

MASTER TEACHERS' CRITICAL PRACTICE
AND STUDENT LEARNING STRATEGIES:
A CASE STUDY IN AN URBAN SCHOOL DISTRICT

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A DISSERTATION

Submitted to the Ph.D. in Leadership & Change Program
of Antioch University
in partial fulfillment
of the requirements for the degree of
Doctor of Philosophy

November, 2009

This is to certify that the dissertation entitled:

MASTER TEACHERS' CRITICAL PRACTICE AND STUDENT LEARNING STRATEGIES:
A CASE STUDY IN AN URBAN SCHOOL DISTRICT

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Acknowledgments

When I think about the last seven years and the journey I chose in my doctoral work, I know that the completion of this dissertation would not have occurred without the help of others. I acknowledge the hard work of Laurien Alexandre the director of the leadership and change program, as well as the faculty and staff of the university graduate school. To my research librarian, Debra Baldwin, I recognize with gratitude because without her expertise and individual attention, this work could not have been conducted. I am also appreciative of the urban school district, principals, and teachers who allowed and participated in the research study.

I am grateful to my advisor and mentor Elizabeth Holloway who kept me on track both academically and personally. She was always responsive to my questions, challenges, and ideas. Her thinking and grounded, purposeful pace helped me make connections and deadlines that otherwise may not have occurred. Additionally, the readers Brad Mitchell and Laurien Alexandre pushed my thinking for extended research and documentation. These perspectives were an invaluable part of the process. I would also like to acknowledge Professor Carol Baron who participated in the initial proposal process that contributed to the development of appropriate methods for the research study.

I want to make a special acknowledge to my research team assistant Brinda Price. Her professional experience, scholarship, and dedication to academic excellence enabled this study to move forward with accuracy, legitimacy, and integrity. I am sincerely grateful to her willingness to volunteer countless hours on nights and weekends.

Finally, to my family and friends who I put on hold while moving through the process, your encouragement and support is justly recognized and sincerely appreciated. May we now make new goals and reach greater heights together.

Abstract

Job embedded professional development in the K-12 education setting has long been discussed and debated. This study builds on standards of critical reflection and thinking using the National Institute for Excellence in Education's Teacher Advancement Program's master teacher model as a conduit between theory and practice. A study of professional development design based on student learning strategies became worthy of review. The master teacher, through field testing and critical reflection, isolates critical elements necessary to transform teaching practice around student learning strategies. The work of the master teacher is situated as a leader of change within a professional learning community. This work has potential to promote significant school improvement. The Teacher Advancement Program models a systematic process by which teachers develop and tune teaching strategies directly from student identified need. This study captures the chronicling process as it relates to and aligns with standards of critical thinking, student meta-cognition, and student deployment and use. It provides a forum for training teachers to be critically reflective practitioners moving conversation and study from theory to practice. The electronic version of this dissertation is available in the open-access OhioLink ETD Center, www.ohiolink.edu/etd

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Chapter I: Introduction and Positioning

Well into the fourth month of the academic year, in December 2006, I spent an afternoon with one of the Teacher Advancement Program (TAP) master teachers observing a seventh grade language arts class in a mid-west city school district. As state director, this is something I do with our master teachers routinely, particularly with those who are new to the program. It provides an opportunity to develop both a common understanding and an expectation of performance around the TAP instructional rubric for teacher skills and knowledge. As we approached the classroom, the previous group was leaving and the new group was coming in. I was struck by this teacher's genuine interest and caring for her students. Hugs and well wishes were predominant, including friendly reminders to "tuck your shirt in" or to watch spouting out particular expletives. The teacher also reminded her students that she had baked a special treat for them and that, if they worked hard, they would enjoy it at the end of the class.

Over the last eleven months, I have immersed myself in search of a process through which teaching practitioners identify critical attributes in their instruction, ultimately helping students to be strategic learners. This began with a critical review of methods around adolescent use of learning strategies and the meta-cognitive processing necessary for cognitive transfer and eventual activation once students realized that their comprehension was compromised. This search has led me, both professionally and personally, to suspect the extent to which this process is pragmatically possible. First, the TAP process requires a deep understanding of instructional practice and a willingness to take time to be critically reflective. Second, the TAP process uncovers both teacher and student vulnerabilities, opening potential political barriers. Third, effective student deployment of learning strategies requires careful construction and modeling by the classroom teacher.

Clearly, the teacher I observed that day had a fondness for her students and certainly appeared to have their genuine interests at heart, but in reality, there is no evidence that anything which took place in the sixty minute teaching block was an outgrowth of critical reflection by the teacher.

Mezirow (1990) defines critical reflection in concert with the making of meaning. Through meaning making, experience becomes internalized and new interpretations are made. This guides decision making through new learning. “Reflections enable us to correct distortions in our beliefs and errors in problem solving. Critical reflection involves a critique of presuppositions on which our beliefs have been built” (Mezirow, 1990, p. 1).

Critical reflection will strengthen this teacher’s instruction and give her students the tools necessary to compete cognitively. Lack of evidence for critically reflective processing continues to hold true in class after class that I observe as part of my TAP responsibilities. Unfortunately, students are often the passive recipients of information that a teacher has “gathered,” but students are seldom shown how to monitor comprehension and make adjustments when their comprehension is compromised.

After teaching for fourteen years and eleven subsequent years in leadership positions in education, I found the extent to which I was pushed toward critical reflection, once I entered the Teacher Advancement Program, provocative. I always considered myself to be reflective as a teacher, but I soon realized the extent to which I engaged in this practice by myself or with my colleagues to be slight. I also recognized that, within the profession, critically reflective teaching is not, and has not been, nurtured to the extent that a critical mass of reflective practitioners exists within the national teaching force.

My position as a researcher then flowed naturally while in this professional placement. With responsibility toward initiating and maintaining the integrity of the program throughout the state, I had the opportunity to see challenges that were political, organizational, and financial. All must be carefully considered when leading systemic change. Additionally, I have been trained extensively in TAP processes and protocols by national trainers within the foundation. Connection to the state department of education allowed for breadth of perception and accurate assessment for statewide expansion possibilities.

I now realize that it is only when teachers have the necessary skills to be critically reflective, defining attributes of instruction that work toward increased student achievement, that these “best” practices can be “framed and posted” as a means to enhance professional practice. So, how do we teach teachers to be critically reflective with the specific purpose of increased student achievement? It was detected through this work that teachers move forward in their instruction without a clear understanding of what they are looking for and how to go about achieving it.

Purpose and Rationale for Study

What, then, do the unwritten rules used by critically reflective teachers look like for forming and transforming the presuppositions upon which current teaching beliefs have been built? The purpose of this study builds on the pressing need to capture, in a chronicle-like form, what proficient TAP master teachers actually “do” in the forming and transforming of their currently held presuppositions. TAP master teachers are rated “proficient” according to the TAP leader/evaluator rubric. TAP, a system in which teacher leaders use critical thinking to inform practice, provides opportunity to explore this work and the extent to which it influences what

they determine to be important. It provides opportunity to study the larger issue of critical thinking.

“For the most part, schools have been organized hierarchically: principals are leaders and teachers are followers. However, schools in the process of restructuring are coming to understand that this conception of leadership restricts the building of a culture of inquiry” (Grimmett & Neufield, 1994, p. 23). As leadership becomes more shared and broadly distributed, it is important to have specific protocols for delivery of high quality professional development that include critical reflection around inquiry leading to transformation of teaching practice.

What does it mean for school change?

In critically reflective teaching, mistakes never constitute failure, but are the conduits toward transformation of practice toward higher levels of awareness and effectiveness. It is useful for the school culture to understand the value of the process of this ambiguity. They create the container, the environment, for this new reality to be manifested. In TAP, this container includes the systems within the applied professional growth domain. In a 1999 report, Bailin, Case, Coobs and Daniels include 1) background knowledge, 2) heuristics, 3) knowledge of key critical concepts, 4) operational knowledge of the standards of good thinking, and 5) habits of mind as a template for critical thinking. “Leaders in restructuring schools create environments and conditions that provide increased comfort with making mistakes and learning from them” (Mojkowski, 1991, p. 29).

Greenleaf addresses the ambiguity with which leaders are faced as they set out to serve by breaking apart and rebuilding a reality. There are no absolute assurances; one must lead from the hypothesis crafted after study and experience. Even though the leader may have options to reexamine the choices and even select different options, faith is what influences the choice

(Greenleaf, 1991). “Faith is the choice of the nobler hypothesis. Not the noblest; one never knows what that is. But the nobler, the best one can see when the choice is made” (Greenleaf, 1991, p. 14). What does the critically reflective teacher use to guide this “faith?” What activates and/or influences this thinking? “How does this impact construction of student learning strategies?”

Heifetz refers to “guiding values [that] are interpreted in the context of problems demanding definition and action. Those who lead have to learn from events and take advantage of the unplanned opportunities that events uncover” (Heifetz, 1994, p. 23). They enjoy improvisation. There are, however, levels of risk as manifested by what the leader brings to the experience. Freire warns of leader shortcomings and their potential on the “choice of the nobler hypothesis” (Greenleaf, 1991).

Freire (2003) warns that fragmenting reality into little pieces has potential danger. “Part to whole” is not useful; rather, “whole to part” fosters clear, more valuable perception. Hence, gaining this “critical understanding” of their reality becomes the most provocative answer to what the change-strategist leader for school professional development should be. This understanding is not a destination; rather, it is [just] something presently out of reach; it is something to strive for; to move toward or become. It is so stated that it excites the imagination and challenges people to work for something they do not yet know how to do... (Greenleaf, 1991, p. 16).

What should the school change strategist do?

Greenleaf (1991) maintains that one of the leader’s most significant challenges is answering the question: “What are you trying to do?” He replies that the question is easy to ask and difficult to answer (Greenleaf, 1991). Reich’s symbolic analyst brings valuable insight to

answering this question. The iterative response involves brokering and building, and then pointing the direction. A high degree of communicative dexterity is required, meaning that the leader listens, collects, communicates, and questions. Clear, succinct metaphor and analogy aid in this part of the process. The direction finally chosen should be built from the collective. Since leaders shepherd this collective understanding, [they] “always know what it is and can articulate it for any who are unsure. By clearly stating and restating the goal, the leader gives certainty and purpose to others who may have difficulty in achieving it themselves” (Greenleaf, 1991, p. 15).

“Using a variety of methods, new leaders constantly remind staff and others of the gap between the vision they have for their children and their current actions and accomplishments. They use dissonance to create a press for improvement” (Mojkowski, 1991, p. 28). Throughout the TAP protocol, assessment of student work serves as the driving force of dissonance. Continuous communication exists stating the disparity between current status and established goals.

Heifetz believes a means to create dissonance or “a press for improvement” is through adaptive work. It begins from a holding environment that is framed around a “...relationship in which one party has the power to hold the attention of another party and facilitate adaptive work” (Heifetz, 1994, pp. 104-105). A developmental task or opportunity serves as the prerequisite necessary for framing the work. “[This] holding environment can generate adaptive work because it contains and regulates the stresses the work generates” (Heifetz, 1994, pp. 104-105).

What goes on in this holding environment has direct implications for the significance and “sustainability” of the change. Within the TAP model, this holding environment, iterative within itself, is the weekly cluster meeting. It is necessary for master teachers to engage in sustained

critical reflection over time and then use it as a guide to “press for improvement” as they construct, model, and teach student learning strategies.

How does change impact student learning?

In a review of the literature on adolescent learning strategies, few studies could document specific gains in academic achievement. Additionally, students could have declarative knowledge about a strategy, but lack understanding to transfer it to a cognitive level that would impact achievement. In other words, a student might be able to talk about a reading strategy and explain how it works didactically; however, the student is unable to deploy the strategy when it is necessary due to lack of a deeper understanding of the strategy’s use, a true measure toward increased academic achievement.

The research on student strategies and their potential to increase student comprehension and/or the frequency with which the strategy might be used appears predominant in the literature. What is not clear in the landscape of research on student strategies is the process and/or reason by which the adolescent student internalizes a strategy, connects and then replaces an ineffective strategy with it and, finally, is motivated to activate the use of the strategy.

The challenge before a critically reflective classroom teacher is to become consciously competent of teaching practices that trigger student understanding. These become the critical attributes of instruction that must always be present to ensure student success. These critical attributes do not simply pop up and announce themselves; to “mine” them within the landscape of instructional practice requires a solid teaching repertoire that includes classroom experience, knowledge of content, and an understanding of learning theory. “[This] professional judgment of the teacher is critical as he or she makes decisions in the classroom to design experiences that encourage student learning” (Campoy, 2005, p. 41).

What are the implications for the teaching profession?

Since *A Nation at Risk* (The National Commission on Excellence in Education, 1983) was first published, a sense of urgency has been established in our country's public schools to reform professional practice and increase student achievement. The report declared that, if the United States had any hope of maintaining a level of preeminence in commerce, industry, science, and technological innovation in the next century, a break from mediocrity had to take place. The report gave further explication that, in the 21st century,

individuals in our society who do not possess the levels of skill, literacy, and training essential to this new era will be effectively disenfranchised, not simply from material rewards that accompany competent performance, but also from the chance to participate fully in our national life. (The National Commission, 1983, p. 7)

Over a twenty-year period following this document's publication, there have been numerous reform initiatives planned and funded with state and federal dollars, and almost all have had limited success in transforming teacher practice and raising student achievement. It begs the question why, after so much support, has so little progress been made? The answer, in part, is that the method by which professional development has historically been delivered to teachers has not been framed as part of a learning process.

The ongoing applied professional development within the TAP model provides opportunities for this to occur through weekly cluster meetings and individual growth plans when the teaching practitioner engages in critical reflection. The master teacher presents new learning focused specifically on identified student needs and then the teacher has an opportunity to develop the new learning during the same session. This requires the teacher to remember:

[r]emembering is central to learning because we learn with our old interpretation. Any new or revised interpretation also must be remembered for subsequent use in making extrapolations, analyses, generalizations, or judgments. If an interpretation is not remembered, it implies thinking, but not learning. (Mezirow, 1991, p. 11)

The weekly cluster meetings meet the criteria outlined by the National Staff Development Council's Standards for Professional Development published in 2001. Under the council's "context and process standards," the TAP model addresses the requirements of:

- 1) aligned professional development goals to school and district goals,
- 2) new teacher learning based on disaggregated student data,
- 3) use of student learning strategies toward an intended goal,
- 4) application of research to decision making, and
- 5) an applied theory of human learning and change. (National Staff Development Council, 2001, p. 5)

In essence, the TAP model provides a system for professional collaboration with specific goals based on the greatest areas of student need within a school or district.

Additionally, on January 8, 2002, President Bush signed into law *No Child Left Behind* (NCLB) as Americans united saying that all children can and must learn. The law recognized what is needed in providing for a high quality education. It called specifically for a highly qualified teacher in every classroom as well as the effective use of research based instructional methods and strategies. The combined effort of the NCLB legislation and the National Staff Development Council's Standards for Professional Development present promise for averting the potential disenfranchisement of thousands of citizens outlined over twenty years ago in *A Nation at Risk*.

How does critical reflection impact professional development design?

But clearly, the work has only begun. Because the teaching profession has had a long history of professional development that provided opportunity for teachers to think, but not learn, in a manner that promoted transformation of teaching practice, it is now necessary to establish

new emphasis and intentional development of the critically reflective teacher, so that a critical mass exists within our national teaching force.

To what extent does the current literature on student learning strategies make comment? How do empirical studies capture understanding of strategy use by students? It became evident in TAP that we must better understand the process of being a critically reflective teacher. The research in this study initiates thinking for educational leaders to consider as they train practitioners in becoming critically reflective around instruction of student learning strategies. A Midwestern urban school district has initiated TAP within Ohio over the last three years. Master teachers have been selected according to district staffing policies. Several master teachers have reached or are emerging toward the proficient level. From this identified collective, master teachers were invited to participate in this research.

Theoretical Foundation: Critical Thinking and Instruction

Bailin et al. (1999) developed a conceptualization of critically reflective thinking around five standards (Standards of Critically Reflective Teaching: SCRT). Through the development of their standards, they point out that “it is the quality of the thinking, not the process of the thinking which distinguishes critical from uncritical thinking” (Bailin, Case, Coobs, & Daniels, 1999, p. 288). Becoming critically reflective is not a matter of learning a checklist of skills or acquiring a specific skill set; it is broader than either of these. The standards imply what a “critical thinker must be able to *accomplish*, for the only way we have of describing what one is able to do in thinking is in terms of the outcomes generated by the thinking” (Bailin, Case, Coobs, & Daniels, 1999, p. 288).

Within the concern of teaching practice, the critically reflective teacher is able to identify and move from the “hows” to the “whys” during an instructional trajectory that promotes student

understanding around a learning strategy. This student *understanding* is substantiated through formative assessment. However, when a teacher knows “why” a particular practice works, there is a much higher likelihood teacher learning, which is transformational, has taken place. The teacher has moved from unconsciously competent to consciously competent, from intellectual development to conceptual development, from thinking to learning.

The concept of critical thinking and/or the critical thinker and how it is actually manifested is both complex and ambiguous. Bailin, Case, Coombs, and Daniels (1999) maintain that there is no particular conception of critical thinking that is necessarily a prescribed method, because it requires connecting and critiquing ideas and information in multi-dimensional ways and, therefore, cannot be reduced simply to a process. This complexity is why it seems ambiguous at times. “This suggests that thinking regarded as critical thinking must be directed toward some end or purpose...” (p. 286).

Good critical thinking is defined by the end product, the result of the thinking, more than as a discrete process. Bailin, Case, Coombs, and Daniels (1999) contend that “it is the standards of good thinking that provide the criteria for determining what attributes are important for critical thinkers” (p. 289). A strong critical thinker is defined with respect to intellectual resources rather than a checklist of observable skills. Hence, these intellectual resources are defined around five key domains:

- 1) background knowledge,
- 2) heuristics (strategies, procedures, etc),
- 3) knowledge of key critical concepts,
- 4) operational knowledge of standards of good thinking, and
- 5) habits of mind. (p. 290)

The strength of the end product correlates to good critical thinking. The processes used to get there, however, are implied within the person's intellectual resources defined within the standards listed above.

The framework presented by Bailin, Case, Coombs and Daniels (1999) was developed with specific interest in the education field. While agreement exists amongst scholars currently for abstract levels of critical thinking, the framework outlined here is at the forefront for providing a conception of critical thinking so that academic study can exist in relationship to specific field of inquiry. This conception of critical thinking around standards was considered both for academic disciplines as well as for instruction in colleges of education. The work of this dissertation extends that of Bailin, Case, Coombs and Daniels (1999) as the standards are purposefully used as the organizing structure both for academic study of the literature and as the organizing frame for research question development.

Alignment of Teacher Advancement Program to National Professional Development Standards

As noted, the National Staff Development Council (NSDC, 2001) provides published standards for staff development. TAP's *ongoing applied professional growth* component supports the NSCD's standards. Of the current 200 TAP schools, all are required to schedule sixty to ninety minutes weekly into the duty day for the professional development components. This meeting, called a *cluster*, follows a specific protocol based on five elements of effective instruction. They are:

- a) identify need,
- b) present new learning,
- c) development of new learning,
- d) application of new learning, and

e) evaluation (Teacher Advancement Program, 2006, p. 56).

In a typical cluster meeting, the master teacher is responsible for identifying the most current student need based on a formative assessment as it relates to the state standard. From this identification, new learning, as it directly addresses the student need, is taught to the teachers during the new learning block. This includes modeling the critical attributes of the master teachers' instruction that made the student strategy work with their students. It is during the development block that the teacher learning begins its transformational process in terms of the adult learner, the teacher. Master teachers must gauge this process in each of their cluster members and make intervention as appropriate. Application begins, then, in the classroom with master teacher support. Evaluation of student achievement is made as it directly relates to mastery of the stated learning objective. Work is continuously refined based on student achievement measures against state academic content standards.

The TAP master teacher serves as the primary research/staff developer. The position rests within the context of the school faculty as a teacher leader. While the master teacher works in concert with the school's leadership team, the master teacher position rests at the epicenter of the work.

The TAP protocol addresses the NSDC learning community's standard for professional development goals that are aligned with school and district goals. It begins with the development of the school plan which drives further development of yearly cluster and cluster cycle goals. "The most powerful forms of staff development occur in ongoing teams that meet on a regular basis, preferably several times a week, for the purpose of learning, joint session planning, and problem solving" (NSDC, 2001, p.8).

The TAP master teacher serves as the primary researcher/staff developer. The position rests within the context of the school faculty as a teacher leader. While the master teacher works in concert with the school's leadership team, the master teacher position rests at the epicenter of the work. This meeting time in TAP occurs during weekly sixty to ninety minute clusters with subsequent follow-up in the classrooms with teachers teaching students.

TAP protocol further addresses the data-driven dimension of the standard as new teacher learning in the TAP model is determined by disaggregated student data. Based on state testing data aligned with state academic content standards, a school or grade level's greatest area of need is defined, such as measurement of reading process. Professional development for eight- to nine-week cluster cycles is based on the students' weakest areas. "Early in a staff development effort, educational leaders must decide what adults will learn and be able to do and which types of evidence will be accepted indicators of success" (NSDC, 2001, p. 16). The indicators of success in the TAP component are academic benchmark assessments aligned with the state assessments and state academic content standards. Student achievement in the TAP context is aligned with state academic standards or local benchmarks.

Essentially, the master teacher scaffolds assessment so that the identified need from the state standard can be monitored throughout the professional development process. The school goal is measured by gains on the state assessments; the yearly cluster goal is measured by gains on the school or benchmark assessment; and the cluster cycle goal is measured by the teacher made assessment showing progress toward mastery of the identified student need.

Within the NSDC learning standard, staff development should improve the learning of all students while utilizing knowledge about human learning and change. Through the TAP cluster protocol, new teacher learning has a much higher likelihood of becoming transformational,

because sessions provide opportunity for modeling. Development of the new learning begins as members are asked to remember what was presented and then integrate it within their classroom context.

During the field test, master teachers must determine what worked in their instruction, based directly on student achievement measured against the state academic content standards. Included in the field test is the student learning strategy that is researched, selected, and designed by master teachers. “[I]t is important that the learning methods used in professional development mirror as closely as possible the methods teachers are expected to use with their students” (NSDC, 2001, p. 24). Member follow-up is then tailored to the individual teachers according to their level of competency with the newly introduced student strategy selected based on the identified student need, and designed around research and field test application. An example of a student strategy would be an “It says, I say” student strategy for guiding students through the meta-cognitive process for making inferences while reading.

During development step three of the TAP model, members have the opportunity to design and then develop the student learning strategy presented by the master teacher. This begins the opportunity for transformational learning. The master teacher models the new learning, emphasizing the critical attributes necessary for enhanced student understanding and increased student achievement.”[T]raining sessions and coursework must include live or video models of new instruction strategies, demonstrations in teachers’ classrooms, and coaching or other forms of follow-up if those strategies are to become a routine part of teachers’ instructional repertoire” (NSDC, 2001, p. 22). Teachers receive additional coaching through the follow-ups as master teachers make formative assessments of each of their members through informal classroom observations.

A working leadership team existing within the TAP model allows educators within a school to apply research to decision making on student strategy construction. After student need is determined and before professional development is presented to teachers, the leadership examines the research base behind student learning strategies. “[I]t is critical that teams of teachers and administrators take the time to study methodically the research that supports the claims made by advocates of a particular approach to instructional improvement or whole-school reform” (NSDC, 2001, p. 20). This research serves as the base for further extension and tailoring of the learning strategy, which occurs during field testing, for the school’s individual students. From this field test, master teachers begin the journey of critical reflection. They are charged with the responsibility of isolating the critical attributes of the learning, the elements of teaching that enhanced student understanding, and the heightened student achievement.

From a broad perspective within the education field, the work of this study falls within the level of the outlined global-to-local prototype below. The primary focus of this research was d, e, and f, as illustrated in Figure 1.1.

a) National Council of Professional Development
b) Teacher Advancement Program
c) Districts/School sites
d) TAP Leadership Teams-master/mentor/administrator
e) Field testing-development of long-range plan for clusters
f) Sixty to ninety minute weekly cluster sessions
g) Classroom follow-ups

Figure 1.1

Relevance of the Teacher Advancement Program

The TAP is a comprehensive, systemic school reform model with the specific goal of restructuring the teaching profession, while attaining measurable gains in student achievement. TAP currently (2008) exists in over 200 schools in fourteen states and the District of Columbia. The local, state and district programs are expected to follow the national model. Assessment of this alignment is made annually during program review. The program consists of four interrelated elements that include: 1) multiple career paths, 2) performance based compensation, 3) instructionally focused accountability, and 4) ongoing applied professional growth.

It is within the ongoing applied professional growth component, which includes weekly professional development cluster meetings and teacher individual growth plans, that the ability to become a critically reflective teacher is essential for success. This ongoing applied professional growth component is the focus of this study. As a systemic school reform model, TAP was developed by a not-for-profit organization in Santa Monica, California. The findings in this study initiate thinking for educational leaders to consider as they train practitioners in becoming critically reflective.

Focus of this Research Study

The focus of this dissertation is a multiple case study in a large urban, Midwestern school district participating in the Teacher Advancement Program. The multiple case offers an approach to study an on-going program of teacher development that models itself around attributes of critical thinking. This multiple case study examines an on-going system of teacher development where teachers use critical thinking to inform immediate practice and then use it to plan teacher development. Participants were selected by a TAP executive master teacher at the state department of education trained in the TAP model. Participants were rated as cluster

leaders/evaluators based on TAP rubrics as being proficient or emerging proficient in their delivery. Consistent interview guides, standard operating procedures, site observations, and follow-up conversations were identified and developed by the state executive master teacher and this researcher. The team met monthly during the first year, and weekly to biweekly during the final year for data analysis.

