T4**	**T5**	**T6**
Interview			Interv---Page	Interv---Page	Interv---Page	Interv---Page	Interv---Page	Interv---Page
			2---6	2---1, 3	2---2, 5		2---4	2---2, 4
Observation/Field Notes			Date 2/12, 2/25	Date 2/6	Date 1/31-12/9	Date	Date 11/21- 12/9	Date 12/9
Teacher Work			X	X	X		X	X
Student Work			X				X	

COMPARATIVE-CASE MATRIX								
PLANNING			**T 1**	**T2**	**T3**	**T4**	**T5**	**T6**
Interview			Interv---Page	Interv---Page	Interv---Page	Interv---Page	Interv---Page	Interv---Page
			2---1, 3, 6	2---1		2---1	2---2, 3	
Observation/Field Notes			Date 2/25	Date 1/9	Date 1/8	Date	Date	Date
Teacher Work			X		X		X	X
Student Work								
DELIBERATE REFLECTION			**T 1**	**T2**	**T3**	**T4**	**T5**	**T6**
Interview			Interv---Page	Interv---Page	Interv---Page	Interv---Page	Interv---Page	Interv---Page
			2---1	2---3, 4	2---5	2---2	2---2,3	2---2, 3
Observation/Field Notes			Date 1/16	Date	Date	Date	Date 1/7	Date
Teacher Work			X		X		X	
Student Work								
MORE DETAILED REFLECTION-CONTENTS			**T 1**	**T2**	**T3**	**T4**	**T5**	**T6**
Interview			Interv---Page	Interv---Page	Interv---Page	Interv---Page	Interv---Page	Interv---Page
			2---1, 3	2—3, 4	2---5	2---1, 3	2---3	2---1, 3
Observation/Field Notes			Date 1/15	Date 1/15	Date 1/4-1/15	Date 1/15	Date 1/7-1/15	Date 1/4-1/15
Teacher Work			X		X			
Student Work								
TIME			**T 1**	**T2**	**T3**	**T4**	**T5**	**T6**
Interview			Interv---Page	Interv---Page	Interv---Page	Interv---Page	Interv---Page	Interv---Page
			1---4, 5	1---8	1---5	2---2, 5 & 1---1	1---5	1---5, 6
Observation/Field Notes		Interims Interivew	Date 11/12-12/9-12/17-1/4	Date 11/12-12/9	Date 11/12-12/17-1/15-1/16	Date 11/12-12/17-1/4	Date 11/12-12/9	Date 11/12-12/9
Teacher Work								
Student Work								

COMPARATIVE-CASE MATRIX								
CONTINUE AR			**T 1**	**T2**	**T3**	**T4**	**T5**	**T6**
Interview			Interv---Page	Interv---Page	Interv---Page	Interv---Page	Interv---Page	Interv---Page
			NO 2---5 &6	2—5, 7, 8, 9	2---9, 11	1---3 & 2---4, 5	2---4, 5	2---3, 5, 6
Observation/Field Notes			Date --	Date --	Date --	Date --	Date --	Date --
Teacher Work								
Student Work								

VITA

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EDUCATION

2002	Virginia Polytechnic Institute and State University, Blacksburg, VA; Doctor of Philosophy in Education candidate, Educational Leadership and Policy
1990	Western Maryland College, Westminster, MD; Master of Science in Education, Educational Media & Technology, K-12
1979	Bridgewater State College, Bridgewater, MA; Bachelor of Science in Education, Elementary Education, K-8

CERTIFICATION

Present	Maryland State Advanced Professional Certificate
1993	Johns Hopkins University, Baltimore, MD; administration coursework

WORK EXPERIENCE

1985 – 2002	Montgomery County Public Schools, Maryland
2000 - 2002	Instructional Specialist, Office of Staff Development
1996 - 2000	Instructional Technology Specialist, Office of Global Access Technology
1994 – 1996	Media Specialist, Roberto Clemente Middle School
1988 - 1994	Media Specialist, Gaithersburg Elementary School
1986 - 1988	Classroom Teacher, Grades 4 and 5/6, Clopper Mill Elementary School
1985 - 1986	Technology Teacher, Grades K – 6 Wheaton Woods Elementary School,
1980 - 1985	Classroom Teacher, Grades 1 - 3, Woods Academy, Bethesda, MD
1979 - 1980	Classroom Teacher, Grade PreK, Woodlawn School, Bethesda, MD
2000 – Present	Adjunct Professor, Western Maryland College, Westminster, MD
2000 – 2001	Adjunct Professor, Virginia Tech, Falls Church, VA
2000 – 2001	Curriculum Development, Maryland Space Grant Consortium; Towson University, Johns Hopkins University, Raytheon, Inc.
1992 - 1994	Curriculum Development, Johns Hopkins University Education Center, Baltimore, MD
1990 – 1991	Curriculum Development, Discovery Channel, Bethesda, MD

PROFESSIONAL ORGANIZATIONS

Association for Supervision and Curriculum Development

Delta Kappa Gamma International - Theta Chapter

International Society for Technology and Education

Maryland Instructional Computer Coordinators Association

Maryland Staff Development Council

National Staff Development Council