Chapter II: Literature Review

“[P]rofessional educators have voiced with increasing frequency their worries about the gap between the schools’ prevailing conception of professional knowledge and the actual competencies required of practitioners in the field” (Schon, 1987, p. 10). Closing this gap is one of the most pressing leadership challenges faced by schools and districts today. It is necessary to provide professional development that includes not only new learning, but also opportunities to transform practitioners’ understanding; one that allows for development and application around instruction of student strategies. This requires broadening of the way professional development is delivered. This chapter includes an explanation of teacher leadership in the Teacher Advancement Program as a model for professional development. A theoretical and empirical grounding upon which this study is built is discussed as it relates to the establishment of professional learning communities that build components of critical practice into daily work. Application of empirical literature on secondary teaching and student learning strategies is included in the conversation as it relates to critical thinking.

Leadership and the Teacher Advancement Program

In the past, professional development was viewed as an external resource brought into the school for principals and teachers. To promote “learning” that extends beyond just thinking into transformation of teaching practice requires a radically different delivery system. “What is being proposed here is a different view of the roles of the principal and the teacher. Principals have power...but it is ‘power to accomplish’ rather than power over people and events” (Grimmett & Neufield, 1994, p. 23). This can be extended through a broadening of professional responsibilities for delivery more directly to experts within the school itself—master teachers.

In a letter to President Obama, Lieberman and Mace share the challenges of professional teacher development and propose needed reform in teacher learning. Their work, conducted through the Carnegie Academy for the Scholarship of Teaching and Learning, includes teacher learning from teacher questions and teacher learning from records of practice. Teacher questions were generated from needs encountered in the classroom, while records of practice illustrated needed work and scholarship for connecting these records of practice with specific student outcomes. The primary advocacy from Lieberman and Mace is the creation of the teacher opportunities for “going public” with the inquiry made into their teaching practice so that others may elevate their own knowledge base.

The learning communities studied (Nelson, 2008) illustrate variability with a culture based on the professional habits of the school. Time may be framed within the work day, but the authenticity of the work related to student achievement can vary considerably. While the potential is present for transformation of teaching practices, it is different based on context and stakeholders. Within the study, the highest performing school created a sense of mission and collaborative study with specific focus on student learning and isolation for what worked and what needed modification. Other sites focused on more traditional ways of classroom lesson validation, activity choice, and analysis of what the school data meant.

There are implications for professional learning communities driving the term’s broad use and what is actualized within the context of the school by definition. Servage (2009) describes the precarious position of teaching practitioners for disengaging themselves to the extent necessary to realize levels of objectivity. The challenge of moral imperative by which the teacher operates is more akin to a nurturing village and is in contrast to a scientific laboratory.

Servage contends that, because of this reality, the teacher must blend the premises of critical pedagogy with democratic ideals and the potential to achieve social justice.

Servage (2008) integrates transformative learning with the potential for adult change of practice through learning communities. The particular challenge with the school culture is driven by the angst felt by the practitioner during periods of unsettled thought due to self-scrutiny and a challenge to deeply held beliefs. Servage further contends transformation is mostly used in reference to the school because of this.

In an Alabama task force, Good and Weaver (2003) provides clear critique for effective and equitable operation of a newly-instituted state in-service centers. Studies indicate teachers prefer to work in grade level cohorts and are most likely to garner support and assistance from fellow teachers as opposed to administrators, university professors, or curriculum coordinators. The study also indicated that most learning occurs within the context of teaching. This supports and adds strength to the premise that professional development services should support a learning community and build on collaborative work.

Clausen, Aquino, and Wideman (2009) indicate when given opportunities for broad school change within a community of learners, there is a higher degree of success. The process moves forward in small ways, first by transforming teacher work from being a transmitter of information to more of an authentic researcher and learner. Their findings indicate broad support of professional learning community ideals such as a shared construction of an identified need based on a school reality and needed learning that feeds and supports the shared goal. Other factors included shared decisions; evidence of long-term commitment that included a record of the learned story. From this, faculty began to think in more collegial ways with the school organization benefiting from holistic, shared, and professional collaboration.

Carroll (2009) promotes the creation of a discourse community to explore social construction within the school. While the focus is on entry year teachers, goals are designed based on career development over all stages of a teacher's career that include leaders of learning. "The starting point for this process is to identify areas of existing practice with which, in some way, teachers are dissatisfied, so that they may critically reflect upon this practice with a view to collaboratively plan an improvement-focused intervention within their classroom" (p. 28). The iterative nature of reflective practice is considered and is categorized drawing reference to Cochrane-Smith and Lytle's (1999) knowledge-for-practice, knowledge-of-practice, and knowledge-in practice.

Aubusson, Steel, Dinham, and Brady (2007) report the challenge for transforming professional learning communities and acknowledge the synergistic application required for actualization. Action learning is defined in a community of practice. Schools initiated professional learning that included discourse around an identified need, professional respect, and the development of collective expertise. The highly effective sites reach a level of critical mass with this dynamic. Importantly, "professional development was shaped by the system which the schools operated by but allowed to evolve from an individual context" (p. 135).

Doolittle, Sudeck, and Rattigan (2008) pose necessary critical elements as schools partner with institutions of higher education. Authentic engagement and voice of the practitioner were found to promote the strongest partnerships between the school and the higher education institution. Small learning communities coupled with time embedded into the work day and fluid relationships were the most distinctive successes in the work of professional development schools.

Mullen and Hutinger (2008) include focus on the principal as well as the institution of higher education. Distributed leadership that includes administrator active participation serves the study groups best. Work includes identification of learning outcomes with specific monitoring with recursive debriefing of student progress. Job-embedded professional development provides development and application of new learning that includes inquiry and reflection. The university partner provides important work reciprocity to enhance programs within both organizations.

Theoretical Grounding for Literature Review

Three over-arching questions provide guidance as the teacher leader “presses for improvement” and becomes critically reflective around instruction of student learning strategies in relation to the five previously stated standards in Bailin, Case, Coombs, & Daniels, (1999) to gauge critical thinking. First, as master teachers grow to higher levels of self-actualization, what does this element mean for them? What should they know as they define themselves as school leaders for professional development? (*What does it mean?*) Second, as master teachers plan for the school’s yearly professional development, how do strong, sound critical thinking skills impact them as clinical practitioners? (*How is it used?*) Finally, when students use a learning strategy, what is its level of effectiveness for increased achievement, its student deployment frequency, and its implications for independent application? (*How do I apply it?*) These questions are considered against theoretical research and current empirical data; they serve as a basis upon which to plan this study’s research methodology.

Critical thinking within the field testing component of the TAP model has been identified as a key area for framing professional development for teachers that most directly impacts student achievement and has the potential to become transformational. During this period, the

master teacher has the responsibility to “test out” a student learning strategy that the leadership team has determined is most appropriate to meet the most pressing student academic need. The learning strategy begins within the research base from which it exists. Through field testing and the teacher’s critical reflection, it is tailored to directly meet the needs of the students in that school. From this, teachers capture the “hows” of their teaching and must reach toward the “whys.” The teacher begins to move from unconsciously competent to consciously competent, from intellectual development to conceptual development.

With that, the following discussion includes theoretical and empirical data in relation to the five standards of critical thinking (SCRT) as presented by Bailin, Case, Coombs, and Daniels (1999):

- 1) background knowledge,
- 2) heuristics (strategies, procedures, etc.),
- 3) knowledge of key critical concepts,
- 4) operation knowledge of standards of good thinking, and
- 5) habits of mind. (Bailin, Case, Coombs, & Daniels, 1999)

Critical Thinking Standards for Teacher Preparation within the Teacher Advancement Program
Background Knowledge

As teachers begin to define themselves as critically reflective, it is useful to understand the extent to which their background knowledge defines their leadership. Responsibility for understanding the meaning behind this definition and the application for its use in school professional development is significant. The ability to recognize and look objectively at both personal strengths and weaknesses as leaders in this “adaptive environment” has direct

implications for the success of the learning around the strategy construction and its potential to become transformational.

What does it mean? Mezirow (1991) describes the extent to which leaders draw upon past experiences to define current areas of concern. It is much like drawing upon personal investments as needs present themselves throughout life.

We have to draw upon our past knowledge to make interpretations that help us choose the dimensions of a new experience to which we will attend. We also draw upon prior learning so that we may associate the new experience with related ideas.” (p. 16)

A critically reflective teacher uses past experience and connects it to current need. This need is determined by the isolated segment of instruction where success has occurred or where student comprehension has been compromised.

As mentioned, there are no absolute assurances; one must lead from the hypothesis crafted after study and experience, and perception plays into the hypothesis in a marked manner. “We develop or construct personal meaning from our experience and validate it through interaction and communication with others. What we make of the world is a result of our perceptions and experiences” (Cranton, 2006, p. 23). As new learning is presented to practitioners, it is valuable to explain that newly made assumptions deemed effective have been the result of interaction with current stakeholders—the students. Field testing validates these current assumptions at a primary level.

As this information is gathered and assumptions become quantified, the master teacher plays a particularly influential role throughout the process. “Frame factors [or assumptions] of different kinds have a strong impact on educational practice, these factors are also ‘moulded’ through the way they are interpreted and understood by the teachers doing the teaching” (Handal & Lauvas, 1987, p. 15). Empowerment is implied within the position; teacher leaders must know

that what they are contending has both merit and value to the school's constituents. "Ultimately it involves a willingness to trust one's own experiences, insights, and intuitions as accurately representing reality even when those contradict dominant values and majority opinion" (Brookfield, 1990, p. 24). It is valuable for the leader to acknowledge any reservations, but important to recognize that the direction being charted is one that the organization will use as a guide. The person chosen to lead this work must exhibit this ability and skill. The leader should keep in mind,

we are all prisoners trapped within the perceptual frameworks that determine how we view ourselves, we are stymied by the fact that we're using our own interpretive filters to become aware of our own interpretive filters—the pedagogic equivalent of trying to see the back of one's head while looking in the bathroom mirror. (Brookfield, 1995, p. 28)

The leader uses others to provide feedback on ideas and critique them honestly and openly.

"Leaders of restructuring schools create environments and conditions that provide for increased comfort with making mistakes and learning from them" (Mojkowski, 1991, p. 29).

This means developing a process for collecting, updating, and interacting with the knowledge gathered from research, operations, customer service, in this case students, and other daily activities. Hence, the role of the master teacher becomes that of "knowledge capitalist." What the leader must do is develop a keen sense for developing "a market that evaluates, recognizes, rewards—and thus shapes—the knowledge assets" (Hesselbein, Goldsmith, & Beckhard, 1997, p. 74). However, it is important to keep in mind that the reflective habits of which the master teacher makes use are learned habits and are culturally imposed (Brookfield, 1995). The caveat communicated is to be clear on this cultural context and then clarify and critique these "knowledge assets" with colleagues. This means that the process is recursive refashioning of the background knowledge in a continuous manner which is regularized in the TAP model through field testing.

This further adds to the meaning behind the master teacher's background knowledge as it builds in a continuous manner. Dewey (1997) maintains that the experience of this newly refashioned background knowledge takes on two aspects. The first is the extent to which the learner or reflective practitioner agrees or disagrees with the problem or proposal. Here the delivery and presentation of ideas becomes significant; hopefully garnering future inquiry and engagement. This leads into the second aspect involving influence and impact on future experiences and/or exchanges. "Just as no man lives or dies to himself, so no experience lives and dies to itself. Wholly independent of desire or intent, every experience lives on in further experiences" (p. 27).

A final factor in making meaning from background knowledge is that of relevance. Bruner (1973) sees value and necessity in making the relative connection between human beings and society, for both social and personal relevance. Social relevance impacts humans everywhere and, in some way, makes small provisions for improvement and survival of humanity. Personal relevance connects at the individual level providing intrinsic satisfaction. "What is taught should be self-rewarding by some existential criterion of being 'real' or 'exciting,' or 'meaningful'" (p. 114).

How is it used? To date, a generally accepted theory of instruction has not yet been established. "We have had to make do and are still making do on clever maxims and moralistic resolutions about what instruction is and should be" (Mezirow, 1991, p. 15). Background knowledge plays into this to the extent that the maxims and moralistic resolutions are a part of a school's overall philosophy of education. This, then, has an increasing impact for critically reflective processes and how they are used with the school frame. "A critically reflective teacher

is much better placed to communicate to colleagues and students—as well as herself—the rationale behind her practice” (Brookfield, 1995, p. 23).

Having a defined working sense for what this means in advance can serve to inform the leader particularly during times of marked change. When there is little time to gather additional evidence or to reflect to any extent, having a firm understanding of how this rationale may be used and drawn upon to inform leadership is necessary.

While theorists can sit in their office...spending days and weeks analyzing what goes on in the practical world, identifying principles and structures to create order in a blurred world, the practitioner often finds himself in a constant...decision-making and acting role.” (Handal & Lauvas, 1987, p. 5)

The master teacher serves as a practitioner, in a dynamic environment.

Clearly then, there is value for the ongoing interaction that can take place between all members to add to individual and collective background knowledge. Building on both depth and breadth of background knowledge is noteworthy. For establishing purpose as part of a collective, Brookfield (1990) contends that, historically, more importance has been placed on breadth, rather than depth of content. With that has come sacrifice of skill; students often feel lacking in necessary skill in order to be fully productive. The comment is distinctive and worthy of consideration because of the potential void that may be created when an individual lacks both depth and breadth in background knowledge for understanding, crafting, and communicating rationales and defenses for particular actions.

To use effectively, the potential to ask purposeful questions, to be skeptical, to hold a broad understanding of the field must exist. McPeck (1981) refers to it as reflective skepticism or, in other words, healthy skepticism because it is about advancement and extension of learning to add to background knowledge, not simply to be disagreeable. This broad understanding of the

field is, in actuality, dynamic for the practitioner, but serves master teachers' use as a holding environment of sorts; where they return regularly to debate, reflect, discuss, and evolve.

Once this holding environment moves through a point of discovery and renders a new value structure around the opportunity for change, the leader must have the learning environments ready to support followers who have evolved and are prepared to embrace new personal growth. The learning is most effective when it is self-directed. "We have to stop simply telling them what they need to know, and find more ways to help them experience what they need to know and lead themselves in a learning process relevant to what they have discovered" (Vaill, 1996, p. 134). Vaill argues that the learner must take the leap from part to whole, making application of new learning, and that this "leap" is best made within the parameters of the organization itself.

Schon (1987) suggests apprenticeships as viable holding environments for this transfer in background knowledge from discovery to practice, ultimately increasing the potential and likelihood for transformational learning.

Apprenticeship offers direct exposure to real conditions of practice and work. But most offices, factories, firms, and clinics are not set up for the demanding task of initiation and education. Pressures for performance tend to be high; time at a premium; and mistakes costly. (p. 37)

Apprenticeship offers the valued exercise of contributing at a foundational level for organization members, teachers, to experience what they need to know, and opportunity to remember; hence, transforming practice adding to the individual's collective background knowledge.

How is it applied to secondary school teaching and student learning? Hartley (2001) specifically focuses on hypermedia instruction and the potential for teaching students learning strategies within that context. She heightens awareness toward the complexities behind teaching learning strategies to secondary level students. Even though students may have become meta-

cognitively aware, that did not directly influence the actual usage of the student strategy. The developmental stage of students could influence strategy use as well as the existence of previously held “meta-knowing” skills that older students must then integrate new strategy learning with that which they already know or use as part of their background knowledge.

Hartley (2001) generalizes to the extent that “[w]hile encouraging learners to use learning strategies, the environment should be conducive to their use...simply having self-check questions and objectives available does not guarantee their use” (p. 301). When is the strategy deployed by the student? What compels the student to use the strategy? What impact does the environment have on the student’s use of the strategy?

Conner and Gunstone (2004) found that student writing quality increased when students had a range of strategies for selection in their background knowledge and had made a conscious decision to use them. Her data focuses on student strategy selection and suggests reasons for lack of student selection that could include automation (such as riding a bike) that might decrease awareness. Interestingly, her research focuses on students’ knowledge, monitoring, and control of learning as opposed to the usefulness of a strategy.

Peklaj and Pecjak (2002) continue the conversation within a self-regulated domain that included both achievement and gender. Their research uncovered that medium achieving students were more goal-directed and had a higher frequency of strategy use. This adds value to the research conversation, because differences between medium achieving and the high achieving could indicate that they have automated some of these strategies as part of their background knowledge, eliminating the necessity of establishing the goal.

Pappa, Zafiropoulou, and Metallidou (2003) build research and offer discussion around students’ intention to plan, monitor, and control their own learning. They argue that, when

learners have meta-cognitive control of their reasoning, establishing a goal based on prior background knowledge, they can then apply it to similar reasoning in the future. A quasi-experimental design allows comparison to be made with students who received intervention on mapping and motivation skills and those who did not. Those who received the intervention performed significantly higher.

Heuristics

As the context in which background knowledge grows over time, strategies and procedures become more pronounced and deemed useful as established heuristics. These heuristics serve to guide thinking and performance. An awareness of these allow the master teacher to problem solve and make appropriate determinations in response to identified areas of student need.

What does it mean? For the master teacher, heuristics serve as the driver or strategy set for analysis, synthesis, and evaluation of information. These strategies exist in a dynamic manner emerging in progressively more sophisticated and evolved ways throughout the situation or study at hand.

Heuristics ground thinking because “[a] critical rationale for practice is a psychological, professional, and political necessity” (Brookfield, 1995, p. 23). Heuristics become a grounding point; in essence, an anchor or “a foundational reference point—a set of continually tested beliefs that we can consult as a guide to how we should act in unpredictable situations” (p. 23).

As the situation or study at hand progressed, it was important to consider the level of balance between proposed actions the teacher took and the level of reflection, from a pragmatic sense, in which the new situation was framed. Brookfield (1990) refers to this interplay between action and reflection as praxis, meaning that “curricula are not studied in some kind of artificial

isolation, but that ideas, skills and insights learned in a classroom are tested and experienced in real life” (p. 50). For the TAP master teacher, this occurs during field testing. During the field testing time, the teacher tests currently constructed strategies and then reconstructs them according to student achievement gains and/or losses.

[T]here is no intellectual growth without some reconstruction, some remaking, of impulses and desires in the form which they first show themselves. This remaking involves inhibition of impulse in its first estate. The alternative to externally imposed inhibition is inhibition through an individual’s own reflection and judgment. (Dewey, 1997, p. 66)

Hence, the value in the adage “stop and think;” as thinking is momentarily paused, opportunity is then made so that a critical rationale for the most coherent plan possible may be capsulated. In the case of instruction, the most valuable and appropriate intervention or instructional plan can be delivered.

Brookfield (1990) explains that “[f]or a teacher in a classroom a critical rationale functions in much the same way as computerized navigation instruments do for air or sea pilots in the midst of the storm” (p. 16). In times of uncertainty, these heuristics, these rationales, help stabilize the environment. From this, the teacher can articulate more clearly “the rationale behind her practice. She works from a position of informed commitment...Knowing this she communicates to students a confidence-inducing sense of being grounded” (Brookfield, 1995, p. 23). Careful reflection for her heuristics and the reasons for their use have been established.

Within the TAP model, it is during cluster time that the heuristics for an identified student need are synthesized, developed, and applied toward instruction. The master teacher serves as leader and professional developer.

Bennis and Nanus discuss lessons drawn from their study of ninety leaders. First, and perhaps most important, is that all organizations depend on the existence of shared meanings and interpretations of reality, which facilitate coordinated action.

The actions and symbols of leadership frame and mobilize meaning. Leaders articulate and define what has previously remained unsaid; then they invent images, metaphors, and models that provide a focus for new attention. An essential factor in leadership is the capacity to influence and organize meaning for the members of the organization. (Bennis & Nanus, 1997, p. 37)

Ability to synthesize what is gathered and then connect it to what has meaning for the organization's members is significant in this step. This means that this acquired skill comes from having broad understanding of what is important, as well as analytical ability to connect the abstract to stories and symbols that make sense to the members.

As the organization's members reach the point where this initial sense can be made, Nystrand (1977) says "that individuals must do two things: they must *discover and construct* a new representation of things, and they must *explore and maintain* the new construction" (p. 97). During the TAP cluster, the development and application blocks which begin in the meeting and carry on into the teacher's classroom provide this opportunity. Members ask clarifying questions while they discover and construct new representations and new heuristics. They then explore and maintain these new constructs as they make classroom application.

Kelly (1955) says that, as practitioners maintain these over time, they become personal constructs. The new learning has become transformational once it reaches this point. For example:

[t]his thing that I hold in my hand: is it black or is it white? Black and white are the rival hypothesis which are set up by the *black* vs. *white* construct...[J]ust as the experimental scientist designs his experiments around rival hypothesis, so each person designs his daily explorations of life around rival hypotheses which are suggested by the contrasts in his construction system. (p. 129)

Within TAP, the master teacher makes the continual connection between these personal constructs, called critical attributes, and the identified student need which they are designed to address. The connections are purposeful so that the critical attributes are conceptualized by the classroom teacher. “Only when we have conceptualized a thing in some way...can we reason through it. Since nature does not tell us how to conceptualize it, it means we must create that conceptualization, individually or socially” (Paul, 1992, p. 20). The TAP cluster meeting protocol provides for this.

How is it used? Because heuristics ground thinking during times of marked change within an organization, how are they best fostered by all members of a system? This is a distinctive question when reflecting on their use, because much of that “use” is contingent on the reflective practitioner’s ability to develop them cognitively as well as recognize and react to them professionally.

Brookfield (1995) states “[students] tell us that seeing a teacher model critical thinking in front of them is enormously helpful to their own efforts to think critically” (p. 25). Within the new learning block of the TAP model, master teacher modeling is recurring; the modeling is constructed around the identified critical attributes from earlier field tests.

“By openly questioning our own ideas and assumptions—even as we explain why we believe in them so passionately—we create an emotional climate in which accepting change and risking failure are valued” (p. 25). By questioning ideas, the practitioner begins to build and/or extend the heuristic frame. When introduced to teachers, it is valuable to present a new idea for a heuristic alongside a currently accepted practice and then link to the identified problem in student achievement. The transfer, as part of the dialog between the two, is what begins to move the transformation forward.

Bruner (1973) says that living vicariously through others can best make this transformation occur. “But I dare say that few are so potentially powerful as participating in dialogue” (p. 106). Through this dialog, the heuristic is fashioned by stakeholders. By affording this opportunity, learning is not only exhilarated, but also manifested authentically within the organizational culture.

When considering its use, safeguarding this dialog exchange from a diabolical communicative environment and providing needed protection of the process to avoid dominance from personal agenda must not be underestimated. “This dialogue cannot be reduced to the act of one person’s ‘depositing’ ideas in another, nor can it become a simple exchange of ideas to be ‘consumed’ by the discussants” (Freire, 2003, pp. 88-89). “Strategy begins with asking: Which stakeholders have to adjust their ways to make progress on this problem [and] how can one sequence the issues or strengthen the bonds that join the stakeholders together as a community of interests...?” (Heifetz, 1994, p. 22).

Next, gaining clarity on a complex opportunity or interest requires multiple entry points for participants, each interacting and contributing from their unique view. All add to the collective. “Values are shaped and refined by rubbing against real problems, and people interpret their problems according to the values they hold” (Heifetz, 1994, pp. 22-23). Differences are a source of strength and their integration and resolution are what solely drive adaptive change. Heifetz maintains that “...inclusion of competing value perspectives may be essential to adaptive success” (pp. 22-23).

Again, situating these competing value structures alongside one another is valuable for modeling heuristics for teaching. Master teachers have recurring opportunities to do this during the learning blocks of the cluster. They then have the necessary “container,” in this case the TAP

cluster, to call upon the modeled heuristic before integrating it into their own structure of theoretical thinking. Then, the proceeding step involves development of the heuristic strategy into a tool for classroom instruction.

Dialog between the master teacher and the teacher-in-training happens throughout the TAP cluster learning, development, and application phases.

Entering the culture is perhaps most readily done by entering a dialogue with a more experienced member of it. Perhaps one way in which we might reconsider the issue of teacher training is to give teacher training in the skills of dialogue—how to discuss a subject with a beginner. (Bruner, 1973, p. 106)

As they begin activation and use of this dialog to fashion heuristics, it is essential for master teachers to have clarity for the new learning goal, which includes an expected level of competency for the new teacher. “The goal must be plain; one must have a sense of where one is trying to get in any given instance of activity” (pp. 113-114). The trajectory toward mastery of the heuristic comes through formative assessment; it is here that the ebb and flow of dialog exchange guides the learning to higher levels of effectiveness. “For the exercise of skill is governed by an intention and feedback on the relation between what one has intended and what has been? achieved thus far—‘knowledge of result’” (pp. 113-114).

As the transformation of practice occurs, the practitioner has opportunity to experience the success in both instruction and student achievement. This serves as a powerful agent of change as “[i]t is no accident that the intellect has been classically described as the controlling feature of the human mind” (Kelly, 1955, p. 127). Tapping into the teacher’s intellect becomes possible because the master teacher has guided thinking through framed critical attributes for teaching the new learning and provided opportunity to individuals to develop within their own personal and professional constructs. “The intellect has been associated with communicable

constructs. When a person communicates the construct under which he is operating, we too can see what he is doing” (Kelly, 1955, p. 127).

The conversation and study through the dialog exchange is recursive. “That is, we construct a model of the world with our system of categories, come to expect certain relationships and behaviors to occur, and then experience our categories, making imaginative projections to construe experience” (Mezirow, 1991, p. 146). The master teacher in a clinically reflective environment has taught the practitioner to use these heuristics in a manner that will inform planning and decision-making in the future.

How is it applied to secondary school teaching and student learning? Brown’s (2005) study researches the level of student transfer between declarative knowledge and practical application and usage. Brown (2005) goes on to address the need presented from previous research to define specifically how students make determinations for strategy selection. Questionnaires were the primary tool for data collection.

The positivistic design makes no comparisons between groups, but does provide descriptive survey research based around notes that students prepared themselves. The findings describe what students’ meta-cognitive awareness and self-regulatory practices look like.

Ommundson’s (2003) descriptive survey research explored motivational antecedents of self-regulation. His study allows generalization between students’ belief in their capability and their actual achievement. This impacts the point of heuristic usage because if, as they report, students who think it is possible to get better, improve; and others do not, then migration to a point when a student is motivated to solve a problem could then be influenced by a student’s innate belief that ability is unchangeable and is less inclined to look for strategies to solve the problem.

Bigg's (1988) findings support the notion that learners need to be strategic rather than tactical if learning is to be impacted at a permanent level. His study, through descriptive surveys, defined student approaches to problem solving and then determined ones that have predominance. Data supported that, when students were provided with heightened meta-cognitive awareness, they become more empowered to decide what they want out of the learning situation and pose a greater likelihood to meet requirements for success or make modification when necessary.

Zellermayer, Salomon, Globerson, and Givon (1991) again investigated use of a computerized writing partner to enhance the planning and writing phases of written composition. The descriptive survey approach enabled researchers to capture student perspective as they navigated the writing protocols. They detected that, when given the opportunity and empowered to make the decision in managing learning, choosing heuristics, higher levels of student learning and understanding occur.

Hogan (1999) wanted to see: if students are exposed to the principles and tactics that their teachers use to manage their discourse, would this enhance student understanding? Findings indicate that, when students' perspectives are connected directly to performance, they do influence gains; hence, when the modeling of the strategies is connected to solving a problem, student use increases.

O'Shea and O'Shea's (1994) work related to self-regulated comprehension strategies. Two groups of randomly selected students received training, the first in meta-cognitive strategy use and the second in cuing for the purpose of reading, but not trained in a specific strategy. The study found that the self-regulation strategies provide greater assistance to students' increases in

achievement. The study is an effective research approach to link heuristics/strategy use with increased academic achievement.

Knowledge of Key Critical Concepts

As heuristics build from reflection and development of critical concepts, knowledge of key critical concepts emerges from knowing what works based on previous experience. It is through these distinctions that potentially new ways of knowing or understanding manifest themselves. This enables the master teacher to continue to problem solve and make decisions among an array of intellectual products produced by professional counterparts and colleagues.

What does it mean? According to Mezirow (1991), “[s]ets of habitual expectation or ‘meaning perspectives’ (created by ideologies, learning styles, neurotic self-deceptions) constitute codes that govern the activities of perceiving, comprehending, and remembering” (p. 4). These meaning perspectives are further evolved through established language systems; and, although these are human made, coherence is brought to them through interpretation. It is through this interpretation that the critically reflective thinker begins to make justification, an ongoing objective. “We engage in reflective learning through the kind of discourse in which we bracket our prior judgments,... and, through a critical review of evidence and arguments, make a determination about the justifiability of the expressed idea whose meaning is contested” (Dewey, 1997, p. 10). Experience provides continuous extension for the critically reflective thinker, because it serves to validate prior judgments. In fact, “[a]dult development is seen as an adult’s progressively enhanced capacity to validate prior learning through reflective discourse and act upon the resulting insights” (Mezirow, 1991, p. 7). These validations become the base for future distinctions.

In many instances, a validation of prior learning occurs through juxtaposition of the two contested meanings. Cranton (2006) says conscious-raising occurs with the exposure to new information, knowledge, insights, or values (p. 143). For the TAP master teacher, it is then valuable to establish this interactive domain through field tests and professional dialog with other master teachers. The transformational learning then comes full circle when the previous way of knowing becomes distinctive and then transplanted by the new understanding or reasoning.

Paul (1992) maintains that understanding a point of view occurs in a genuine sense only when that understanding transplants a previous one. “[W]e do not fully understand reasoning until we grasp its force in conflict with other reasoning” (p. 69).

The point is a valuable one for establishing protocols and making distinctions around transformational learning. The master teacher presents new learning framed around an identified need; with that, the identified student need should be capsulated with practitioner understanding associated with that need.

Distinctions may then drive further problem solving. [W]hen Piaget talks about the social, intellectual, and moral values of the adult world, he insists part of society’s goals should not be only the transmission of old knowledge and values, but the creation of new knowledge and values. (Schwebal & Raph, 1973, p. 204)

Questions and/or questioning drives the thinking through which the new knowledge and values are made. This means the recursive nature allows for the new knowledge to be processed and then new values considered and key concepts emerge. Cranton (2006) in Brookfield (1990) argues that, because of the dynamic, fast-paced organizational life, survival is actually contingent upon the ability “to scrutinize the validity and accuracy of [these] assumptions” (Brookfield, 1990, p. 21).

Scrutiny is critical to sound validity. Gaining clarity on a complex opportunity or interest requires multiple entry points for participants each interacting and contributing from their unique

view. All add to the collective. “Values are shaped and refined by rubbing against real problems, and people interpret their problems according to the values they hold” (Heifetz, 1994, pp. 22-23). Differences are a source of strength and their integration and resolution are what solely drive adaptive change toward transformational learning.

When teacher development time is appropriately planned within the TAP model, participating teachers have the chance to enter from these multiple perspectives. The master teacher has critically defined what worked for increased student achievement. If clearly modeled, participants should begin to develop the new learning according to their current levels of competency and understanding. Opportunity is offered for input and adjustment based on real-time class use.

Furthermore, the heightened awareness of critical concepts through questioning serves as an emancipator, because it “provid[es] people with a systematic critique of their own self-understandings and social practices in order to provide them with the knowledge on the basis of which they can change the way they live” (Fay, 1987, p. 39). Knowledge of critical concepts is continuously defined and refined through justification, testimony, review and, ultimately, means empowerment because of increased awareness.

How is it used? As the master teacher defines knowledge around critical concepts, these definitions inform decisions. When considering use, it is valuable to know the criteria used to inform these decisions. These criteria then become internalized over time and inform the teacher’s thinking. “These are the deeply embedded internal injunctions that define the boundaries of what we allow ourselves to think” (Brookfield, 1995, p. 45). In a sense, these injunctions serve as a form of quality control. They set out reminders for what is acceptable in

classroom teaching practice as the practitioner level of critical reflection and knowledge of key critical concepts increases.

As the previously discussed heuristic act sets out strategies and procedures for addressing identified needs, the use of critical concepts works out the challenges posed by the actual use of the procedure. It concerns the strategies use in actual time. It becomes “[c]ontrasted to the heuristic act...[as an] explicative investigation...While the heuristic act occurs almost outside the framework of time, the explicative investigation proceeds step by step and extends over time” (Nystrand, 1977, p. 97). As knowledge of critical concepts increases and extends, these self-reflective voices are used as an attempt to confirm or reaffirm previously held understanding.

Vaill (1996) argues that the learner must take the leap from part to whole, making application of new learning, and that this “leap” is best made within the parameters of the organization itself. He defines this as permanent whitewater and supports the “leap” through systems thinking. In TAP, the cluster sessions and the individual growth plans serve as the approach for systems thinking.

Taking a systems thinking approach within the school context requires “...simultaneous macro- and micro-orientation, identifying pockets of readiness and resistance and allocating resources accordingly” (Mojkowski, 1991, p. 30). Once the follower-ship has evolved to readiness, and an environment has been established to support learning; systems thinking is useful for managing change. Vaill defines what transpires through systems thinking within the organizational context.

Systems thinking is not a reductionistic task through which we search for the one or two factors that “explain” a phenomenon. Instead, systems thinking asks its practitioners simultaneously to hold the whole in mind and to investigate the interactions of the component elements of the whole...and to investigate the relation of the whole to its larger environment. (Vaill, 1996, p. 109)

Systems thinking, an iterative process, is inclusive as it challenges participants to collect, critique, and communicate continuously the impact of their work and how it can evolve to support the larger whole. Hence, change is driven from all aspects within the organization, subsequently reducing the likelihood of resistance.

Throughout the TAP model, the cluster and teacher individual growth plans drive investigation around the impact of teacher work in student strategy development as it is measured directly against student achievement. The continued investigation explains impact as it defines critical constructs that add to the success.

The discoveries gathered over time confirm initial insights. These small discoveries affirm and explicate. “An explicative affirmation is an ‘Ah’ experience, as contrasted with the ‘Aha!’ of the original construction. Essentially, explicative investigations are processes of *reality-maintenance*” (Nystrand, 1977, p. 98). Master teachers then reach a point where they can maintain the new practice in a transformed, evolved manner.

Not that this point is necessarily a point of arrival. As the master teacher teaches other teachers and they interact and apply it to direct instruction, the dialog further refines collective understanding. This further contributes to their knowledge of critical concepts. As competency is reached, defined transformation of practice has the potential to begin. “When we have learned how to do something, we can execute smooth sequences of activity, recognition, decision, and adjustment without having, as we say, to ‘think about it.’ Our spontaneous knowing-in-action usually gets us through the day” (Schon, 1987, p. 26). As a learning environment is fostered that supports continuous inquiry, new perspectives are welcomed and embraced by members of the organization.

When considering use of key critical concepts, it should be expected that times will emerge when the current level of understanding brings perplexing, unexplained results.

It is common, in these types of situations, to speak of “thinking like a doctor”—or lawyer or manager—to refer to the kinds of inquiry by which competent practitioners bring available knowledge to bear on practice situations where its application is problematic. (Schon, 1987, p. 34)

When the organization can achieve this, there is strong evidence that it has reached a level of critical mass. The organization’s knowledge of critical concepts becomes an acculturative part of the systems thinking, the iterative process, challenging participants to collect, critique, and communicate the impact of their work and how it supports the larger whole.

How does it apply to secondary teaching and student learning? Vandergrift’s (2003) research adds perspective to a student’s frame for the course of learning around key concepts as revealed in foreign language instruction. A mixed method design “capture[s] how a given strategy is used or the particular combinations of strategies used to build meaning” (p. 477). The “how” adds value for the framing process, because it has the potential to capture “how” the students planned around key concepts for successful completion, monitored their comprehension, and evaluated their approach within the foreign language classroom.

Aleven and Koedinger (2002) implemented and tested the effect of a computer-based cognitive tutor where students were expected to offer self-explanation as part of academic responses. Students in the experimental group who explained their steps through knowledge of key concepts learned with deeper understanding than those in the control group. The experimental group explained problem solving steps with greater depth and had higher levels of transfer when presented with new problems to solve.

Carriedo and Alonso (1995) uncovered that, while students may have declarative knowledge about learning strategies and be able to recite what they are supposed to do, they are

unable to activate it when necessary. Findings were varied and, in some instances, no detectable differences in achievement could be documented between the control and the experimental groups. A greater likelihood of achievement gains is possible if the strategy training is relevant to students' needs and clearly explained as to when it can be effectively used.

Operational Knowledge of Standards of Good Thinking

Operational implies movement and change. This fourth domain standard poses many direct possibilities for impacting teacher instructional leadership. Reflection in action is distinctive because it operationalizes a transformed understanding and is different “from other kinds of reflection in its immediate significance for action” (Schon, 1987, p. 29).

What does it mean? Knowing how to use standard practices for good thinking for leading change at an organizational level can both empower and transform. In the school setting, this impacts both the teacher as professional learner and the student as academic achiever. As leaders navigate within an organization, they move through significant challenges and dilemmas. Good thinking directly informs the leader and has a higher likelihood of success. “Jack Mezirow (*cf* 1990), has suggested that adults engage in deep... learning only when faced with what he calls a ‘disorienting dilemma,’ a situation in which our usual perspectives won’t work or won’t fit” (Wergin, 2003, p. 20).

The “reflection-in-action” in essence motivates or becomes the agent of the change. Hence, the dilemma is not something to be viewed negatively; it is the reflective process that it generates which is significant. This significance revolves around the dichotomy between the changing circumstances and stepping outside the situation and reflecting from a larger scope. It means that operationalizing this dichotomy generates purposeful movement for organizational change.

Seeing the value and use for acquisition of perspective for future understanding validates the process and increases the likelihood of the critically reflective teacher defining what operational knowledge means for standards good thinking. As meaning becomes internalized, it becomes “of use.” Hence, the learning has become transformative. “Reflective learning becomes transformative whenever assumptions or premises are found to be distorting, inauthentic, or otherwise invalid. Transformative learning results in new or transformed meaning schemes...” (Mezirow, 1991, p. 6). Within the classroom context, these meaning schemes refer to strategies for both student thinking and student instruction. Learning becomes transformative for the TAP master teacher after new learning is presented and opportunity is afforded for development and use. Teacher perspective is transformed to a greater extent when the professional is pushed out of a previous comfort level.

The master teacher must carefully guide the response with clarity, reason, and evidence that the new perspective has merit. This means knowing specifically the “hows” and “whys” of the critical attributes for the new learning around strategy instruction. “Critical thinking is not a separate subject taught in a compartmentalized way. Instead, developing critical thinking is a process underlying all educational activities” (Brookfield, 1990, pp. 21-22). From this comes inquiry and natural curiosity. It means that the continuous questions become the process. In TAP, this refers to the cluster meeting protocol, an embedded process built on continuous cognitive questions for credibility and coherence in transformed teaching practice.

Using standards of good thinking to formally frame the learning environment for critical reflection can be both intuitive and intellectual. The former coincides more frequently with the traditional context of teacher reflection. “Learning something new and difficult and then reflecting on what this experience means for teaching [has been] visceral rather than an

intellectual route into critical reflection” (p. 50). As mentioned, there are multiple entry points within the learning organization to drive intellectual thinking; however, there is merit to using the new learning as common ground to begin an intellectual path to guide teacher reflection. “Of all the methods available for changing how we teach, putting ourselves regularly in the role of learner has the greatest long-term effects” (p. 50).

Teachers find their own way as they establish new meaning for operational thinking. The TAP model takes them repeatedly through the reflective process.

Making meaning is central to what learning is all about. The learning process may be understood as the extension of our ability to make explicit, schematize (make association within a frame of reference), appropriate (accept an interpretation as our own), remember, (call upon an earlier interpretation), validate (establish the truth, justification, appropriateness, or authenticity of what is asserted), and act upon (decide, change an attitude toward, modify a perspective on, or perform) some aspect of our engagement with the environment, other persons or ourselves. (Mezirow, 1991, p. 11)

Within TAP, the frame of reference is the identified need within the teacher’s classroom. During cluster, teachers develop new perspectives presented through a guided process that requires remembering or calling upon what was previously taught even just a few minutes earlier. This support is provided for individuals to act upon the new understanding promoting modification of practice.

The teacher leader should not underestimate the tumultuous nature of the transformational change process. Reflection in action, operational knowledge of good thinking, is not without a certain sense of loss with the experienced, tenured professional. “One of the most common emotional reactions reported by students, particularly where significant change is occurring, concerns a grieving for lost certainties” (Brookfield, 1990, p. 46). Naturally, at the other end, previously held beliefs and practices are replaced. Initially the effect is ominous; it should be monitored and guided with care.

Operating good thinking through this change process carries significant weight, because its experience is what the reflective practitioners recall, either positively or negatively. There is a risk of failure in addition to exposure to inabilities that may not have been evident previously. “The sense of risk and exposure heightens the significance these episodes hold for students so that these episodes become transformative turning points leading to changes in students’ self-concepts” (Brookfield, 1990, p. 49).

Within the TAP model, it is the proverbial “pulling off the covers” and exposing marginal practices that need attention. As a genuine teacher learning model, a recursive reminder communicated by the master teacher is necessary. Within this snapshot of progress, changes made are important. This promotes a higher likelihood for recall that is met with satisfaction. “In the aftermath of action, we try to find the opportunity to reflect back on the memories, experiences, and interpretations that caused us to make what we felt like instinctual responses” (Brookfield, 1995, p. 42).

As this begins to be recognized as standard practice, teachers become more inclined to use the opportunity for dialog and the change process moves more readily. “The most general implication is that a culture is constantly in process of being recreated as it is interpreted and renegotiated by its members” (Bruner, 1986, p.123). Professional development for teachers that is job-embedded means attention is focused on developing and supporting operational knowledge for good thinking standards.

Education is (or should be) one of the principal forums for performing this function—though it is often timid in doing so. It is the forum aspect of a culture that gives its participants a role in constantly making and remaking the culture...(Bruner, 1986, p. 123)

How is it used? Brookfield (1990) contends “[a]s we experience the dilemmas, ambiguities, and contradictions involved in trying to live in the adult world, we begin to look

critically at the accuracy and validity of these tenets” (p. 19). For the critically reflective teacher, using standards of good thinking as they relate to student achievement is ongoing. Often these tenets are held in long standing visceral esteem. It is used within the TAP model continuously. The manner in which it is deployed and activated directly affects instruction. Establishing the environment that supports inquiry and exploration is the first step because “sometimes the fit is harmonious, sometimes it is discordant...” (p. 23). The discord is not to be construed as something negative or remiss; rather, it indicates that inquiry, when driven by standards of good thinking, is what will create the best path toward transformed teaching.

The master teacher within TAP operates as the driver of the standards of good critical thinking. Teachers begin the reflective trajectory shifting instructional contexts during the field text phase. This is the period when they gain clarity for what they wish to do and adjust according to student understanding and achievement. Brookfield (1990) defines this as critically responsive teaching, “teaching which is guided by strongly felt rationale but in which its methods and forms respond creatively to the needs and concerns expressed by students” (p. 23). In this case, the needs of the students are determined by gains or losses in achievement. This is tracked throughout the process. He defines the “responsive” aspect as an actual and appropriate “willingness of teachers to adapt their methods, content, and approaches to contexts in which they are working and to the ways in which students are experiencing learning” (p. 24).

Preparedness becomes the by-product of these adaptations. As the reflective practitioner thinks within the ebb and flow of these needs and concerns, a new scaffold or plateau is realized, but the context remains the same. “What he has learned in the way of knowledge and skill in one situation becomes an instrument of understanding and dealing effectively with situations that follow” (Dewey, 1997, p. 44).

Putting the operational knowledge in place and using standards of critical thinking is what produces a disorienting dilemma; the cause which drives the genuine need for reflection. It is a fork-in-the road, a gathering of all pertinent facts but, in addition, the leader must effectively communicate the “hows” and “whys” behind what these facts represent. Moving through the thinking process must also include a product that informs and communicates. The pause in the work is the point where the process begins.

In the response of the uncertainty, we metaphorically climb a tree; we try to find some standpoint from which we may survey additional facts and, getting a more commanding view of the situation, may decide how the facts stand related to one another. (Dewey, 1997, p. 11)

From a leadership vantage point, it is valuable for the leader *to* decide how the facts stand related to one another, and how they measure against the projected progress the organization plans to make. The TAP master teacher communicates this at the onset of every cluster meeting as the identified need, the first step in the five steps of effective learning.

There is value in restating the goals and providing continuous internal summaries. This serves as a form of quality control within the organization. In the TAP model, this revisiting of goals and directions is an integral part of cluster protocol and individual growth protocols.

How does it apply to secondary school teaching and student learning? Anthony (1996) investigates student learning behavior and attempts to provide an explanation for the predominance of passive, dependent learning behaviors as opposed to active and more self-regulated ones. Results provided evidence that discrepancy exists between declarative knowledge of a strategy and actual student choice and application of an ineffective strategy which, in many cases, might simply be out of habit. “[T]he learning environment must actively encourage the development and use of students’ strategic learning behaviors by providing

instruction and feedback on the use of strategies, and demonstrating improved student performance” (p.33).

Peverly, Brobst, and Morris (2002) build their study through descriptive research and then add regression analysis to interpret findings and make correlations. This adds impact to their work because of the potential to determine why a student used a strategy and the rationale connected to it. The study supports that knowing the strategy is important, but what the student does with the strategy has far greater impact.

Fleming and Walls’ (1998) ethnography results include a recommendation for programs of study in foreign language that include self-monitoring, self-evaluation, and self-management. They found that students taking responsibility for learning in authentic and automatic ways was a significant factor in experiencing success. Exploration around student strategy application helps to define the “how” and “when” for taking action. They also found that students attached value to the strategies, which could increase the likelihood that they will be conditioned in a way to be used in the future.

In a mixed method interpretative design, Thomas and McRobbie (1999) framed student learning around a surface approach, an achieving approach, and a deep approach. An LPQ questionnaire captured data as to student use around these three approaches and then was complemented by case studies around two students and the metaphors they fashioned to describe personal operational learning.

Habits of Mind

The final domain for critical thinking standards can be thought of as the thread which connects the previous thinking standards, because it recognizes their presence and acknowledges their value. It begins by holding respect for legitimate intellectual authority and current ways of

knowing for constructing understanding. “It is no accident that the intellect has been classically described as the controlling feature of the human mind. The intellect has been associated with communicable constructs...His behavior then makes sense to us; we understand him” (Kelly, 1955, p. 127). Deftness around habits of mind provides the teacher leader with the ability to step outside the thinking and assess the new understanding objectively. Hence, “[i]f a person responds to an alternative habit of mind by reconsidering and revising prior belief systems, the learning becomes transformative” (Cranton, 2006, p. 24).

What does it mean? For the master teacher in the TAP model, it serves as the umbrella for professional development. “Simple utilitarianism dictates that critical reflection is an important habit for teachers to develop...[B]ecoming critically reflective increases the probability that we will take informed actions” (Brookfield, 1995, p. 22). The leader seizes this opportunity and assumes the responsibility for establishing purpose that can be explained and justified. Leading an “organization of learning” is one way to achieve this.

If a student or colleague asks us why we’re doing something, we can show how our action springs from certain assumptions we hold about teaching and learning. We can then make a convincing case for their accuracy by laying out the evidence—experimental as well as theoretical—that under grids them. (Brookfield, 1995, p. 22)

As TAP master teachers frame learning for the cluster meeting, they must be cognizant that the theory being developed based on field testing must have included recognition of legitimate intellectual authority, meaning other colleagues. At times, the TAP leader will follow and then lead as theory emerges and is fashioned. “A theory is nothing more (or less) than a set of explanatory understandings that help us to make sense of some aspect of the world” (Brookfield, 2005, p. 3).

According to Burns, leaders that both follow and lead are primarily transformational. This is in contrast to transactional, which he defines by a “quid pro quo” relationship between

two parties. Both sides enter into the relationship recognizing what the other brings to the table. The relationship, however, is limited to this exchange. The relationship forged in transformational leadership engages leader and follower both and extends each to higher self-actualization and efficacy. The experience is transcending. Throughout the journey, each assumes the role of the other as needs become evident (Burns, 1978). “Interpreting predicting, explaining, and making meaning are acts we engage in whether or not we set out deliberately to do so, or whether or not we use these terms to describe what we are doing” (Brookfield, 2005, p. 3).

Leaders should not attempt to be omniscient and must recognize power and privilege that may manifest within or from the class from which they come. They must have an internal comfort level that allows for inquiry and risk-free learning beginning at the point of entry and continuing through the leadership experience. “At the point of encounter there are neither utter ignoramuses nor perfect sages; there are only people who are attempting, together, to learn more than they now know” (Freire, 2003, p. 90). Once a leader can lead as a learner, then a culture can be realized for all to participate in a safe, oppressive-free environment. It begins, however, with the leaders’ realization of what they have the potential to become. “In this way, the sage is above the people, but the people do not feel him as a burden; [h]e is in front of the people, but the people do not feel him as a hindrance...”(Lao, 1993, p. 87). The leader holds respect for intellectual authority and currently acceptable modes of understanding.

What this means for master teachers is that they carefully attend to include respect for other truths or inquiring attitudes. This is because “[i]n contrast to existing social science, critical theory aims to go beyond merely describing what is...to setting out what ought to be. This is

realized through the unmasking and analysis of contradictions within the existing social structures” (Collins, 1991, p. 36).

Through modeling of the isolated teaching practice that has been identified for student strategy instruction, the master teacher has the forum for describing “what ought to be.” Then through development and follow-up, the master teacher has a captive audience on a one-to-one basis to address contradictions and navigate through solutions. These solutions drive action that is communicated between the master teacher and the career teacher. The solution, however, is based on research-based student strategies that can evidence success from specific students at that particular school. “The careful research project that leads up to the notion of communicative action is lengthy and detailed, but it amounts to providing the rational justification for a more balanced way of understanding the modern world...” (Collins, 1991, p. 106). Because evidence exists from the process which shows how the strategy brought gains toward student achievement with which the teacher is personally familiar, the justification is much more powerful and, hence, enjoys greater likelihood the action will transform practice.

With that, the communicative action ignites inquiry for the group of practitioners the master teacher is leading to look further.

To the open mind, nature and social experience are full of varied and subtle challenges to look further. If germinating powers are not used and cultivated at the right moment, they tend to be transitory, or die out, or to wane in intensity. (Dewey, 1991, p. 33)

Kotter (1999) suggests that “people [often] resist organizational change because they assess the situation differently from their managers or those initiating the change and see more costs than benefits resulting from the change” (p. 34). When the iterative process of systems thinking is experienced collectively, and learning systems are in place to support necessary

changes, resistance is reduced. “People ... resist change because they fear they will not be able to develop the new skills and behavior that will be required of them” (p. 35).

Framing an environment around learning systems naturally and timely serves the needs of these participants as they move through difficult periods of perspective change. “Perspective transformation is the process of becoming critically aware of how and why our presuppositions have come out to constrain the way we perceive, understand, and feel about our world” (Mezirow, 1990, p. 14). It means these “hows” and “whys” that the TAP model purports will become part of a working repertoire of habits of mind in a TAP teacher.

How is it used? The “Habits of Mind” standard is used most effectively within the organization when considered a dynamic process. It is emancipatory in the sense that propositions are continuously critiqued, meaning schemes are not considered static but rather checked by questions posing new degrees of relevance against them.

Mezirow (1991) maintains that “[i]n order to be free we must be able to ‘name’ our reality, to know it divorced from what has taken for granted, to speak our own voice” (p. 3). This becomes possible when the individual interacts with meanings and questions suppositions. Acceptance of periods of angst as part of the process allows extensions and deeper levels of understanding once the reflective process has taken place.

Critical thinking cannot be mindless as the result of unsound habit even during periods of confusion or periods that might seem directionless. Brookfield (1990) maintains that “[a] clear sense of purpose helps you endure periods of seemingly directionless confusion” (p. 16). The ebb and flow of meaningful critical thinking within a collective endures when this purpose is clear. Within the TAP model, three levels of goals drive direction and purpose. This purpose is

continuously stretched throughout new learning and the development process to address periods of directionless.

Reading this sense of purpose or vision in smaller segments to promote understanding begs for a more comprehensive audit of the organizational collective for which the current habits of mind exist. The leader can assess a number of elements that can include:

the student's level of learning readiness, the student's previous experience and knowledge in this area, the student's and teacher's personalities, the personalities of other learners, the political ethos of the educational institution, and the dominant values and traditions of the culture of which the student is a member. (Brookfield, 1990, p. 68)

Leaders use their habits of mind to question these elements and their legitimacy for moving toward the established purpose. With that, decisions can be rendered with greater clarity and appropriateness. Preparation is possible to guide followers through expected periods of angst because these possibilities are previously considered here.

Brookfield (1990) further maintains that:

[a]n initial sense of release and liberation invigorates a student who is exploring a new area of knowledge, trying out a new skill, or examining alternative perspectives. [but] What follows this initial enthusiasm is often anxiety about unfamiliarity of these new ways of thinking and acting and a concurrent longing for the security of old ideas and behaviors. (p. 53)

Guiding through periods of anxiety is best addressed by providing instruction for the acquisition and development of new skills. Habits of mind are used when first awareness is present to consider previous assumptions and to monitor skill development so that a retreat to the familiar might be avoided.

How does it apply to secondary school teaching and student learning? Researchers Kermarrec, Todorovich, and Fleming (2004) conducted research that student achievement is contingent upon a student's ability to self-regulate learning processes. Their contention was that "if...learner participation is important to teaching—learning process, then understanding the

factors that influence how students engage in the learning process becomes even more important” (p. 123).

The premise behind Azevedo, Fielding, and Moos’ (2004) descriptive survey is that the dynamics between the phases of self-regulated learners could affect how students regulate learning in science. Evidence suggests that, while students learned more content working together with a hypermedia tool, the total learning gain in achievement was small. It could also suggest that the students not only did not know how to use what they learned, but also did not know when to take action.

Within Thomas Farrell’s (2001) case study, he attempted to get high school students to think about their reading strategies. The method effectively embedded aspects of teaching and learning with students commenting that they had never been asked to think about such things before. The fact that good reading relies on effective meta-cognition is significant based on his findings because, if students are not aware that cognition breaks down, they will not use the strategy strategically.

Peklaj and Pecjak (2002) also investigate self-regulated learners as related to students’ cognitive and affective motivational processes. Their contention was that these learners interpret and integrate their learning as a systematic process of their own volition. They also argue that understanding and fine-tuning these skills are in concert with what is required in an informational age where quick, effective adaptation is necessary due to rapid change.

Concluding Thoughts

Broadening the roles of both teachers and principals toward professional developers of adults has long been overdue. Countless attempts have been unsuccessful or have stalled because, in most attempts, leaders have not had an opportunity to attend to their own learning in

the development of adult practitioners. This is particularly true in the process to raise student achievement through instruction of student learning strategies.

In order to provide useful training, coaching, and development for master teachers, it is important to move training from primarily conceptual conversation around critical thinking to more concrete, pragmatic examples and narrative conversation. The conceptual and empirical content provided explains how and why elements of critical thinking are necessary for strong teaching when student learning strategies are taught.

With that, the need developed for a chronicling of the critically reflective process in which master teachers engaged over the field testing period. During the field testing period, master teachers build student strategies directly related to isolated areas of student need. A strategy may be extended specifically for an area of weakness identified in a particular student body. Determining the attributes of instruction that become critical for realizing student achievement is necessary before master teachers can begin to teach and ultimately transform the practice of their colleagues.

Merriam (1988) states “[t]he selection of a particular design is determined by how the problem is shaped, by the questions it raises, and by the type of end product desired” (p. 6). The problem emerged from the need to isolate, and then train in a more didactic manner, critical reflection used in the field testing process in the construction of student strategies. It raises the questions as to 1) what the process includes, 2) the extent to which it aligns with standards of critical reflection, and 3) the possibility for the existence of further elements beyond the five identified standards of critical reflection.

To ensure teacher success and continued systemic involvement and use, frameworks for what critically reflective teachers’ thinking looks like in real time must now be made available.

This study provides an opportunity to define what critical thinking looks like in the teacher planning process around the development of student learning strategies. This chronicling moves practice forward because future training and development can include planning and thinking strands that practitioners can use both before and after instruction.

Chapter III: Methodology

The purpose of this study is to explore the critically reflective processes used by master teachers within the Teacher Advancement Program (TAP) in their field test classrooms. A representative case study design was chosen as the research approach to investigate the context and processes of teachers' critically reflective practices in three middle schools that have implemented TAP. This chapter describes: 1) design overview/researcher role and methodological fit, 2) research method, 3) data analysis, 4) ethical issues 5) limitations, and 6) transferability to teaching practice.

Design Overview and Role of Researcher

Most discussion and training within the TAP program has existed at the conceptual level. This has presented difficulty for master teachers throughout the state and the country, because development is delayed until they have an opportunity to implement the field test, analyze the data, and segment the new learning for teacher development. The aim of this study is twofold: 1) to understand the construction of the critically reflective process used by master teachers during field testing, and 2) to examine processes in relation to standards of critical thinking. Specifically, this case study explores the research question: How do the master teachers in the Teacher Advancement Program use reflection from field test trials to determine attributes of effective instruction? This research study includes levels *three* and *four* in the TAP field testing process Figure 3.1.

1) School professional plan based on the area(s) of greatest student need.
2) Yearly cluster goal designed around identified area of greatest need. The selection and design of student learning strategies is made from this.
3) Master teacher field test strategies to determine critical elements of instruction that directly increased student achievement.
4) Sequence and segmenting of trial learning and subsequent instruction for all teachers during weekly cluster meetings.

Figure 3.1 Field test process

Methodological Fit: A Case Study of TAP

While being a critically reflective teacher is frequently discussed and referred to within professional practice dialogue, it has not been clearly understood what critically reflective teaching “looks like,” “sounds like,” and/or “feels” like.” Although the TAP program has realized documented gains in student achievement through focused teacher development of field tested strategies, master teachers have a lack of awareness or heightened difficulty explaining what the reflective process looks like. Consequently, they are not able to train new master teachers during the expansion phases of the TAP program in other schools or districts. For the program to be effective and feasible, trained master teachers need the skill to transfer their knowledge of effective practices to other teachers.

Thus, within the development of TAPs protocols, the acquisition and communication of specific critical attributes of instruction became the driver for teacher development. Highly developed skills of critical reflection are necessary for this to be captured with the field test. There is no simple recipe for capturing the reflective processes that teachers engage in their practice. Any research method chosen to uncover these processes must be contextually sensitive to the field setting and capable of deeply exploring teachers’ thought processes. A case study approach was chosen because “it is an empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident” (Yin, 1994, p. 13). The boundaries between the phenomenon of critically reflective thinking done by teachers during the field testing process and the identification of critical attributes of effective instruction are not clearly evident. This study captures the process between both elements as conducted by master teachers within the TAP.

Bassey (1999) contends that theoretical case “research work has the purpose of trying to describe, interpret or explain what is happening without making value judgments or trying to induce any change” (p. 40). Because this study has as its primary purpose to capture the practiced, unwritten rules that reflective teachers use for defining and then forming critical attributes for effective instruction, case study is the ideal design.

Any case study can be further described by the intention for conducting the study and the rationale for choosing a particular case. This study of master teachers in TAP can be described as a *representative case with replication* (Yin, 2003a).

A...rationale for a single case is the *representative* or *typical* case. Here the objective is to capture the circumstances and conditions of a commonplace situation. The case study may represent a typical “project” among many different projects...a representative school... (Yin, 2003a, p. 41)

In this research, *replication* or a *multiple case study* has been chosen because of the advantages that replication offers in terms of robustness of findings. In particular, replication has the advantage of “the development of a rich theoretical framework” (Yin, 2003a, p. 47).

The choice of a research design that explores underlying theoretical principles applied in the field corroborates the importance of research design in education in which “the aim is to give theoretical accounts of the topic—perhaps its structures, or processes, or relationships—which link with existing theoretical ideas” (Bassey, 1999, p. 40). In the TAP field tests, the existing theoretical ideas are formed within the standards for critical thinking as reviewed in Chapter 2 of this study. The theoretical principles serve as a guide for formulating the design of teacher interview questions, coding of interview responses, and document analysis.

In their methodological fit for field research, Edmondson and McManus (2007) suggest a framework for research question development. They provide valid reasons for strong questions that are aligned with well-defined, thought out provocations based on an organization’s

identified need. Emergent theory becomes part of a dynamic continuum ranging from mature to novice. Openness is valued as a necessary criterion so that key agents can be explored through appropriate methods.

In summary, the *representative case study with replication* (Yin, 2003a) provides a good methodological fit for the study of master teachers' critical thinking in field test practice in relation to the rich theoretical framework provided in the critical thinking literature. Mezirow (1991) believes sound operational methods for critical reflection extend opportunity for the making of meaning resulting in both individual and organizational learning. Additionally, a professional, scholarly, research environment assists in the loss of what was once held as certainty (Brookfield, 1990). A representational case study with replication provides opportunity for both of these factors to occur.

Role of the Researcher

My observation of the field test class allows for study of the socially constructed reality for the identification of critical attributes of instruction. The field test class provides the context for the identified frames of critical reflection and triangulation between the field test, the long-range plan documents, and the interview.

“To make their interpretations, the researchers must gain access to the multiple perspectives of the participants. Their qualitative study designs...generally focus on in-depth, long term interaction with relevant people in one or several sites” (Glesne, 1999, p. 5). My interaction has included coaching and training over a one-year period. Multiple perspectives are included through cross-referencing of actual field test observations, interviews, and final document analysis of long-range plans where the final sequencing and segmenting of critical attributes of effective instruction are recorded.

Since the role of coach and trainer is combined, the role of this researcher becomes that of participant observer in an authentic way. As researcher, I made observations of master teachers while they were conducting the actual field test process. I scripted the text of the lesson during their instruction. The script served as a base for the subsequent interview process around the field test. Follow-up interviews were conducted after the TAP long-range plan had been drafted. Reflective journaling captured master teacher thinking involved in this process.

This researcher did not formally evaluate any of the research participants in relation to their employment or job standing with the district. The purpose of the study was to explore and chronicle the critically reflective process teachers followed in their practice. No value judgments were made in relation to the process.

Research Method for this Study

Research design is a *representative case study with replication* that examines the theoretical principles of critical thinking in relation to the implementation of the TAP program in middle schools. The context is the TAP pilot in a large urban school system in a Midwestern state; the cases are three different middle schools. Each case has *embedded units of analysis*, which include quantitative and qualitative sources of data. The use of *embedded units for analysis* is advisable when the analysis includes outcomes or processes within the case itself, rather than simply a more *holistic* approach that examines the global nature of the organization or project (Yin, 2003b). Each embedded unit is labeled according to the source of the data. In this study, there are three types of data units—individual or school personnel, small group or classroom, and large system or school. The next section describes each aspect of the case design, including the context of the case study, the cases, sources of data, data collection procedures, and data analysis.

Figure 3.2 describes visually the design for the embedded case study. It includes both subunits of analysis as well as the global nature of the study as it rests within the context of the Midwestern state and school district.

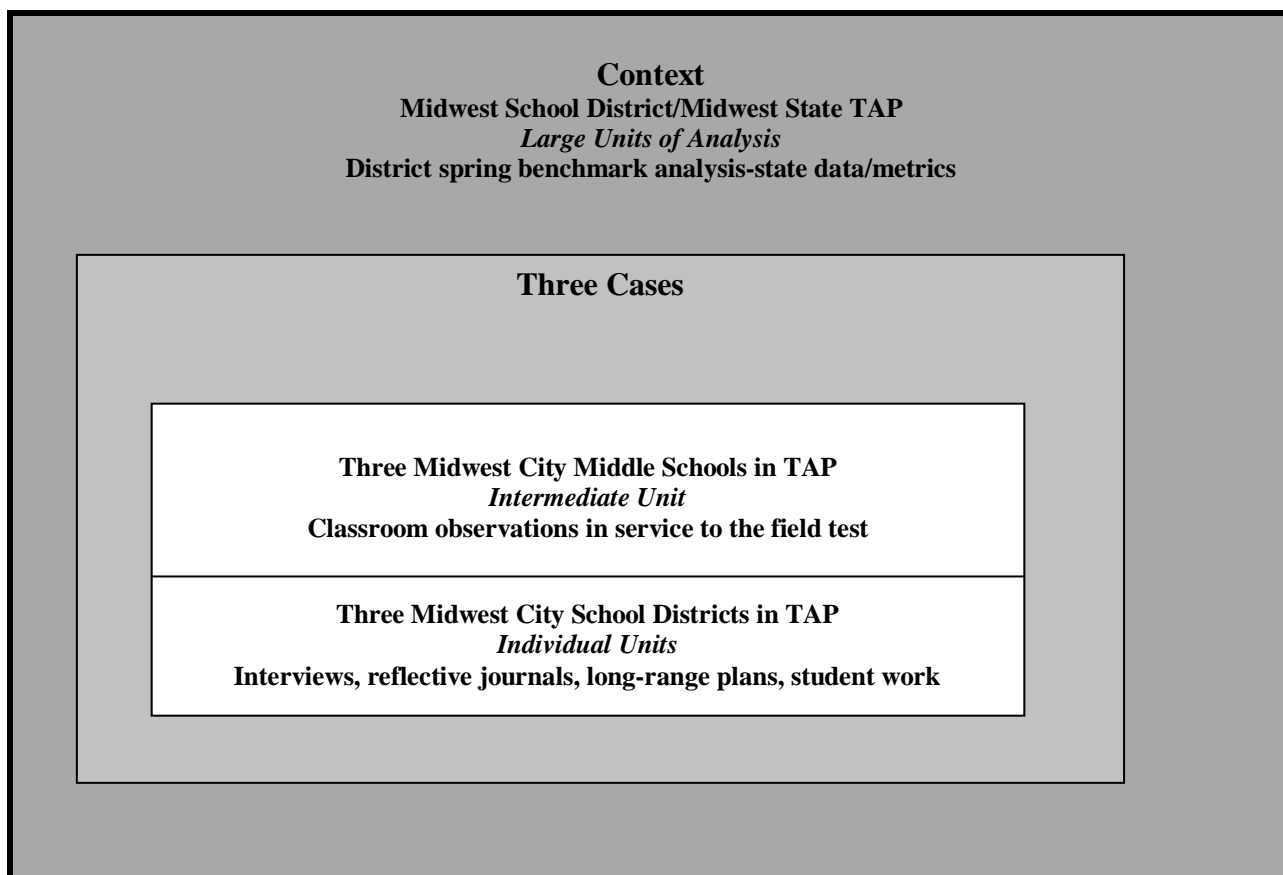


Figure 3.2 Design for embedded case study

The large units of analysis include benchmark analysis distributed by the district test coordinator, as well as the school level master teachers; test data was collected and categorized by master teachers. Comparative analysis between student achievement and teacher professional development took place at the end of the school year.

The intermediate units of analysis include the state TAP director/this researcher conducting observations in service to the field testing. This scripting provided the foundational forum for the subsequent interviews. Each master teacher was observed as scheduled. Scripts served as a foundation for future interviews and follow-ups.

The individual units of analysis included all five master teachers (plus one mentor teacher) as noted in the schedule. Ms. Andrews, Ms. Mercury, Ms. Bolton, Ms. Baldwin, and Ms. Wolf represent the individual units. The actual teacher names have been changed to protect the participants. A case study database contained all transcripts, field notes from observations, long-range plans, and master teacher reflective individual growth journals.

The Context

As part of the statewide initiative to improve teacher quality, the urban Midwest city school district became part of the pilot for the TAP. The development of a solid critical mass of master teachers in TAP schools, so that a high level of quality could be maintained with future expansion, was the primary goal of the initial state funding. After the first year, it became evident that master teachers needed to have strong critical reflection skills in order to be successful in field testing, defining critical attributes of student learning strategies, and sequencing and segmenting these for classroom teacher professional development. Context demographics of the school district were identified and included in the course of the study implementation. This included school and district demographics, student population, and state-wide report card results.

The district regularly benchmarks student progress in relation to the yearly state achievement tests. Both the district TAP coordinator and the district professional development director monitor student progress of these benchmarks. A comparative analysis between student achievement in the targeted TAP areas of teacher professional development was made. These data provided feedback on the TAP professional development designed around the identified student need. A comparative analysis between the professional development and student achievement was made. Both district positions report to the director of curriculum who approves

funding sustainability and future development. As future expansion is planned around a three-year deployment, it is necessary to establish appropriate training of master teachers for a first year “plan and study.”

The Cases

Three middle schools within the Midwest City school district served as sites for the study. Middle schools were chosen for the potential they hold for improvement. Specific demographic information for each school site was included in the final study after official approval for this study was granted. The schools each have two master teachers, each have received identical training from the TAP National Training Institute, and each have similar student populations in grades six through eight. Four of the six potential master teachers are in their first year as master teachers; one is in her third year. All have multiple years of classroom experience and some have received national board certification. One of the six master teachers declined to participate after the study had begun due to personal responsibilities; a mentor teacher agreed to participate in her place.

All master teachers at the commencement of the study had reached nine or more years of classroom teaching experience. The mentor teacher had completed six years of experience. Gladwell cites neurologist Daniel Levine “[T]en thousand hours of practice is required to achieve the level of mastery associated with being a world class expert in anything” (Gladwell, 2008, p. 40). Since all master teachers had reached nine or more years of classroom experience, the 10, 000 hour benchmark is appropriate to consider. The 10, 000 hour benchmark and a level of cognitive mastery attained when performing task involving multiple complexities such as classroom teaching. The model recommends that master teachers have ten years of classroom experience.

Large Units of Analysis

Source of data. Data came directly from the TAP school district as it resides alongside the state level initiative for eventual operation of the TAP. The intent is for all districts within a state to be self-regulating so that program rigor and quality can be sustained locally. Periodic district and yearly state assessments monitored student achievement. Both the district TAP coordinator and the district professional development director are responsible for showing evidence that focused professional development correlates with student achievement.

Data collection procedures. Accountability for teacher professional development dollars is directly linked to gains in student performance. Identification of program strengths helped to inform future recruitment. A comparative analysis was made between teacher-focused professional development and student achievement. Metrics from district benchmark tests aligned to state tests and/or state achievement tests were used. Data documenting these linkages serves as evidence for program expansion within the district; the coordinator and the director have stakeholder interest in its success.

Intermediate Units of Analysis

Sources of data. This research study was framed within the time period in the master teacher's reflective process beginning with the deployment of the field test to define the critical elements of instruction to be used in future transformational teacher development. This is then followed by the completion of the long-range professional development plan outlining the critical elements of instruction necessary for heightening student achievement. Data from this study will be shared with these district leaders at the conclusion of the study. This was the agreed quid pro quo when permission was initially granted to conduct the study. It was not necessary to

conduct the meetings until after the conclusion of the study since data from the leaders will not affect the outcome of this research.

Data collection procedures. Initially, the field test observation was conducted and recorded through field notes by the primary researcher. Each master teacher was observed prior to the research interview. Documentation in the form of scripting the field tested lesson as taught in TAP training ensued under focused observation of the master teacher in practice. “Focused observations require that you narrow the scope of what you are looking for... You want to find all the ‘parts of the building’ or ‘kinds of persons’ or ‘stages in an activity’” (Spradley, 1980, p. 128). Data recorded through observation was focused and framed into the conversation around which the post-field test interview was conducted with each master teacher.

Individual Units of Analysis

Sources of data. Individual units of analysis included interviews following the field test observation, reflective journals kept by the master teacher following field testing and prior to long-range plan development, and long-range plans as prepared by the individual master teacher. These procedures are a required part of the TAP protocol for job-embedded professional development. The teacher was not required to do additional recordkeeping and this researcher closely followed the work of the practitioner. While the reflective journal was not an officially required component, most master teachers keep informal notes already, and the opportunity to capture this in written form enhanced their practice and facilitated the work in planning that was a required part of their assigned responsibility.

Data collection procedures. One-on-one interviews were conducted with individual master teachers. The schedule in appendix D illustrates how these interviews progressed. This researcher conducted the primary and follow-up interviews. Scripts of the field test class were

provided to the master teacher prior to the interview. Master teachers were asked to review the captured lesson and reflect on it prior to the interview.

Questions were then framed around the standards of critical thinking. Follow-up questions included connections between the standards and the identified critical attributes of instruction around the student learning strategy. Each participant was asked a series of interview questions related to their reflective processes after conducting a teaching episode. These interpretations served as the basis for capturing their interpretative processes. An interview template based on the theoretical processes is included in Appendix D.

Reflective journals based on field testing practice conducted by the master teacher were used as a means to capture free thinking as well as the intuitive nuances in which the practitioner engages informally when planning. The master teacher recorded the points when student understanding “clicked” and when it was compromised. Additionally, adjustments for student comprehension, including lesson pacing and structure, were included.

Long-range plans served as the repository for framing instruction based on identified student need and planned professional development for teachers. This plan served as the eventual frame for preparing large-scale professional development for teachers in the respective school. Figure 3.3 illustrates the research process the master teacher followed during the case study. It commenced with the pre-field test interview, followed immediately with the field class observation and Phase I interview with this researcher. The master teacher continued in subsequent weeks to conduct follow-ups and formative assessment in the field class. Reflective journals were kept as part of the individual growth plan (IGP) process. The Phase II and III interviews occurred over this time period. Once significant formative gains had been produced,

the master teacher administered a summative assessment. At this point, the long-range plan became the repository for framing the planned professional development for school faculty.

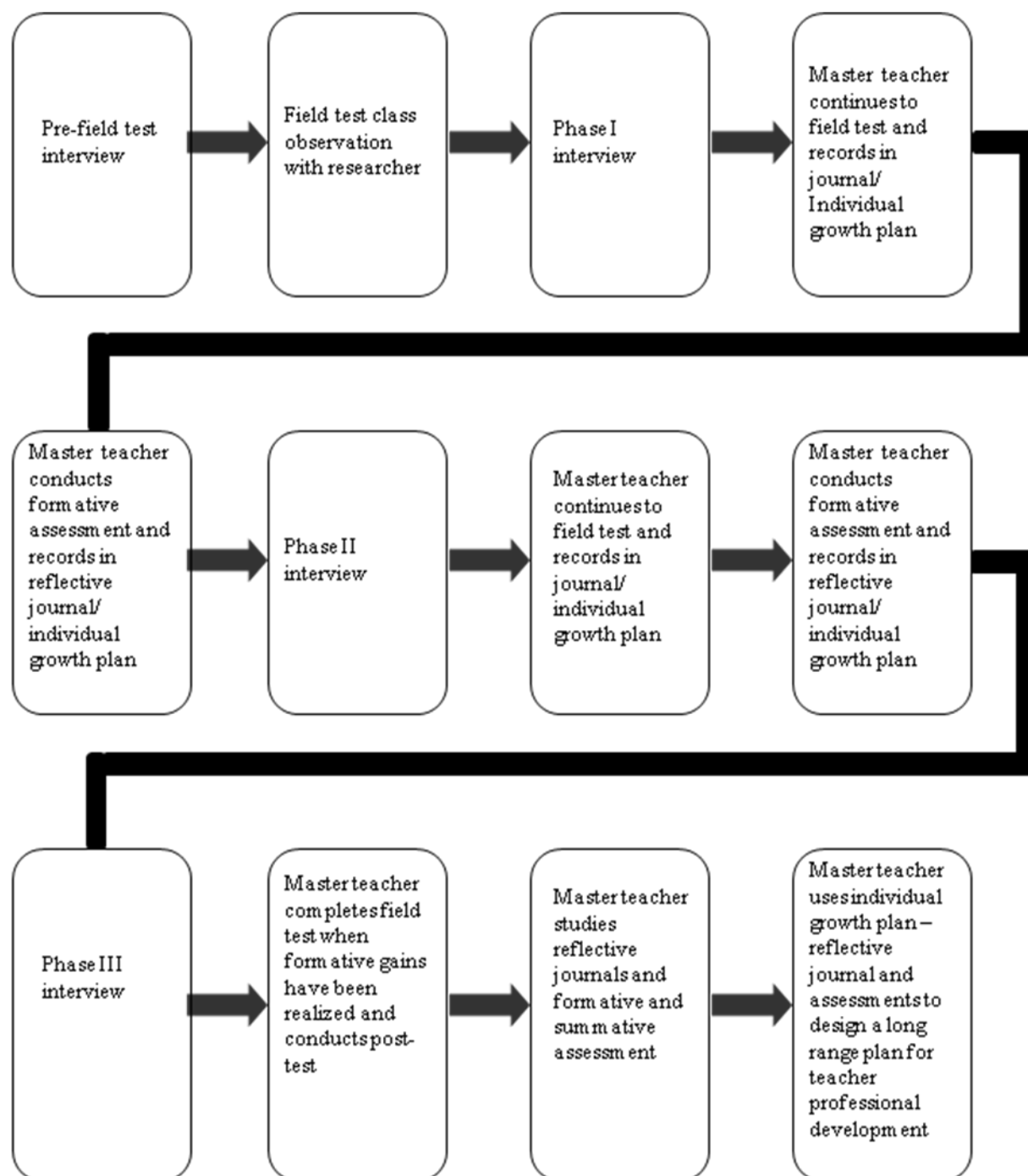


Figure 3.3 Research process: collection, coding, analysis

Data Analysis

Within the individual units of analysis, three areas of analysis included interviews from field observations, reflective journals, and long-range plans for professional development design. Discourse analysis was conducted from these elements. From that, coding was completed. First, questioning was done according to the standards of critical thinking: the interview conversations. Second, coding was done through the master teacher's identification of: 1) critical attributes of instruction, 2) assessment of student learning, 3) modifications in instruction based on identified student need and, finally, 4) sequencing and segmenting of learning strategies to maximize student achievement referred to as (CAMS). Categories were defined from the individual codes. One additional group, "other teacher feedback from reflections," captured unanticipated evidence.

Within the intermediate units of analysis, class observations were in service to the field test. Field test classes were scripted and provided to the master teacher prior to the interview. This supported the aforementioned.

Finally, the large units of analysis included school district metrics from state benchmarks and were used to form a comparative analysis between focused professional development and student academic achievement. An extensional category was included as "emergent" serving as a repository for collecting, analyzing, and then providing recommendations for future district training based on this study's findings. Each of these sources of data and the approach to their analysis is detailed in the next sections. The treatment of the interviews, journals, and long-range plans are treated under discourse analysis.

Discourse Analysis

Theme analysis was used for systematic examination of interview transcripts and document analysis.

A deductive approach collects stories like marbles and sorts them by their colors, sizes and stripes into “etic” taxonomy. “Etic” refers to the categories of the analyst drawn from grand theory and imposed from the outsider viewpoint onto others’ worlds. (Bojo, 2001, p. 122)

The five standards for critical thinking served as the “outsider viewpoint” onto the world of the critically reflective master teacher in the Teacher Advancement Program.

“The inductive approach to narrative theme analysis apes its taxonomy from emic categories in use by people who tell stories. Emic is how insiders sort their stories” (Bojo, 2001, p. 123). Bojo mentions further that thematic analysis moves between both of these categories. This intermingling of both etic and emic served as the base for responding to this study’s primary research question: How do the master teachers in the Teacher Advancement Program use reflection in data analysis from field tests to determine attributes of effective instruction? This provocation is in relation to the theoretical structures for background knowledge, heuristics, habits of mind, knowledge of critical concepts, and operational knowledge.

Coding and Categorization

The citations of evidentiary sources include linkages between the evidence from the data and the standards for critical thinking. The case study protocol includes the standards for critical thinking, building the interview questions from the five standards framing the questions “What does it mean?” and “How do I use it?” and, finally, “How is it applied to secondary teaching and student learning?”

The research team collected the evidence and categorized it according to interview questioning. Cross checks were conducted between differentiated data collected and the

theoretical propositions presented within the questions generated from the standards for critical reflection.

Coding and frequency counts from CAMS coding followed and were aggregated into Excel spreadsheets. Thematic analysis is included with a prioritization of points for future master teacher development following as recommendations. The process which was followed for the study is represented in Figure 3.4.

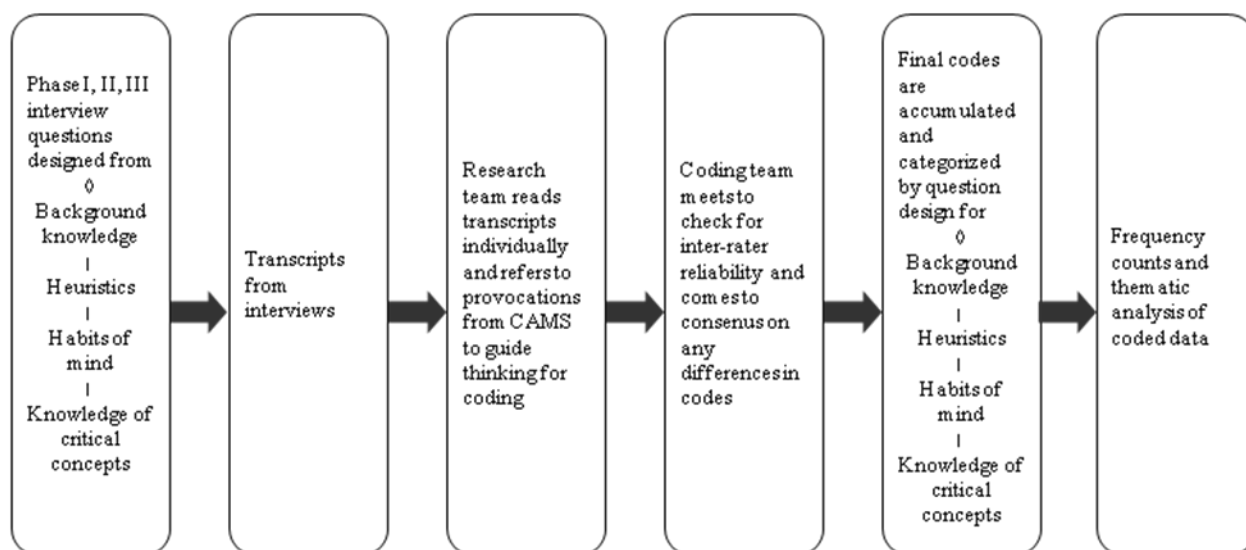


Figure 3.4 The research process

Both of Yin's (1994) recommendations to secure the validity of the analysis of data exist in this study. The triangulation among the interview, the long-range plan document, and the journal analysis support the former. The theoretical grounding in the standards for critical thinking served as the guide for data collection and interpretation, and supported the latter.

From this, data collected from interviews was coded according to: 1) critical attributes of instruction, 2) assessment of student learning, 3) modifications in instruction based on identified student need and, finally, 4) sequencing and segmenting of learning strategies to maximize

student achievement and referred to as (CAMS). The following provocations served as filters for the aforementioned.

Critical attributes of instruction

- 1) What was the study learning objective for this segment of instruction?
- 2) How was demonstration of mastery measured?
- 3) How does this align with the state academic content standards?
- 4) What were the critical aspects of instruction where student understanding was evident in relation to the intended objective?
- 5) What was the evidence that student work informed instructional decisions?
- 6) What questions were asked to support learning and understanding?

Assessment of student learning

- 1) What was the teacher looking for in student work at distinctive points throughout the instruction?
- 2) How was strategy application/deployment measured?
- 3) What were the difficulties students encountered? How did it exhibit a lack of understanding?

Modifications of instruction based on student need

- 1) What informed the teacher in adjustments made in instruction?
- 2) How was this decision made in relation to mastery of the state learning standard?
- 3) What did the teacher actually “do” that made the learning “click” for student understanding?
- 4) What adjustments would the teacher use again in teaching the lesson?

Sequencing and segmenting of learning strategies

- 1) What did the teacher indicate were the “enduring ideas” around the learning strategy?
- 2) Based on what was indicated, what is the best way at this point to deploy the learning strategy?
- 3) What was the thinking used for the most appropriate order in which to present the new learning in relation to student mastery?

Microsoft Excel spreadsheets served as the primary document storage across etic and emic theme analysis. Coding of interviews through CAMS was included. The primary researcher input all data into record sheets. This software served as the primary tool for documenting the codes and categories determined by the research team.

Method for Inter-rater Reliability

The process of coding transcripts from data collection occurred over a 3½-month period. To aid in the attainment of inter-rater reliability, double coding analysis was used. Transcripts by site and phase were read, studied, and coded independently by the researcher and his assistant from the state department of education. To guard against fatigue, coding sessions were limited to three-hour blocks of time.

During the work sessions, each coder read the phase separately. Each question was read, studied, and coded separately. Once this step was complete, coders reconvened, discussed, deliberated, and when necessary, came to consensus. Each coder recorded field test data separately on record sheets as an added safeguard against damage or loss.

When agreement needed to be reached, a pause in the process occurred. Coders referred back to the initial training guides used. The “red” and “green” flags for each of the codes were used as a basis for deliberation. Discussion ensued until consensus was reached.

Table 3.4 represents the percentage agreement of inter-rater reliability for each site under each phase.

Site A Reliability	Open/Phase I	Phase II	Phase III	Total % Reliability
Background Knowledge	20/20	3/3	6/8	29/31 93.5%
Heuristics	13/13	4/4	18/20	35/37 94.6%
Habits of Mind	10/11	9/10	19/20	38/41 92.7%
Operational Knowledge	11/12	4/5	5/5	20/22 91%
Knowledge of Critical Concepts	12/12	4/4	12/13	28/29 96.6%
Total % Reliability				150/160 93.8%
Site B Reliability	Open/Phase I	Phase II	Phase III	Total % Reliability
Background Knowledge	8/10	11/11	12/12	31/33 93.9%
Heuristics	12/12	16/17	15/16	43/45 95.6%
Habits of Mind	14/16	10/10	13/13	37/39 94.9%
Operational Knowledge	10/11	10/10	15/15	35/36 97.2%
Knowledge of Critical Concepts	12/14	6/6	13/13	31/33 93.9 %
Total % Reliability				177/186 95.1%
Site C Reliability	Open/Phase I	Phase II	Phase III	Total % Reliability
Background Knowledge	3/3	4/4	9/10	16/17 94.1%
Heuristics	4/4	4/4	8/10	16/18 88.9%
Habits of Mind	7/7	8/8	12/12	27/27 100%
Operational	4/4	5/6	7/7	16/17

Knowledge				94.1%
Knowledge of Critical Concepts	6/6	4/5	6/6	16/17 94.1%
Total % Reliability				91/96 94.8%

Table 3-4 Percentage agreement for inter-rater reliability

Ethical Issues

Merriam (1988) contends that during data collection and data dissemination are most likely points where ethical dilemmas become pertinent. She lists Walker's (1980) five most recurrent problems in case study:

- 1) Problems of the researcher becoming involved in the issues, events, or situations under study;
- 2) Problems over confidentiality of data;
- 3) Problems stemming from different interest groups for access to and control over the data;
- 4) Problems concerning publication, such as the need to preserve the anonymity of subjects; and
- 5) Problems arising from the audience being unable to distinguish between data and the researcher's interpretation. (Merriam, 1988, p. 179)

Since the majority of data collected was done by this researcher in the form of interviews, observations, and document analysis of worked conducted by teachers in the three Midwestern schools, confidentiality was maintained at all levels. Additionally, pseudonyms were used to further ensure participant privacy. Participants were told exactly what the study would involve and why the study was being conducted. Informed consent for this study was completed and application was submitted to the Antioch Graduate School Institutional Review Board. The content for the study was communicated in its basic form so that participants understood why

their organization was chosen. Feedback as a form of reciprocity was offered to benefit the further development of the TAP organization within the district. All participants were asked to read information forms and sign the informed consent protocol. Official permission was granted by the schools and district.

Commentary revolving around master teacher effectiveness was carefully guarded. Dialog on interpersonal relations was kept strictly confidential. All tapes and transcripts were kept secure throughout the study and then destroyed after the recommended time frame as required by the Institutional Review Board. Most, if not all, of these identified sites were progressive in their nature and development. It was quite probable they could be reluctant to participate because they fear findings might be interpreted in such a way that the organization is negatively perceived. In negotiating permission to do the study, it was specified that the findings would be used for internal research and development for improved training. No comparisons between individual sites or critiques of the learning activities were to be made. This would be of particular importance to participants because, in most cases, their programs were in the initial stages of evolution.

Finally, all participants were assured that the information they shared would be reported accurately and honestly. Transcripts were made available to review for accuracy and intent. Clear distinctions were always maintained between the data and the researcher's interpretation of the data. This researcher plays no role in the evaluation procedures or processes of school district employees.

This chapter has detailed the study design, a multiple case study with replication, the sources of information gathered, the coding and analysis of the data collected for each of the cases, the method for inter-rater reliability, and the ethical issues that were addressed in this

study. Chapter 4 first presents the findings from each of the three phases of the study. Finally, the primary findings from the three cases are presented side-by side for the purpose of descriptive comparison.

Chapter IV: Data Analysis/Results

In Chapter IV, the data and analysis of this “case study with replication” in a large Midwestern city school district are presented. First, the findings of the three cases—Saylor, Chester, and Clyde Middle Schools—are presented individually in their entirety. Second, the commonalities, differences, and distinct findings across the three cases are discussed. The presentation of findings for each case includes: 1) the interview analysis of Phases I, II and III, 2) coded analysis of documents, and 3) metrics from pre- and post-testing.

The data from the interview analysis resulted from the master teacher’s clinical work in field trials. The data related to the field trials included three separate interviews conducted by the primary researcher. Phase I included the field test class observation by this researcher and the participating master teacher. Specifically, the interview sought to answer the research question, “How do master teachers in TAP use reflection in data analysis from field tests to determine attributes of effective instruction?” Pre-field test questions were posed to the master teacher prior to the field test related to the teachers’ specific lesson plan. At this time, the field testing cycle was commencing and students had been given a pre-test by the master teacher. The pre-test served as a baseline for measuring improved student achievement.

Phase II included the first follow-up interview two to three weeks after the completion of the initial field test. This interview sought to answer the research question, “How does the master teacher use data from field testing to determine attributes of instruction?” Classroom follow-up with students was conducted weekly in the field test rooms. At this point, the master teacher had begun the individual growth plan, tracking reflections from the research interviews, the additional classroom follow-ups, and regular formative assessments.

Phase III represented the final research interview, an additional two to four weeks after the Phase II interview. This interview sought to answer the research question, “How is application made for transfer to instructional learning strategies?” As noted in the field test flow chart (Figure 4.1), the clinical trials followed after analysis of student data from state assessments. Next, the master teacher began building a student strategy drawing from research-based practice. The strategy is designed to meet students at their current academic place. The target is based on the state’s academic content standards, not test questions. It is manifested by expectations of performance in the classroom. From the formative data collected, the master teacher scaffolds and extends the strategy, tailoring it to specifically meet the needs of the students. Classroom follow-up continued as well as the development of the master teacher’s long-range plan. The field testing cycle had reached completion and the post-test was administered according to readings made previously on the weekly formative assessment. This is illustrated in Figure 4.1.

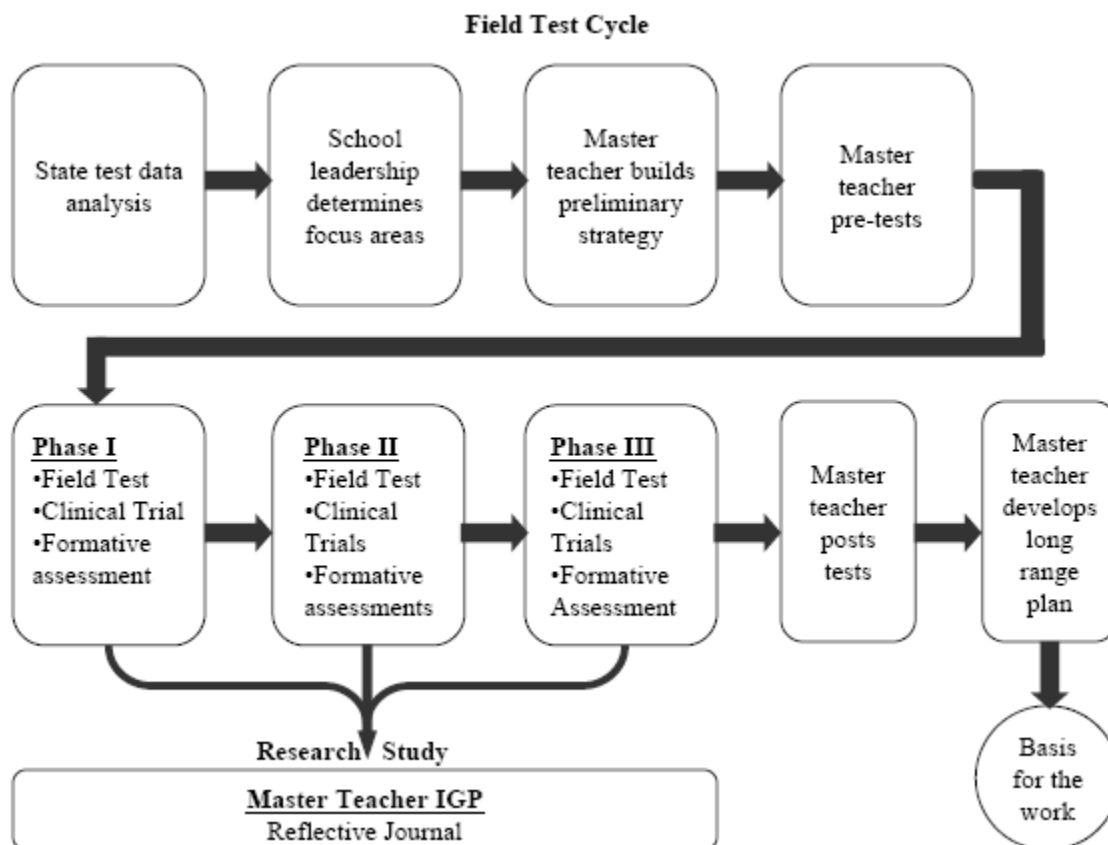


Figure 4.1 Field test cycle

The master teacher discussed the trials in relation to student progress monitoring, modifications of strategies, and instructional practice. Direct dialog from the master teacher is included to capture thinking in relation to critical practice. Their critical practice is presented in an aggregated context of a school team that works in concert with their current school leadership practices. Final coding and frequency levels are included in this chapter.

Site A: Saylor Middle School

Saylor Middle School serves the area just west of the city's downtown metropolitan area. The community is largely of Appalachian decent with a high number of single parents. The middle school building is nearly one hundred years old, but it has been well maintained by the

city school district. It has an enrollment of 333. The school ethnic makeup includes 29.6 % black and 65.9% white. The percentage of students receiving free and or reduced cost lunch is 99.5.

The school's value-added score, which measure a year's worth of student growth, is above what has been determined for Saylor, but the school has not made adequate yearly progress and has been designated as on *academic watch* by the state's department of education. All of Saylor's teachers have a bachelor's degree and over 60% have master's degrees. Each of the master teachers has advanced degrees in education with one having completed a Ph.D. The school has two master teachers and both participated in this study one master teacher has 29 years of experience and one has 11 years of experience. The master teachers research, plan, and deliver the professional development for their school.

Site A: Saylor Field Test Description

The field testing trials conducted by this master teaching team included an identified student need around the inability to make inferences from data and/or information presented in text. Saylor's students could pick out general information about what they had read, but when asked to make inferences about what they had read, they demonstrated an inability to do this. Field test trails were conducted to determine the extent to which students were able to go back into the text to find information and build an accurate response. The extent of students' prior knowledge and the implication it had on student achievement was also of immediate interest to this team.

Site A: Saylor Opening/Phase I

How do master teachers make meaning from field tests to determine attributes of effective instruction? The master teacher was interviewed prior to beginning the field test. Following the field test, the interview continued with Phase I questioning. The pre-field test

questions established the purpose of the field test. Questions following the observation were constructed from the five standards of critical thinking. Master teacher Baldwin had nine students in her field test. Master teacher Bolton had ten students in her field test. Data was collected from the field interviews, coded using the elements from CAMS, and then discussed. This research process is illustrated in Figure 4.2.

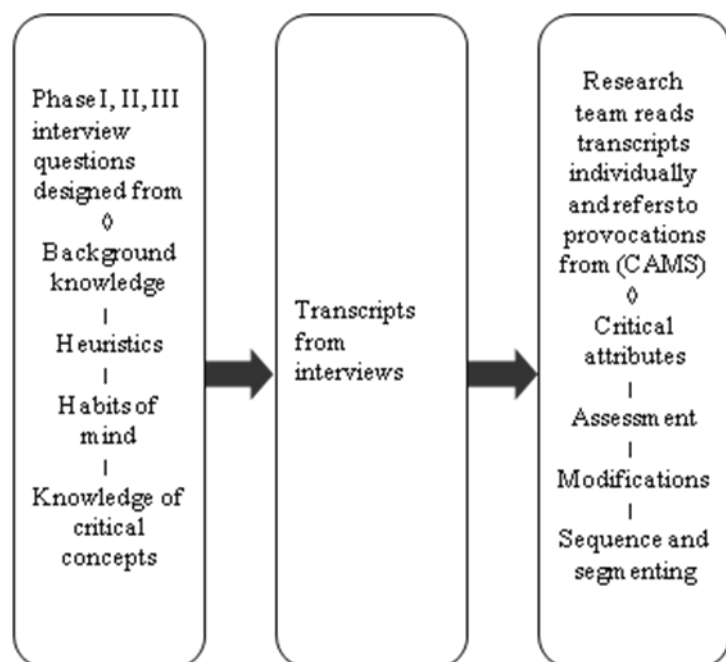


Figure 4.2 Saylor research process: collection, coding, analysis

The pre-field test interviews and opening/Phase I, II, III interviews were coded according to the elements described under CAMS in Chapter 3, critical attributes, assessment, modification, and sequencing and segmenting. Each question was indicative of the corresponding standard of critical thinking. It represents the master teachers' processing and practice around the standard. The frequency counts from the opening interview and Phase I interview are represented in Figure 4.3. In this phase, a tendency toward defining the critical element and making an assessment existed in master teacher reflections. There was less attention toward making any modification of instruction or definitive sequencing or segmenting of content.

Frequency Counts - Opening - Site A

	C	A	M	S	E		C	A	M	S	E
□ Background Knowledge	0	0	1	1	3		6	3	1	0	0
▣ Heuristics	0	0	0	0	0		1	2	0	0	2
■ Habits of Mind	0	0	0	1	0		1	0	0	0	0
□ Operational Knowledge	2	0	0	0	0		1	0	0	0	0
▣ Knowledge of Critical Concepts	0	1	0	0	0		4	0	0	0	1

Frequency Counts - Phase I - Site A

	C	A	M	S	E		C	A	M	S	E
	Baldwin						Bolton				
□ Background Knowledge	0	0	0	1	0		1	2	0	1	0
▣ Heuristics	2	0	0	0	1		2	0	0	0	3
■ Habits of Mind	2	0	0	1	3		1	0	1	0	1
□ Operational Knowledge	1	1	0	0	0		0	2	2	2	1
▣ Knowledge of Critical Concepts	0	1	0	0	0		0	3	1	1	0

Figure 4.3 Opening and Phase I frequencies

Background knowledge. Under background knowledge, the master teachers' retrieved past knowledge for interpretation and current use. This included framing learning with consistent nomenclature to increase student understanding with the specific intention of more authentic student usage and increased student confidence. This team of two teachers drew from past

interpretation of their background knowledge and connected it to their current knowledge of students. “We were a little hesitant, but I think they got it. They were just worried about not being correct...we would say something and then one would say, ‘that’s what I thought too!’...and I’d say, ‘why didn’t you say it?’” Students responded that a fear of being wrong precluded their participation. These inferences by the teacher team around student understanding drove assessment and the definition of critical attributes of master teacher instruction. The teachers asked the question, “Is part of the problem that they don’t know how to access that prior knowledge, or what to do with prior knowledge, or maybe they don’t trust their prior knowledge?” From this, teachers worked to frame learning toward introspection finding entry points of understanding with which students would be familiar to increase student confidence. Hence, from the teachers’ perspective, through use of teacher background knowledge, students could then move to higher levels of complexity and eventual success.

Heuristics. Student independence geared to empowerment, anchored master teacher thinking. Master teachers refrained from particular learning strategies if classroom teacher involvement was predominant; thus increasing student dependency. Meaning that, because of student’s reluctance to take risks and actively participate, teachers could easily dominate the classroom. The team was cognizant of this possibility. Independent thinking was encouraged and was noted when it was observed in the classroom. After working in groups, master teachers reported, “They kind of weaned themselves off their partners. They asked, ‘Are we working individually? Can I work individually?’” They lobbied for independence, which the teachers acknowledged and supported. Teachers respected variables in thinking by students. A special needs student commented about the location of the Missouri River and the use of a “text to self” comprehension strategy, “...yeah, it is in the book, but it could also be in your head.” This broad

thinking was acknowledged and supported. Student independence was purposefully considered by the team.

Habits of mind. Within habits of mind, meaning was defined by the teacher, as the intellectual authority, using accepted modes of understanding. The master teachers defined a stronger level of mastery around the student's ability to critique work. As the master teacher lens became more in focus, it then served as a potential habit of mind. The master teacher team worked to move beyond a previously used state test question as a focus to a broader grasp of resources to find necessary information. Students then moved to usage and synthesis; this would create movement toward independent thinking what the team sought for its students. Teacher reflection on student learning indicated emphasis on the development of student habit of mind. "I'll start rolling out and then...that last one when I think that they're ready to think outside of test prep, then maybe I will introduce that last category." An entry point with mastery was carefully and purposefully planned. A stronger level of mastery, through critique as a habit of mind, was the team's vision. They tied the strand together with graphic organizer use to stimulate synthesis on the student's part. This would activate and stimulate interaction with student prior knowledge and contribute to the expansion of prior knowledge.

Operational knowledge. Master teachers discussed pause in operations for further defined practice. "My focus before was making sure I had enough to keep them busy. Now, my focus is on the fact it is okay to take time to use wait time, to go in different directions, then bring them back." This indicated a shift in operational pacing. The direction toward understanding versus singular management of the operation was emerging from teacher thinking and planning of instruction.

Knowledge of critical concepts. Teacher reflection included probing for reflective explication from students around a topic like symbolism. A student would be asked to identify and explain. Understanding of the necessity of a target was discussed. I had a basic understanding of what I wanted to test. I kept revising because it depended on the kids, the class, what they were weak in, what they weren't weak in." For the team, it served as a grounding point and, once students lobbied for independence from the teacher or group, the signal was present that the modification made moved students toward mastery and independent confidence as opposed to dependent reliance on the teacher and/or group.

Site A: Saylor Phase II

How do master teachers use data from field testing to determine attributes of instruction? The Phase II interview was conducted within two weeks of the first field test observation. The master teacher was midway into the field test. Classroom follow-ups had occurred to gather additional monitoring data. The frequency counts for the Phase II interview are represented in Figure 4.4. Both master teachers considered all levels of CAMS; however, the frequencies remained relatively low in number.

Frequency Counts - Phase II - Site A

	C	A	M	S	E		C	A	M	S	E
	Baldwin						Bolton				
<input type="checkbox"/> Background Knowledge	0	0	0	0	1		0	1	1	0	0
<input checked="" type="checkbox"/> Heuristics	1	0	0	0	0		1	1	0	0	1
<input checked="" type="checkbox"/> Habits of Mind	0	2	1	1	2		3	0	0	1	0
<input type="checkbox"/> Operational Knowledge	0	0	0	0	2		1	0	1	1	0
<input checked="" type="checkbox"/> Knowledge of Critical Concepts	0	0	1	0	0		0	0	1	1	1

Table 4.4 Phase II frequencies

Background knowledge. A broad understanding of the field enabled skepticism and purposeful questioning. The teachers focused on authentic student engagement with the strategy and its deployment based on identified need by the student. Reflection included noting student willingness to share their responses in an authentic communicative application and usage. “When we’re having discussion, I’d look at their answers; one of the things that I’m noticing is their willingness to share out their answers.” The engagement and the comfort level of interaction by students were used to define what worked in their instruction.

Heuristics. Through heuristics, the master teachers extended current reference points. They observed that test questions used by classroom teachers were not crafted at the same level of complexity as the state assessments. Once the bar was raised with question complexity, then students needed to understand exactly what the question was requesting them to develop and discuss. This for them was appropriate placement for new instruction. Master teachers decided to extend this by infusing the new strategy with the current content being taught in the classrooms. “They [teachers] don’t need an extra thing to do, and they need to see where to intertwine it easily to make sense for the students.” The adult entry point for understanding and use became the extended heuristic for defining what was critical.

Habits of mind. The master teacher focused on encouraging the adult to think like the student would think. When a student is asked to interpret a graph, but has no idea how to problem-solve to get the answer, the teacher should ask: “What are some of the things you know how to do which may apply?” Application to the teacher’s current content was considered by the master teachers. If allotted time had elapsed, should teachers move to the next concept to spend additional time? This struggle was discussed. “What are you going to do to re-teach that? How are you going to address that misconception? The next time you teach the lesson, how are you

going to head that problem off?” Once the teacher identified the student misconception and that it exists, a deeper understanding was reached.

Operational knowledge. Adapting methods and/or content to match ways students learn was a focus. “We start off with the bar graphs and circle graphs. We spend the majority of time there, then breeze through the less familiar graphs. That’s actually where we need to spend more of our time.” Master teachers search for ways to help students visualize better. They discussed differences in levels of difficulty behind finding an answer in the text versus finding multiple data and detail and stitching it together for a new way of knowing or understanding. Adapted approaches around a graphic visual planned a specific focus toward teaching abstract thought was a predominate theme.

Knowledge of critical concepts. Teachers reflected on current conceptualizations, then made contextual decisions. “When I first started teaching, the writing process was brand new. Now there has been much research done on meta-cognition that people, especially students use...so it would only make sense to draw the best practices from that information.” Instruction was modified for various group work around thinking and searching for information in and around text. Teachers studied student application to discern the extent of student understanding. Teachers showed students how the “labeling” around a title “think and search” emerged and modeled meta-cognition. The labeling was defined as critical and was realized through the modification of classroom instruction.

Site A: Saylor Phase III

How do master teachers make application for student transfer of instructional learning strategies? The Phase III interviews occurred at the end of the field test process. The master teacher had reached a point where sufficient gains had been documented formatively and the

student strategy had clarity. A post-test was ready to be administered. Frequency counts are represented in Figure 4.5. Higher frequencies existed at this final phase with both critical attributes and assessment. In addition, teachers had higher levels of critical attributes, the essential learning necessary for understanding around habits of mind and heuristics.

Frequency Counts - Phase III - Site A

	C	A	M	S	E		C	A	M	S	E
	Baldwin						Bolton				
<input type="checkbox"/> Background Knowledge	2	1	0	0	1		2	1	1	0	0
<input checked="" type="checkbox"/> Heuristics	2	1	0	1	1		6	3	2	2	2
<input checked="" type="checkbox"/> Habits of Mind	6	5	0	2	2		1	2	1	0	1
<input type="checkbox"/> Operational Knowledge	1	0	0	0	1		1	0	1	1	0
<input checked="" type="checkbox"/> Knowledge of Critical Concepts	4	4	0	1	1		3	0	0	0	0

Table 4-5 Phase III frequencies

Background knowledge. Master teachers were conscious of the rate of student thinking and process. “It slows them down...they are forced to reread and then think before they respond.” They noted the questions from the students ranged more around lack of understanding versus curious thinking or extending of knowledge. Student observable behavior was noted from asking classmates to search back to the primary sources of information. Because individual student background knowledge was limited, the master teacher measured repetitive application as critical for student empowerment and strategy use. Name change in student strategy was considered because “think and search” implied more of a right there extraction of informational text. Student synthesis and application in the formation of new knowledge was missing. The developmental stage of the student and student performance drove the authentic strategy extension.

Heuristics. Master teachers saw the effect on student learning with a whole-school rollout of a student strategy. As students were empowered to make decisions it had an impact on student performance. Students commented that they may have just learned or used the strategy in social studies and now were using it in science. Teachers knew they did not have to re-teach the strategy at the beginning of each class, but could assess student stages, and then adjust the learning at the appropriate point for each class. They also learned that chunking the strategy encouraged faculty members to include it more frequently in the classroom because it was more manageable as they planned. They noted that students were reluctant to share, so master teachers regularly modeled their thinking and then proceeded to frame a student model. “How did you come up with that?...you can question students who do get it naturally, [sharing] what they were thinking and showing other students what they were doing.” The master teachers picked up with slow, purposeful thinking encouraging students to pause, to note multiple paths, and to discover and apply from personal prior knowledge, notes, classmates, or primary sources.

Habits of mind. The master teachers generated opportunities for peer review with active student engagement in critique. Students were asked to make original constructions in relation to inferences. Female students were a bit hesitant at first, but then gained a comfort level. High level students became consciously competent in their thinking process because they were asked to verbalize their thinking to others. Student empowerment was planned with individual competition to a middle school student. Teachers mentioned, “Okay now, are you smarter than a fifth grader?...they liked the competition. [Students] also knew they weren’t getting graded so there was no pressure on them...this was just looking at it and deciding on it.” Students established initiative for personal achievement and satisfaction.

Operational knowledge. Master teachers shared curiosity between the relationship and influences of the “author and me” and “think and search” strategies. They acknowledged that fewer students at Saylor had finely-tuned abstract thought developmentally yet; students remained more concrete in their thinking. Student engagement and usefulness was considered a factor. “You don’t want to make it so much work that they are not going to tackle it, but at the same time, you want to make it a higher level of work than they are used to.” They considered the strategy work to be seamless and to be used and managed in cross-curricular ways.

Knowledge of critical concepts. How can the student activate the strategy when necessary? This moves beyond simple restatement of a strategy learned. Master teachers repetitively encouraged students to actively and consciously think about their thinking. Developmental stages of middle school students were an important consideration with particular emphasis on student readiness to think abstractly. Challenges to activate directly connected to intimate application by the students in their daily lives such as making clothing choices or ordering a pizza rather than thinking about a major in college or a career in the future.

Site A: Saylor Individual Growth Plans/Long-Range Plans

Throughout the field test cycle, the individual growth plan served as a journal for the master teacher to record reflection on the clinical trial performed. After the conclusion of the field test, the master teacher began development of the long-range plan. While the plan remained a dynamic document based on student progress monitoring, it served as a base for representing the eventual delivery of professional development to faculty members. The content correlation between Saylor’s master teacher team and the individual growth and long-range plan documents was aligned. The primary focus was on reading comprehension across content areas with mathematical emphasis on reading charts and graphs. The team’s individual growth plans were

coded to CAMS. The frequency distribution is listed in Figure 4.6. A high level of assessment was evident by both master teachers, and master teacher Baldwin in addition had a higher frequency for defining what was critical in relation to the assessment through her individual reflective process.

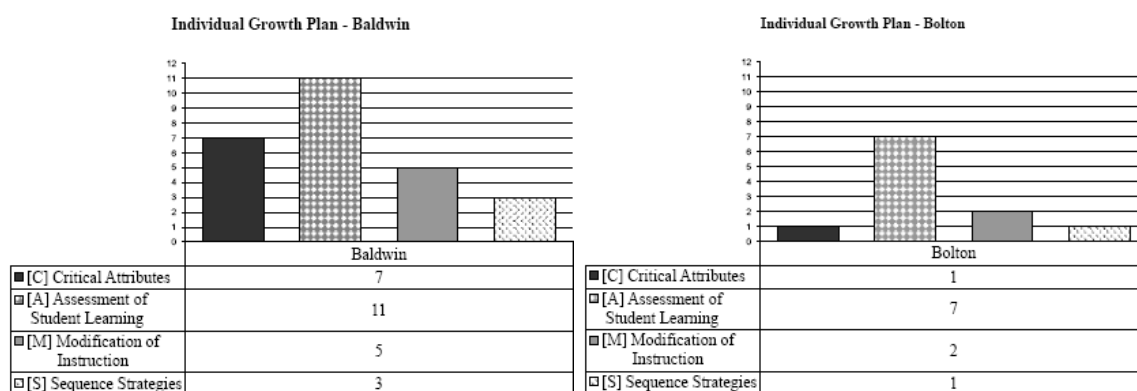


Figure 4.6 Individual growth plan frequency

Site A: Saylor Student Pre/Post Performance

The master teacher formal processing and planning was communicated in terms of student learning. The pre-test and post-test results are illustrated in Figure 4.7.

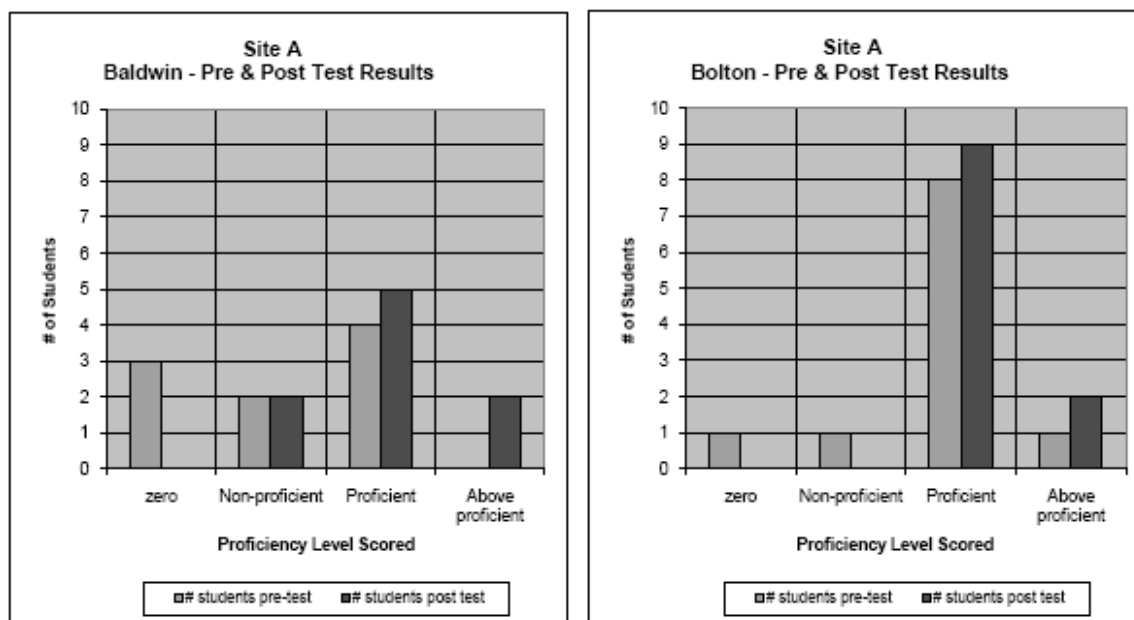


Figure 4.7 Pre/post student performance

Master teacher Baldwin tracked gains from the pre-test to the post-test. Out of nine students, two students moved to above proficient and one additional student moved to proficient. No student performed at the zero level.

Master teacher Bolton tracked gains from pre-test to post-test. Out of the ten students tested, one student moved to above proficient, and one student moved to proficient. No student remained at the zero or non-proficient levels. There was no significant movement to the higher ranges of advanced proficient in either group.

Site A: Saylor Student Responses

What can you do now, you could not do previously; how do you know? After the initial field test lesson, students were asked to reflect on their overall learning. Students were asked to explain what, in their opinion, they could now do more effectively. Student responses that included a declaration of the topic taught for the day were classified as having declarative knowledge of the concept. They were distinguished from student responses that showed

indication that the student had processed information cognitively so that the strategy could be activated when comprehension was compromised.

Declarative Student Knowledge	Potential for Cognitive Student Empowerment	Non-response
<p><i>Baldwin Trials-Student Response</i></p> <ol style="list-style-type: none"> 1. What I could do today that I could not do yesterday was my math homework. 2. When we were going over it the second time [I understood]. 3. Today's lesson I felt I knew it; it was harder for me yesterday. 4. I learned how the box and whisker plots work and how to use them. 5. I got it at the end of class. 	<p><i>Baldwin Trials-Student Response</i></p> <ol style="list-style-type: none"> 1. I found out what the inter-quartile range means. 2. I got it when Mrs. Baldwin was showing us how to determine where the answer came from and how to figure it out. 3. I started to understand it and then answered the question right 	<p><i>Baldwin-Student Response</i></p> <ol style="list-style-type: none"> 1. one student
Declarative Student Knowledge	Potential for Cognitive Student Empowerment	Non-response
<p><i>Bolton Trials-Student Response.</i></p> <ol style="list-style-type: none"> 1. Yesterday I would not have been able to do think and search questions. 2. I got it by using the QAR strategy. 3. I know I can tell the difference between the two [right there and think and search] 4. I could state a sentence instead of using a different sentence. 	<p><i>Bolton Trials-Student Response</i></p> <ol style="list-style-type: none"> 1. I can find the answer to a question in one sentence; I could not do that yesterday? 2. I can determine whether you get your answer from the text or in your head 3. I knew that I got it because I could tell what Mrs. Bolton was talking about. 4. I knew I got it when I got the question right 	<p><i>Bolton Trials-Student Response</i></p> <ol style="list-style-type: none"> 1. I don't because I didn't do anything. 2. I could eat two buckets ice cream.

Student survey summary responses from Saylor indicate student's reporting in a declarative form of understanding. Some students did indicate potential for monitoring comprehension and

held promise to activate the strategy in the future when their comprehension would be compromised. Affirmative student feedback was also reported and valued by students. This followed the preliminary teacher knowledge of students and served to define entry points for student understanding and the need to experience success.

Site A: Saylor Summary Findings

Both master teachers at Saylor realized gains from the pre/post-test. Higher code counts occurred with critical attributes of instruction and assessment of instruction. A similar trend occurred with master teacher individual growth plans, both with a high assessment frequency. Master teacher Baldwin indicated through critical attributes a more formal definition in her reflective process for what was critical for students to do for maximizing their understanding. Student responses for Baldwin indicated that self-monitoring for understanding existed such as “I can determine whether I get my answer from the text or in my head.”

The Saylor team focused on student prior knowledge and worked to bridge gaps in student perspective. Teacher knowledge of students was present with a focus on independence. Because students had limited content knowledge, teacher focus was on repetition to increase the likelihood of student success. Student responses indicate movement to independence with conscious level of competence expressed in student statements. “I found out what the inner-quartile means.”

While student academic progress was made, it existed primarily with student movement from zero or non-proficient to proficient. Limited movement to above proficient occurred. Student responses indicated declarative knowledge of strategies; those that showed potential for independence remained largely restatements of teacher information. Students could report out the

importance of a particular learning strategy, but did not articulate clear description of the end product and the expectation for mastery.

Site B: Chester Middle School

The Chester Middle School has an enrollment of 297 and serves an inner city neighborhood situated in an area that is high crime and high poverty. Two government housing projects are within walking distance of Chester. The proportion of students receiving free and/or reduced lunch is 99.9 %. Students moved into a newly-constructed facility in January 2008 complete with interactive instructional technology in all classrooms. The school's value-added score measuring a year's worth of student growth is below expected levels, placing Chester in the state's academic emergency category. All of Chester teachers hold a bachelor's degree and 38.9% hold a master's degree. One of the master teachers holds a bachelor's degree in mathematics education and the other holds a master's degree in reading. The school has two master teachers, both of whom participated in his study. One master teacher has 29 years of experience and one master teacher has 11 years of experience. They are responsible for planning and deploying the professional development to Chester's faculty.

Site B: Chester Field Test Description

The field testing trials conducted by this team centered on activating prior student knowledge for increased reading comprehension and number and number sense in mathematics. The team has determined that, when students do not have necessary prior knowledge or understand the problem, it is difficult for them to work through the full strategy and maximize on all steps of the strategy. The team worked with small groups of students that were representative of all performance levels. A special focus was placed on students who were considered in easy range of the next performance level; they referred to these students as the "bubble" students.

How should faculty best teach the student strategy with content that has already been taught and students can pull from prior knowledge?

Site B: Chester Opening/Phase I

How do master teachers in TAP make meaning from field tests to determine attributes of effective instruction? The master teacher was interviewed prior to beginning the field test. Following the field test, the interview continued with Phase I questioning. The pre-field test questions established the purpose of the field test. Questions following the observation were constructed from the five standards of critical thinking. Master teacher Andrews had six students in her field test. Master teacher Mercury had nine students in her field test. Data was collected from the field interviews, coded using the elements from CAMS, and then discussed. This research process is illustrated in Figure 4.8.

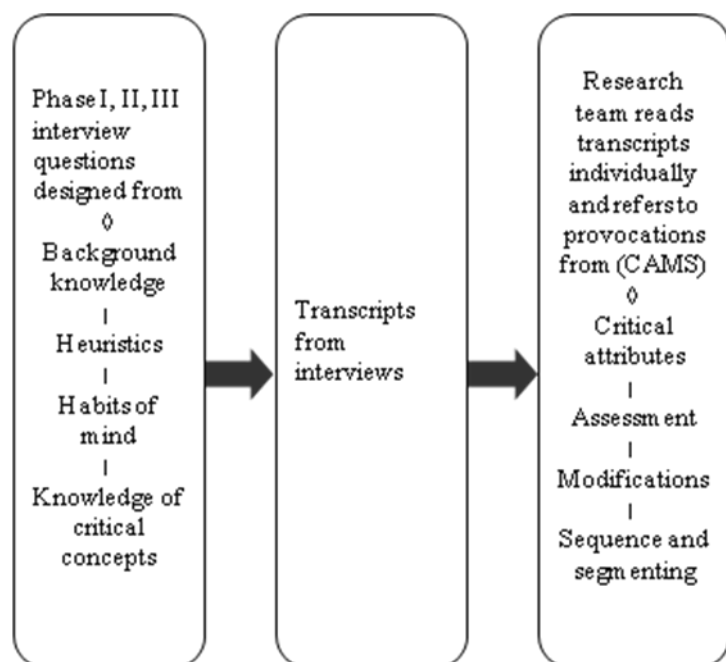


Figure 4.8 Chester research process: collection, coding, analysis

The pre-field test interviews and opening/Phase I, II, III interviews were coded according to the elements described under CAMS in Chapter 3, critical attributes, assessment, modification, and sequencing and segmenting. Each question was indicative of the corresponding standard of critical thinking. It represents the master teachers' processing and practice around the standard. Frequency counts from the opening interviews and Phase I interviews are presented in Figure 4.9

Frequency Counts - Opening - Site B

	C	A	M	S	E		C	A	M	S	E
	Andrews						Mercury				
<input type="checkbox"/> Background Knowledge	0	0	0	0	0		2	0	2	2	1
<input checked="" type="checkbox"/> Heuristics	0	0	0	0	0		0	2	1	0	0
<input checked="" type="checkbox"/> Habits of Mind	0	0	0	0	0		0	0	0	1	0
<input type="checkbox"/> Operational Knowledge	0	0	0	0	1		1	1	0	1	1
<input checked="" type="checkbox"/> Knowledge of Critical Concepts	1	0	0	0	0		5	2	0	0	1

Frequency Counts - Phase I - Site B

	C	A	M	S	E		C	A	M	S	E
	Andrews						Mercury				
<input type="checkbox"/> Background Knowledge	0	0	0	0	0		1	1	0	1	0
<input checked="" type="checkbox"/> Heuristics	2	0	0	0	0		3	3	0	1	0
<input checked="" type="checkbox"/> Habits of Mind	2	1	1	0	0		5	2	1	3	0
<input type="checkbox"/> Operational Knowledge	0	1	0	0	0		3	2	0	0	0
<input checked="" type="checkbox"/> Knowledge of Critical Concepts	0	2	0	0	0		0	2	0	1	0

Figure 4.9 Opening and Phase I frequencies

Background knowledge. The master team drew on students' background knowledge beginning with a focus on student performance on homework, working from a whole to part perspective in relation to geometric shapes. The master teachers were clear about necessary student performance expectations to accurately benchmark at each level, but noted faculty members' level of proficiency. "You must be able to check off what student's can and can't do—it's a more valuable way to measure progress to mastery...the problem is that teachers are doing the strategy and not seeing that connection" This provided them with knowledge of students adding to an overall collective to move them to higher academic achievement. They focused on the necessity of scaffolding the learning with clear objectives. "The strategy we are working on [with students] is going through the thought process of the relationship between numbers and the action words in the problem." Focus is on connecting the action word and the math problem to successfully formulate a mathematical computation. The master teachers found that initial student engagement was best connected to familiar content to enhance student confidence. "They're so used to using numbers like (3) or (5)...geometry is a different nature." Student performance status drove thinking around this element.

Heuristics. In reference to student mastery, the master teachers noted student eagerness to participate in learning as significant for their students. They cited this in relation to assessment and any corrective measures taken. At present, students were caught between an initial misuse of vocabulary between the terms *acute* and *obtuse*. "I actually anticipated that they would have problems with *acute* and *obtuse*, and they got the answer right." Students appeared to have captured initial understanding; further probing uncovered other particular weaknesses. "I tried to reaffirm why they got it right...I realized the misconception that I anticipated was there." The master teacher found it important to frontload explanations to students to avoid confusion.

Further levels of accuracy were noted from monitored usage in the classroom and debate and interaction with fellow students. “The more they had to defend their answers and argue with each other...their ideas were becoming more concrete...moving from short term to long term memory.” The master teachers believed it important for students to verbally communicate first, then communicate in writing because the more fluent they became in acquiring vocabulary, the greater their strength in both mathematics and reading.

Habits of mind. The team connected with familiar content with students. Starting here eliminated the need to measure mastery; it allowed for fine tuning of the operations. The use of a graphic organizer for reading comprehension was modified to meet student need. In relation to self-questioning and processing toward a high level of understanding, the master teacher realized, “I was asking them to do too much when I asked them to visualize what was going on...I have to streamline; self-questioning is a big piece of this strategy.” She knew good readers question themselves and then try to find answers within the text. Independent monitoring of text to self-comprehension was an emphasis. “I had visuals of what a truffle looks like. Perhaps I could have a picture of a pig hunting for one.” This encourages the independent monitoring for higher levels of comprehension. In mathematics, scaffolding questions from low level to high level was a mode of teacher understanding. “As we discussed the vocabulary, I would ask some questions about the figures that were on the desks...it clicked that they understood the vocabulary.” Then as students moved from asking general to specific questions, the master teacher knew it was important for her to model. Developing a set of mathematical properties and then eliminating all but the desired figures that relate, required a didactic model. She modeled thinking around framing the “elimination factors,” asking something that was true of all three, then two, then one. Connection through familiar

context/prior knowledge, then adaptation and application was followed by the team.

Operational knowledge. The team focused on selective choice by the student to use the strategy when appropriate. They believed the reason for the strategy use was to measure student mastery, and the strategy served as the conduit for the teacher to communicate a path to mastery for students. The operations should be selected based on a determined need by the student. “I don’t want someone [student] to say I have to answer every question using this particular strategy; it is when I get stumped on a question.” With this, continuation for monitoring student mastery was evident. “One girl did not understand how animals hunt for vegetation; she did not see a pig as a hunting animal.” Students make connections to what they know; then, finding their way and making clarification around them, was thought of value by this team. “When you deal with greater than and less than in elementary school, they talk about an alligator mouth. Greater than and less are angles...” This entry point was key for success because students could then apply the new concept of geometric shapes and angles to an alligator mouth they recalled from elementary learning. Reliable confirmed need determined by the students themselves built perspective for a new way of knowing for the future.

Knowledge of critical concepts. “Sometimes a clarification from a peer is much stronger than from a teacher ... Jerry was saying he talked a lot more this year...” Through peer-to-peer interaction, more expectation of critical processes/concepts is possible. “My higher level students did well on this type of question; it was the basic and below basic that had difficulty but were making progress. They were becoming aware of the process.” The master teacher was aware of the habitual expectation and the importance of its presence for achievement. The math master teacher saw students able to discuss mathematical computation first with her, then with other students, then finally synthesize new learning and make it their own. Then students

became eager to make independent choices in class activities applying their learning first hand. The master teacher is still wondering, however, if students can navigate with total independence. “I still wonder in a testing situation...will they be able to go through each step of the strategy without a visual prompt?” Once successful, students respond positively with connecting, applying their learning, and making new meaning from prior expectation.

Site B; Chester Phase II

How do master teachers use data from field testing to determine attributes of effective instruction? The Phase II interview was conducted within two weeks of the first field test observation. The master teacher was midway into the field test. Classroom follow-ups had occurred to gather additional monitoring data. Frequency counts from Phase II are represented in Figure 4.10

Frequency Counts - Phase II - Site B

	C	A	M	S	E		C	A	M	S	E
	Andrews						Mercury				
<input type="checkbox"/> Background Knowledge	1	1	1	0	1		0	3	2	2	0
<input checked="" type="checkbox"/> Heuristics	2	2	1	1	2		0	5	0	0	4
<input checked="" type="checkbox"/> Habits of Mind	0	0	0	0	1		1	3	0	1	4
<input type="checkbox"/> Operational Knowledge	1	1	1	0	1		3	1	0	1	1
<input checked="" type="checkbox"/> Knowledge of Critical Concepts	1	0	0	1	1		1	0	0	1	1

Figure 4.10 Phase II frequencies

Background knowledge. They wondered if, by enriching them in mathematical activity in geometry, a stronger sense of understanding would occur. The activity involved a compare and contrast of different geometric shapes with the elimination of properties that did not match. The remaining properties represented the desired figure. This benchmark directly aligned with the

state standard in mathematics. “I was impressed that students could recall the [geometric] words, but I knew students wouldn’t know exactly...have enough understanding to meet the outcome without an activity to build their understanding.” The master teachers discovered that students had a greater recall of prior knowledge than anticipated and did not have to backtrack as far as expected. Because initial understanding was present, instruction was modified accordingly.

Heuristics. The master teachers began to make use of their findings as they prepared new learning for the faculty members. They considered their work a chronicling of the requirements to increase instructional effectiveness. They asked Chester teachers to keep running records of student progress directly aligned with their instructional goals; this framed teachers’ awareness of the necessary strategy extensions designed to meet student need. They honored the teachers’ current place in a learning curve and recognized that what they were developing for their teachers was unique to the faculty of Chester. They were addressing teacher content knowledge currently and readily pointed out that, in another school, the focus might well be another area. Focus was on providing for the teachers to teach the use of the strategy to students in the classroom. They referred to the strategy as a tool for student learning. “...so my goal isn’t just to teach them the ‘doctor of number’ strategy, but rather how to use the strategy with appropriate questions to students.” As the strategy is extended and used throughout the school, common nomenclature was emphasized. “We like using the same terminology across the board in the school, so the kids don’t hear the same concept but labeled in a different way.”

Habits of mind. The master teachers fostered deeper understanding using their current work from clinical trials to establish a sense of purpose to address an identified student need. Modeling for students was emphasized in the instruction of three- dimensional shapes. They recognized that three-dimensional shapes were difficult for students and the dash line was an

indicator that the shape had depth. The students in the trial responded, “That’s a square pyramid.” In reality it was just distorted to show depth, but the master teacher indicated important value in playing out the characteristics of a square and a rectangle, and the relationship of the dash lines. During these periods of learning that become habitual, the master teacher considered, “What do they get, what do they not get, and how can I deliver the content without confusing them or putting too much information out there?” They recognized the developmental point of middle school students and discussed cognitive modeling as a critical element for fostering understanding and for development of a habit of mind.

Operational knowledge. As the master teachers considered methods and content approaches for their teachers, appropriate entry points for curriculum along with validity from clinical trials were foremost in their thinking. The master teacher noted that her below basic students were listing irrelevant information from the text, and she found critical her questioning of students for specifics in relationship to the question. She focused on key items from the text and asked students to access prior knowledge. She planned to focus on a group of below basic students to further define critical attributes of instruction so students focus on the question, plan the response, then extend the response appropriately. In mathematics, the master teacher wondered if it would work in geometry and if there were parts that needed to be adjusted or eliminated because of the content. She knew this would incite comment or questions from teachers. These things were considered in order make necessary adaptations for authentic classroom implementation as they prepared for faculty presentation.

Knowledge of critical concepts. Scaffolding of the curriculum and definitive mastery toward grade level appropriateness were deemed important. Student thinking and problem solving were framed, discussed, and taught in a purposeful way. Post-it notes were kept on the

table for students to write down questions as they interacted with text. They used defined critical concepts in the purposeful conversation. “It is important to have the student, and in this case the teacher, aware of their own thinking in their questions and their interaction with the text. Once teachers become aware of what they do as they read and as they plan, they are going to think [about it] in the delivery of that content and the presentation of that content.” Framing the critical elements of the thinking process will inform their instruction.

Site B: Chester Phase III

How do master teachers make application for student transfer of instructional learning strategies? The Phase III interviews occurred at the end of the field test process. The master teacher had reached a point where sufficient gains had been documented formatively and the student strategy had clarity. A post-test was ready to be administered. Frequency counts for Phase III are included in Figure 4.11.

Frequency Counts - Phase III - Site B

	C	A	M	S	E		C	A	M	S	E
	Andrews						Mercury				
<input type="checkbox"/> Background Knowledge	1	1	1	2	1		3	2	1	0	0
<input checked="" type="checkbox"/> Heuristics	2	2	1	2	1		5	0	1	2	0
<input checked="" type="checkbox"/> Habits of Mind	1	0	0	0	0		3	1	2	3	3
<input type="checkbox"/> Operational Knowledge	3	2	0	0	2		3	3	0	2	0
<input checked="" type="checkbox"/> Knowledge of Critical Concepts	2	2	0	2	1		2	3	1	0	0

Figure 4.11 Phase III frequencies

Background knowledge. In relationship to geometry angles and shapes, and self-monitoring abilities, the master teacher determined a visual checklist was necessary to increase

the likelihood that the student would move beyond simple declarative knowledge of the strategy to active deployment and use. She noted that students would complete the strategy steps if guided; however, they would typically not complete them independently. “What I learned was in order for the strategy to become part of the student’s thought process, the student must be held accountable.” Student thinking processes were framed in a linear projection, to encourage reflection.

Heuristics. Recursive routines with labels of thinking were frequent reflections. The master teachers considered the compromise of student comprehension and the actual shutdown of student processing because of the students’ lack of navigation for thinking and problem solving. Teachers used mixed ability grouping with intentional labeling of thinking/questioning processes and made application by asking students to consider a topic related to them; *the reason why people text each other*. “Using the labels, they got to necessary points by monitoring themselves.” The master teachers noted that they received more complex responses from students because students really had to stop and think. “They really had to think about this subject, so they were asking themselves why and not just once...I did have to prompt them.” Self-monitoring was regulated through labeling, and the recursive nature of the process enabled students to refine the heuristic.

Habits of mind. Master teachers considered integration of student learning procedurally based on the students’ own vision. Teachers focused on an entry point where students had competence so the engagement would be more likely. Motivating students became a critical attribute for development. In the master teacher’s field test, students ran across a problem with finding perimeter because of the unfamiliar word “mural.” The teacher discussed how significant the lack of content knowledge became for students because students could not get beyond the

word and its meaning. Additionally, there were no clues about painting, brushes, or drawing in the text of the question. The integration of a habit of mind process was directly affected by student current content knowledge.

Operational knowledge. This included the use of post-it notes furthering schema. Student generated questions became the impetus for thinking. The master teacher used these questions to model how students could find answers within their own questions. The thinking strategy was considered, and the teacher prompted a thought process: “What was the first thing you did? What was the second thing you did? What was the third thing?” Becoming consciously aware of the process was emphasized for independent operations.

Knowledge of critical concepts. A greater knowledge of critical concepts allows the student to activate the strategy versus simply to restate it. The master teacher in mathematics considered the abstract conceptualization necessary for geometric understanding and recognized students’ developmental place in math. “The struggle with surface area; I think it is a difficult concept. They all know edges, faces, vertices. They are very comfortable with those shapes.” They anchored cluster planning around this familiarity. Breadth of understanding superseded memorization of formulae at first. This included identifying parts, having conversations then solving problems. “So for volume, [for example] they know they just have to find the area of the base and multiply it by the height.” The broader breadth was the master teachers’ current approach to reaching higher student levels of conceptualization and understanding.

Site B: Chester Individual Growth Plans/Long-Range Plans

Throughout the field test cycle, the individual growth plan served as a journal for the master teacher to record reflection on the clinical trial performed. After the conclusion of the field test, the master teacher began development of the long-range plan. While the plan remained

a dynamic document based on student progress monitoring, it served as a base for representing the eventual delivery of professional development to faculty members. The content correlation between Chester's master teacher team and the individual growth and long-range plan documents was specific and direct. The primary focus was on the extended response question preparation and mathematical geometric computation. The plan manifested the formal processing of the master teachers. The team's individual growth plans were coded to CAMS. The frequency distribution is listed in Figure 4.12. While master teacher Andrews formatively assessed, there was no indication that the critical attributes of the instruction were formally considered during her reflections.

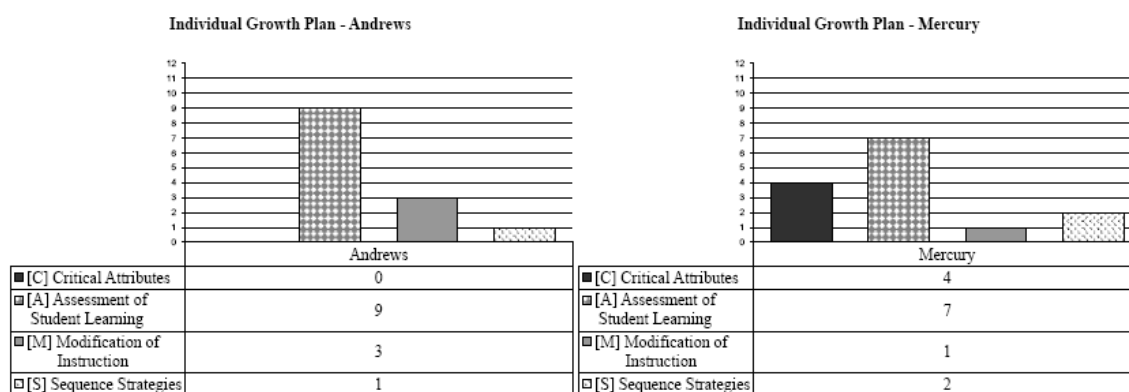


Figure 4.12 Individual growth plan frequency

Site B: Chester Pre/Post-Test Performance

The master teacher processing and planning built on the level of student success for activating prior knowledge. Assessment was made in relation to students' ability to successfully make connections. Modifications and segmenting followed these assessments at Chester.

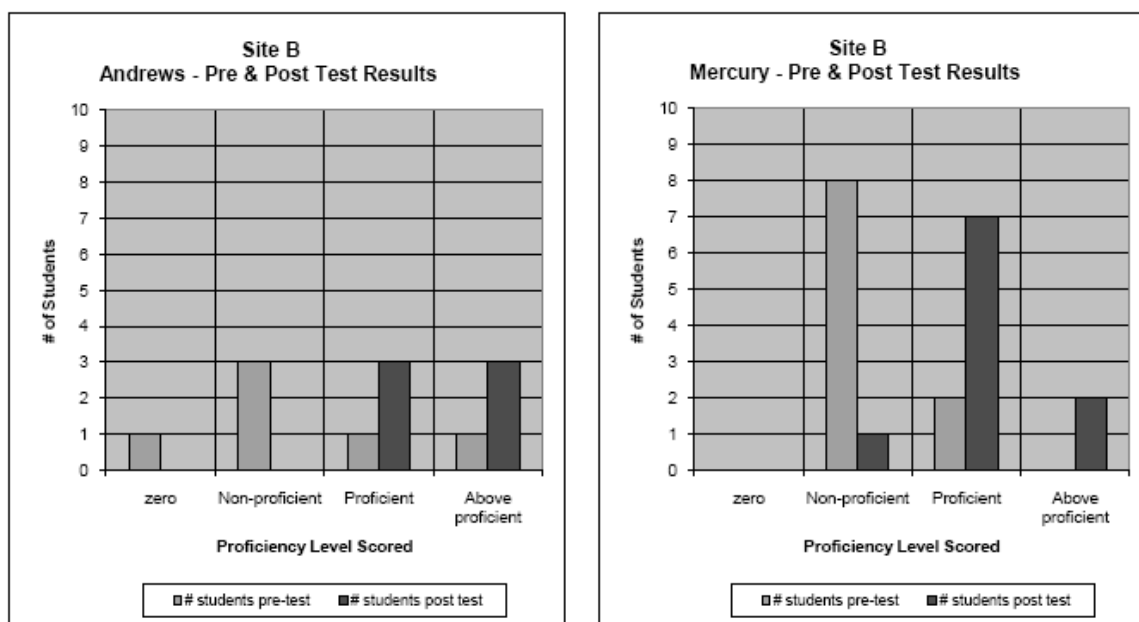


Figure 4.13 Pre/post student performance

Master teacher Andrews (Figure 4.13) tracked gains from the pre-test to the post-test. Out of six students, two moved to proficient and an additional two moved to above proficient. No student remained at the zero or non-proficient levels.

Master teacher Mercury (Figure 4.13) tracked gains from pre-test to post-test. Out of the ten students tested, five moved to proficient, and two moved to above proficient. No student remained at the zero level. There was no significant movement to the higher ranges of advanced proficient in either group.

Site B: Chester Student Responses

What can you do now, you could not do previously; how do you know? After the initial field test lesson, students were asked to reflect on their overall learning. Students were asked to explain what they could now do more effectively. Student responses that included a declaration of the topic taught for the day were classified as having declarative knowledge of the concept. They were distinguished from student responses that showed indication that the student had

processed information cognitively so that the strategy could be activated when comprehension was compromised.

Declarative Student Knowledge	Potential for Cognitive Student Empowerment	Non-response
<p><i>Andrews Trials-Student Response</i></p> <ol style="list-style-type: none"> 1. I thought that I couldn't read this selection out loud because I may mess up by doing something I don't know. 2. I could not do "Author and Me"; now I can do it. 3. I would have stuck to thinking truffles are candy. 4. I know it because she broke it into easy steps. 5. I can take what I learned today and use it for a different day. 	<p><i>Andrews Trials-Student Response</i></p>	<p><i>Andrews Trials-No response.</i></p> <ol style="list-style-type: none"> 1. I already know how to read well and answer these types of questions.
Declarative Student Knowledge	Potential for Cognitive Student Empowerment	Non-response
<p><i>Mercury Trials -Student Response</i></p> <ol style="list-style-type: none"> 1. I can now classify and define two dimensional shapes. 2. I knew I understood during the "I Spy" review. 3. I see a circle is not a polygon. 4. I got it when I understood congruent, acute, and obtuse. 	<p><i>Mercury Trials-Student Response</i></p> <ol style="list-style-type: none"> 1. I can develop a sufficient set of properties to describe geometric shapes. 2. I learned to recognize geometric properties; I could not have identified a polygon or determine which shape was a closed figure. 3. I can identify closed 	<p><i>Mercury Trials-Student Response</i> Two students</p>

5. I got it when she was smiling saying “yes you got it.”	figures and can classify and define two dimensional shapes. 4. I could not have identified geometric shapes; I could not tell polygon from the rest.	
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Student surveys following the field test classes indicated sequencing and segmenting as well as the definition of unfamiliar words of value to Chester students. It eliminated potential roadblocks to students’ processing. Students could recognize their success if that success was clearly defined. Some students found the strategy unnecessary, indicating that they had already internalized another heuristic to enable success.

Site B: Chester Summary Findings

Both master teachers realized gains at Chester with the math master teacher moving eight students from non-proficient to proficient or above. In reading, gains were equal, moving four students to proficient or above proficient. High frequency coded counts occurred around critical attributes and assessment of instruction. A high frequency of assessment existed in the master teacher individual growth plans as well. The Chester team focused on the test question promoting students getting the correct answer. The master teachers were cognizant of monitoring the pace at which new content is introduced so that students would not give up. A high value was placed on small incremental student success; hence, frontloading content to fill in gaps in student prior knowledge existed such as with a word like “truffle.”

While student gains occurred in both proficient and above proficient, student responses indicated a declarative knowledge with only mathematics indicating movement toward explaining an understanding for how and why. Students responded, repeating what the teachers

said was important. Little evidence existed in the teacher's field work that broad student understanding for future application and processing on assignments would be necessary or expected. No evidence existed in student response that empowered the connection of two or more ideas to create a new idea or solve a problem.

Site C: Clyde Middle School

The Clyde Middle School serves a far northern sector of the Midwestern city's metropolitan area. The middle school building was constructed in the 1950s when the area experienced rapid growth. The school has an enrollment of 493 students with an ethnic composite of 70.5% black, 3.4% Asian/Pacific Islander, 2.8% Hispanic, 2.2% multi-racial, and 20.8% white. The proportion of students receiving free and/or reduced cost lunch is 98.8%.

The school's value-added score, measuring a year's worth of student growth, met the required expectation for Clyde Middle School. It has been designated a "continuous improvement" school by the state's department of education. All of Clyde's teachers hold a bachelor's degree and 52% hold a master's degree. Each of the master teachers has advanced degrees in education. For this study, however, one master teacher declined to participate after the study began due to her unavailability to participate. Both master teachers do research, and deploy and deliver professional development to Clyde's faculty members. The master teacher who did participate in the study had nine years of classroom experience. Although she is not directly responsible for leading a weekly cluster session, a mentor teacher agreed to participate as a substitute. She had six years of classroom experience. The mentor's reference included her assigned classroom at Clyde.

Site C: Clyde Field Test Description

The field testing trials conducted at Clyde Middle School included a primary focus on the writing process using a formula writing approach. This included an identified need that student writing lacked detail and exposition that was logical when developing extended assignments. Master teachers determined that student writing lacked transition and logical sequencing and segmenting. A formula writing process was studied to directly attend to weak extended writing responses on the state's achievement test.

Site C: Clyde Opening/Phase I

How do master teachers make meaning from field tests to determine attributes of effective instruction? The master teacher was interviewed prior to beginning the field test. Following the field test, the interview continued with Phase I questioning. The pre-field test questions established the purpose of the field test. Questions following the observation were constructed from the five standards of critical thinking. Master teacher Raven had eight students in her field test. The Mentor teacher did not lead a pre-test and post-test. Data was collected from the field interviews, coded using the elements from CAMS, and then discussed. This research process is illustrated in Figure 4.14.

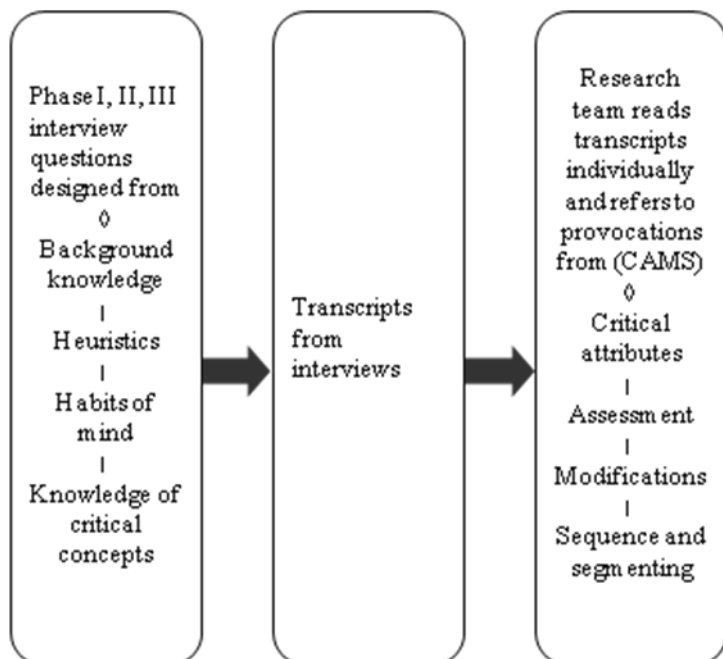


Figure 4.14 Clyde research process: collection, coding, analysis

The pre-field test interviews and opening/Phase I, II, III interviews were coded according to the elements described under CAMS in Chapter 3, critical attributes, assessment, modification, and sequencing and segmenting. Each question was indicative of the corresponding standard of critical thinking. It represents the master teachers' processing and practice around the standard. Frequency counts for the Clyde opening interviews and Phase I interviews are included in Figure 4.15.

Frequency Counts - Opening - Site C

	C	A	M	S	E		C	A	M	S	E
<input type="checkbox"/> Background Knowledge	0	0	1	1	3		6	3	1	0	0
<input checked="" type="checkbox"/> Heuristics	0	0	0	0	0		1	2	0	0	2
<input checked="" type="checkbox"/> Habits of Mind	0	0	0	1	0		1	0	0	0	0
<input type="checkbox"/> Operational Knowledge	2	0	0	0	0		1	0	0	0	0
<input checked="" type="checkbox"/> Knowledge of Critical Concepts	0	1	0	0	0		4	0	0	0	1

Frequency Counts - Phase I - Site C

	C	A	M	S	E		C	A	M	S	E
	Raven						Wolf				
<input type="checkbox"/> Background Knowledge	0	0	0	0	0		0	0	0	0	1
<input checked="" type="checkbox"/> Heuristics	0	1	0	1	0		0	0	0	0	0
<input checked="" type="checkbox"/> Habits of Mind	1	1	2	0	0		0	0	0	0	0
<input type="checkbox"/> Operational Knowledge	1	1	0	0	1		0	0	0	0	1
<input checked="" type="checkbox"/> Knowledge of Critical Concepts	1	2	0	1	0		0	0	0	0	0

Figure 4.15 Opening and Phase I frequencies

Background knowledge. The master teachers reviewed the writing process ahead of time. High interest in the story on the part of the students became a critical attribute for instruction. The teacher reported that students' discussion went slightly off topic that morning, but she let it extend because that's where the students wanted to go. It was an opportunity for interpretation and new association to occur in relation to the writing topic.

Heuristics. The teacher tied students' own personal feelings to an inference into the character's feeling. This was to include both empathy and/or sympathy. "I wanted them to use the handout provided and go through and circle the word. For example, when they put up

mountains, I would have them go to their handout list and circle a word to describe mountains.” The master teacher then requested students to write out the non-linguistic representation and add transitional words sequencing and segmenting logically and coherently.

Habits of mind. The master teacher used her current intellectual authority and determined that students had the necessary knowledge but needed to be self-motivated to use the strategy. The master teacher noted that students needed to decide on the appropriate placement of the adjectives. The rubric assisted in the decision-making process. “They have that in front of them, and it’s not me telling them.” The teacher discovered that the order for adding the sense details was important. Students had to have a reason that the detail was necessary.

Operational knowledge. The master teacher determined the perspective needed by students for mastery. The teacher collected preliminary work from her students and determined that student progress was too slow. Time was indicated as the necessary factor for improvement. The master teacher returned the assignment with necessary factors for mastery communicated to students. At this point, the master teacher determined the immediate need to develop a rubric outlining student expectations.

Knowledge of critical concepts. This master teacher used habitual expectations and confirmed when students gave responses with appropriate adjectives that increased the clarity of what they were communicating. She acknowledged that getting students to continue independently would be the next step. Transfer was not evident at this point.

Site C: Clyde Phase II

How do the master teachers use data from field testing to determine attributes of instruction? The Phase II interview was conducted within two weeks of the first field test observation. The master teacher was midway into the field test. Classroom follow-ups had

occurred to gather additional monitoring data. Phase II frequency counts are included in Figure 4.16.

Frequency Counts - Phase II - Site C

	C	A	M	S	E		C	A	M	S	E
	Raven						Wolf				
□ Background Knowledge	2	1	0	0	0		0	1	0	0	0
▣ Heuristics	2	0	0	1	0		1	0	0	0	0
■ Habits of Mind	2	0	0	1	2		3	0	0	0	0
□ Operational Knowledge	3	1	0	2	0		0	0	0	0	0
▣ Knowledge of Critical Concepts	3	1	0	1	0		0	0	0	0	0

Figure 4.16 Phase II frequencies

Background knowledge. The master teacher exercised skepticism based on her understanding of writing instruction. The master teacher noted that deployment of the learning strategy had a tendency to stop or become stalled. She acknowledged that adding the “snap” words was critical to the formula writing prompting students to go into further detail. “Detail and description...I think are critical for them. I think that’s where we lose a lot of points on the state test.” The students do not elaborate. The circumspect view of the master teacher concluded that student familiarity with additional descriptors would assist in this extension.

Heuristics. The master teachers’ questioning of students extended the ground pointing in the field testing process. The rubric served as the grounding point; the primary focus was on the state test and answering questions at a higher level. “So if they are answering a four point question, I expect my students to write at least four sentences.” The rubric guide student thinking so more elaboration was included in student exposition.

Habits of mind. “My goal for use of this strategy is for students to write a book review. The framework will extend a deeper understanding for students.” The master teacher planned to “model for them what a book review would look like; discuss and analyze the different aspects.” The master teacher expects the students to plan and communicate a compelling argument from the book; she planned to use exemplars to enhance student understanding and extend to a deeper understanding.

Operational knowledge. The master teacher considered her operational approaches and adapted accordingly. The master teacher noted that students had difficulty with cognitive transfer to writing. A student could explain things in class verbally, but had difficulty getting the idea transferred to paper. “I think planning strategies to teach students how to use transitional words would be a small part of this.”

Knowledge of critical concepts. Critical knowledge framed decisions around grammar basics and writing transitions. The master teacher prompted rereading/editing so student work would have greater clarity. She listed actual transitional words such as “first” and “next,” as possibilities. Student focus, planning, and then revising were her critical knowledge frame.

Site C: Clyde Phase III

How do master teachers make application for student transfer of instructional learning strategies? The Phase III interviews occurred at the end of the field test process. The master teacher had reached a point where sufficient gains had been documented formatively and the student strategy had clarity. A post-test was ready to be administered. The frequency counts for Clyde Phase III interviews are presented in Figure 4.17.

Frequency Counts - Phase III - Site C

	C	A	M	S	E		C	A	M	S	E
	Raven						Wolf				
□ Background Knowledge	3	0	1	2	0		1	2	1	0	0
▣ Heuristics	3	2	0	0	3		1	0	0	0	1
■ Habits of Mind	2	2	0	0	2		2	0	2	0	2
□ Operational Knowledge	2	0	0	0	1		2	0	1	0	1
▣ Knowledge of Critical	2	0	0	0	2		0	0	0	0	1

Figure 4.17 Phase III frequencies

Background knowledge. Consideration for the developmental stage of students was a primary focus. The master teacher tracked student self-monitoring so that a habit of mind could begin. As students asked the teacher questions, she probed with further questions so that thinking would eventually fall to students as a habit of routine.

Heuristics. The teachers' perspective on the learning strategy extended based on student performance. The charts and graphics for thinking continued to be mentioned as well as turning more and more of the monitoring over to students to empower them. The master teacher considered common practices of many faculty members that might hinder student development. Often students receive assignments with the premise of keeping them busy rather than extending cognitive thinking. While questions included reference to assigned reading, they might not extend thinking or application. "It keeps students busy, and students worry about getting the assignment done versus giving detailed answers." Teacher perspective was formed around observation of colleague practices and student work products.

Habits of mind. The master teachers considered systematic student integration of the process and reflected on progress at this point. Student empowerment was mentioned. "What I

noticed in one particular student; she was working on formula writing in class; she had the best answer. I am starting to realize she always had it...she just didn't know how to put it down." The student asked the teacher if it made sense; her confidence increased. She had begun to establish a system internally to integrate learning.

Operational knowledge. The master teacher continued to reflect on student self-management and self-monitoring. "They can be comfortable in reading; they can understand the content, but to put it down on paper is a whole other situation...putting thoughts to words is difficult." The master teacher considered non-linguistic representation as an aid to learning. "They know if it is a two-point question, they need two spokes." She would not change anything in the strategy at this point. The self-monitoring and assessment was acting accordingly and as planned for the field test group.

Knowledge of critical concepts. Student activation versus simple restatement was considered at Clyde Middle School. The master teacher ascertained that, in previous trials, students did not indicate that they knew how to break the prompt into parts to determine exactly what or how to respond. Now, students seemed more confident. "The question is asking me to compare and contrast; I know what that means."

Further, students were required to critique each other's work, and validate why a particular response was strong or weak. Student learning became interconnected so that system activation was more likely by the independent student.

Site C: Clyde Individual Growth Plan/Long-Range Plans

Throughout the field test cycle, the individual growth plan served as a journal for the master teacher to record reflections on the clinical trial performed. After the conclusion of the field test, the master teacher began development of the long-range plan. While the plan remained

a dynamic document based on student progress monitoring, it served as a base for representing the eventual delivery of professional development to faculty members. The content correlation between Clyde’s master teacher field test and the individual growth and long-range plan documents was present. The primary focus was on the extended response question preparation. The plan manifested the formal processing of the master teacher. The team’s individual growth plans were coded to CAMS. The frequency distribution is listed in Figure 4.18.

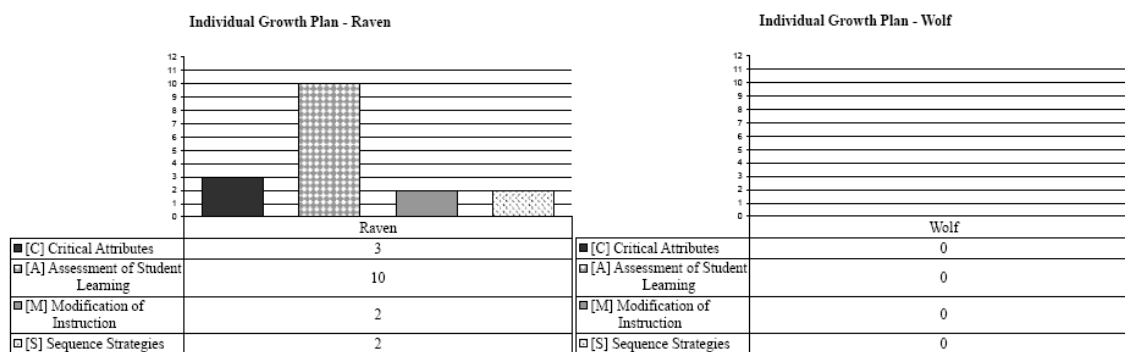


Figure 4.18 Individual growth plan frequency

Site C: Clyde Pre/Post-Test Performance

The master teacher’s formal processing and planning was communicated in terms of answering test questions. Strategy was designed to unpack test questions, plan a response, and then add in transitions and adjectives to improve writing ability.

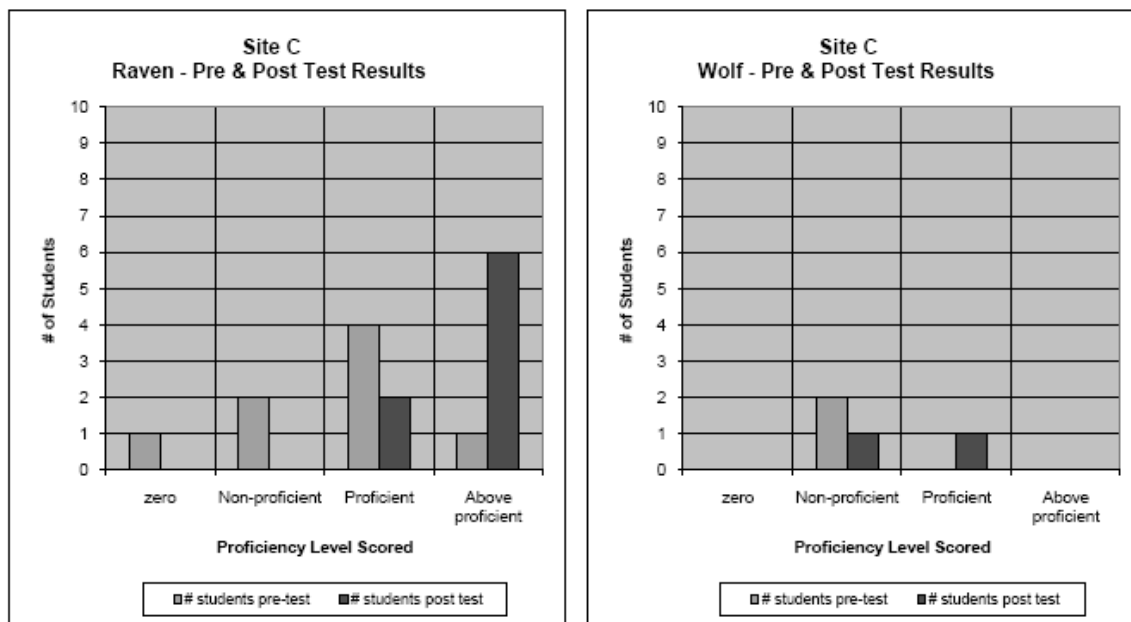


Figure 4.19 Pre/post student performance

Master teacher Raven (Figure 4.19) tracked gains from the pre-test to the post-test. Out of eight students, two moved to proficient and an additional five moved to above proficient. No student remained at the zero or non-proficient level. Mentor teacher Wolf tracked two students and realized improvement to proficient from one student.

Site C Clyde Student Responses

What can you do now, you could not do previously; how do you know? After the initial field test lesson, students were asked to reflect on their overall learning. Students were asked to explain what they could now do more effectively. Student responses that included a declaration of the topic taught for the day were classified as having declarative knowledge of the concept. They were distinguished from student responses that showed indication that the student had processed information cognitively so that the strategy could be activated when comprehension was compromised.

Declarative Student Knowledge	Potential for Cognitive Student Empowerment	Non-response
<p><i>Raven Trials-Student Response</i></p> <ol style="list-style-type: none"> 1. I can write sentences with a lot of details by using snap words and the outer spoke. 2. I can write with complete sentences and explain better. 3. I can write in complete sentences. 4. The Formula writing helps me to understand the questions to get all the points. 5. I do not have to raise my hand to ask questions; I can do Hillary and think out loud. 6. I paid a lot of attention instead of chatting to classmates; I get the hush and snap words. 	<p><i>Raven Trials-Student Response</i></p> <ol style="list-style-type: none"> 1. I started to get it when I tried it myself. 	<p><i>Raven Trials-No response.</i></p>
Declarative Student Knowledge	Potential for Cognitive Student Empowerment	Non-response
<p><i>Wolf Trials -Student Response</i></p> <ol style="list-style-type: none"> 1. We wrote the fill outs; it gave me ideas what I can do if my computer gets a virus. 2. The point in the lesson when I got it was the writing part. 3. I understood what the teacher was talking about. 4. I knew it had a [computer] virus. 	<p><i>Wolf Trials-Student Response</i></p>	<p><i>Wolf Trials-Student Response</i></p>

Student survey responses indicate primarily declarative communication responding to teacher's verbal communication in class for the purpose of learning. Feedback from the instruction played into formal affirmation for progress.

Site C: Clyde Middle School Summary Findings

Because one of the master teachers at Clyde was not able to participate as originally intended, a mentor agreed to participate as a substitute. Certain limits existed since the mentor position does not assume the full responsibility of a master teacher.

The reading language arts master teacher experienced gains to advanced proficient in five students. The Clyde team focused on student writing processes using a formula writing strategy. Overall frequency counts were lower with this team because of limits with the mentor.

Student motivation was considered necessary to activate strategy use. Students were given models of mastery to encourage self-assessment. Formative assessment was regular from the teachers, and teachers noted student confidence as an important element of increased student performance. Teachers did not see student transfer as quickly as expected.

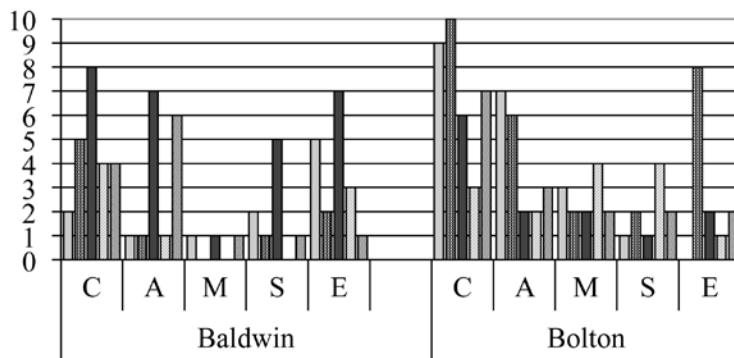
Overall Summary Findings

Overall total frequency counts from the three sites included: Site A: 160 counts; Site B: 186 counts; and Site C: 94 counts. The lower numbers at Site C could be attributed to the mentor teacher and her level of expertise with the model.

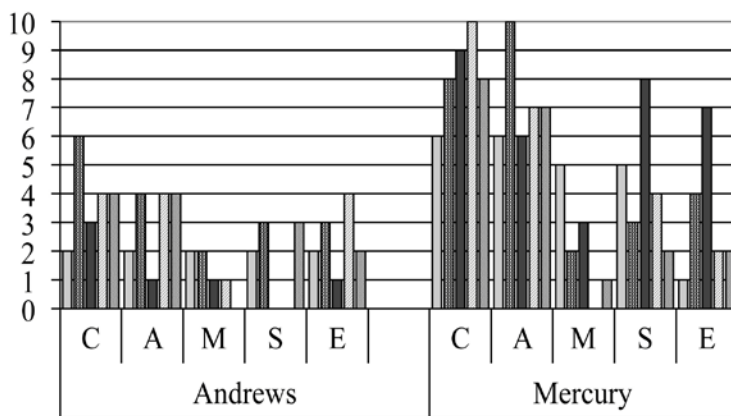
Habits of mind and heuristics had the highest frequency counts at all three sites. In CAMS codes (Figure 4.20), each master teacher at each site had the highest frequency counts under critical attributes and the second highest in student assessment. Within each teacher's individual growth plan, however, this trend did not follow. Assessment was most frequent within the frame of that plan.

Note: Legend –left-right bar graph
 –Background Knowledge
 -Heuristics
 -Habits of Mind
 -Operational Knowledge
 -Knowledge of Critical Concepts

Frequency Counts - All phases - Site A



Frequency Counts - All phases - Site B



Note: Legend –left-right bar graph
 –Background Knowledge
 –Heuristics
 –Habits of Mind
 –Operational Knowledge
 –Knowledge of Critical Concepts

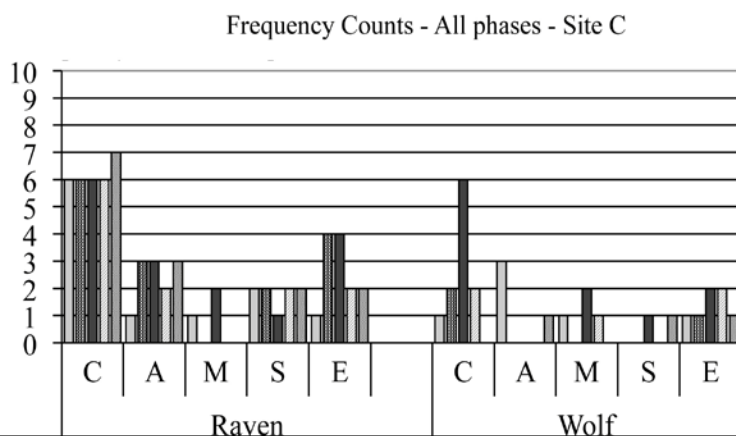
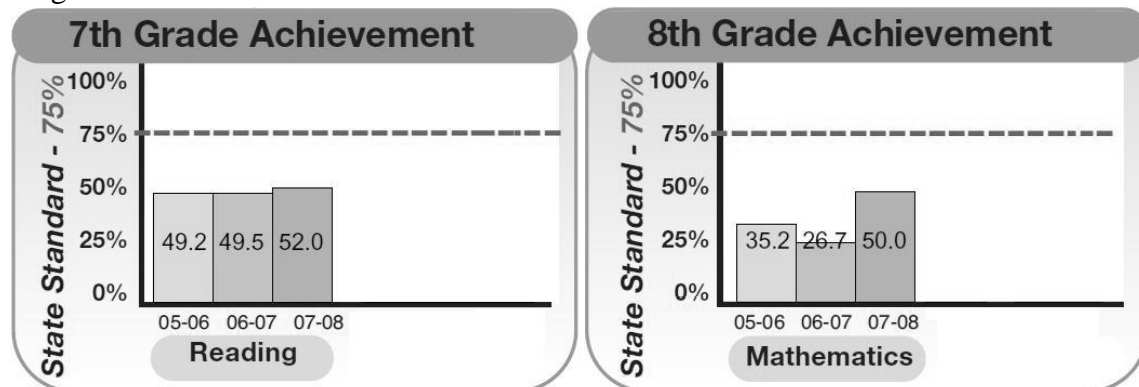


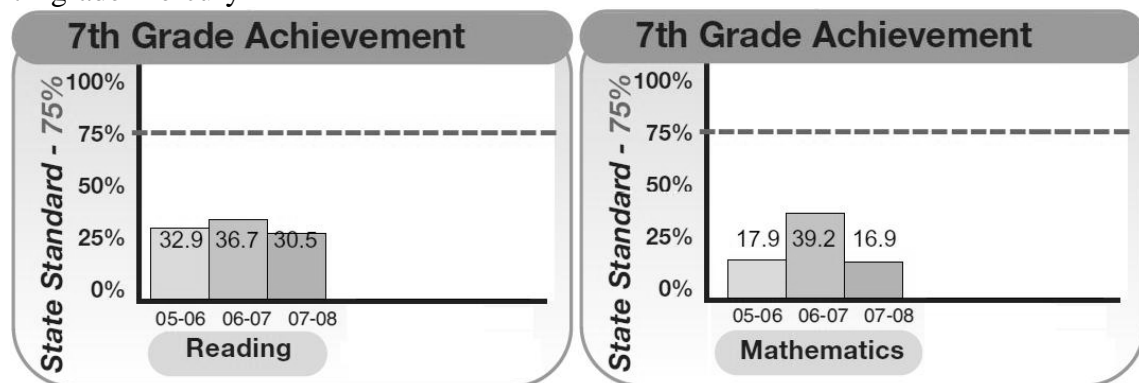
Figure 4.20 Overall frequency counts by site

The state's achievement tests are administered at the conclusion of each academic year. While the state longitudinal data represents a different cohort of students each year, it can provide a distinct vantage point and meaningful reading of a school's academic program. If the field tested and master designed student strategy has potential impact for increasing overall student achievement, it should be illustrated during this state-wide assessment. These state results in the field tested areas are included in (Figure 4.20). Site B experienced a 22.3% decrease in mathematics and a 6.2% decrease in reading. Site A realized a small gain of 2.5 % in reading and Site C experienced a small 8.6% increase in writing. The most significant student achievement gain was at Site A with a 23.3% increase in mathematics.

Site A Saylor MS
 7th grade Bolton
 8th grade Baldwin



Site B Chester MS
 7th grade Andrews
 7th grade Mercury



Site C Clyde MS
 7th grade Raven
 7th grade Wolf

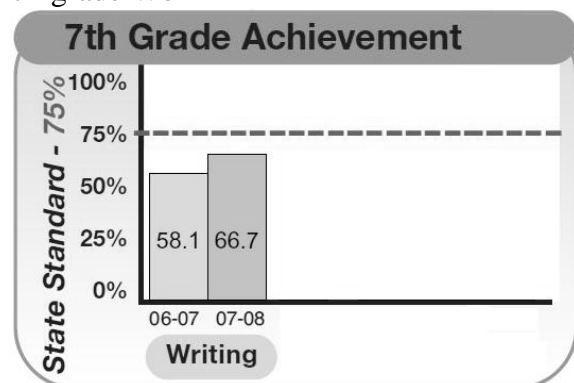


Figure 4.21 State achievement data by site

Master teachers progressed through the field test process over a two-month period. During this time, they were charged with the responsibility for building student strategies in order to get maximum formative gains from their students. Once this occurred, master teachers then had responsibility for preparing new learning for faculty members. During the opening Phase I, master teachers relied on all five standards of critical thinking indicated in Figure 4.21.

Total CAMSE- Combined Opening & Phase I

	C	A	M	S	E	Total	%	
	All participants							
□ Total CAMSE - Combined Opening & Phase I	56	40	13	22	24	155		
■ Background Knowledge	11	6	4	6	6	33	21%	
▨ Heuristics	11	8	1	2	7	29	19%	
▨ Habits of Mind	14	4	5	7	4	34	22%	
■ Operational Knowledge	9	8	2	3	5	27	17%	
■ Knowledge of Critical Concepts	11	14	1	4	2	32	21%	

Figure 4.22 Total frequencies for opening and Phase I

At this point, master teachers relied slightly more on background knowledge, habits of mind and knowledge of critical concepts to define important aspects of instruction, student mastery, levels of student accuracy, and identified student need. Additionally, at this opening phase, master teachers defined critical elements for student success and made frequent assessment. This would indicate that teachers actively looked for what worked to gain student understanding and regularly made assessment to measure progress.

During Phase II, the master teacher had time to become familiar with the needs of the field class. She is at a point now where modifications in instruction can be made from previous formative assessment. By this time, a collection of critical attributes had time to accumulate through both Phases I and II. Figure 4.23 indicates overall frequency and percentage.

Total CAMSE- Phase II

	C	A	M	S	E	Total	%
	All participants						
Total CAMSE - Phase II	32	24	10	16	25	107	
Background Knowledge	3	7	4	2	2	18	17%
Heuristics	7	8	1	2	7	25	23%
Habits of Mind	9	5	1	4	9	28	26%
Operational Knowledge	8	3	2	4	4	21	20%
Knowledge of Critical Concepts	5	1	2	4	3	15	14%

Figure 4.23 Total frequency for Phase II

When considering student mastery, a higher frequency of CAMS existed as master teachers used habits of mind (26%) and heuristics (23%) to define elements of student mastery as well as teacher mastery. Conversely, a low percentage (14%) of overall coded frequency existed from knowledge of critical concepts relating to specific content in reading, mathematics, and writing. This would indicate that master teachers did not readily draw on expertise in specific content to define critical elements for student mastery. Instead, they drew from their own academic experiences that had formed internal habits and guiding devices.

This trend continued during Phase III with both heuristics and habits of mind combined representing half of overall coded frequency from master teacher's reflective practice as illustrated in Figure 4.24.

Total CAMSE- Phase III

	C	A	M	S	E	Total	%
All participants							
Total CAMSE - Phase III	72	39	17	22	30	180	
Background Knowledge	12	7	5	4	2	30	17%
Heuristics	19	8	4	7	8	46	25%
Habits of Mind	15	10	5	5	10	45	25%
Operational Knowledge	12	5	2	3	5	27	15%
Knowledge of Critical Concepts	14	9	1	3	6	32	18%

Figure 4.24 Total frequency for Phase III

At this point in the field tests process, master teachers considered student transfer; student's ability to monitor their understanding and activate learning strategies when necessary. When master teachers were asked what they expected to see students do when their comprehension was compromised (habits of mind and heuristics), they responded at a 50% frequency. This would indicate that the master teachers recognize the importance of student transfer for sustained student academic growth.

As a collective of reflective practitioners, they continued to show affinity for using heuristics and habits of mind in reflective practice. Additionally, master teachers made frequent reference to critical attributes of instruction and assessment of student progress as indicated in Figure 4.25.

Total CAMSE- All Phases

	C	A	M	S	E	Total	%
All participants							
■ Total CAMSE - All phases	160	103	40	60	79	442	
■ Background Knowledge	26	20	13	12	10	81	18%
■ Heuristics	37	24	6	11	22	100	23%
■ Habits of Mind	38	19	11	16	23	107	24%
■ Operational Knowledge	29	16	6	10	14	75	17%
■ Knowledge of Critical Concepts	30	24	4	11	10	79	18%

Figure 4.25 Overall frequency for all phases and all participants

Emergent themes were included as an extension of CAMS. These occurred as the master teacher reflected on her practice for an extended time in the interview about instruction in a broader way beyond the student strategy being field tested. During these extension periods, teachers thought in broader ways about why a student was not able to give a correct response or activate and apply particular skills that had been mastered. From this, teachers gave thought to curriculum design and the sequence, schedule and pace at which content was presented.

For example, many students who had been unfamiliar with the word “mural” shut down because of a lack of understanding. Simply put by the master teacher, if this had been an achievement test, many may not have moved forward with the section. The master teacher reflected on the implication this would have on score interpretation and the implication that has for school instructional teams.

Additional knowledge of students was included in reflection for box and whisker graphs and how more time was necessary for this learning. Further consideration was given to students ready to move on because they are accelerated or advanced and provision that could be made for them.

While overall emergent themes did not illustrate any distinction beyond an extension from CAMS, the research team was circumspect to these periods of teacher reflection and noted them accordingly in the frequency collective. During these periods, teachers thought purposefully about their practice and that helped inform them in other important ways during the field testing process.

Finally, when studying overall frequency trends, both for critical thinking affinity and the codes as represented through CAMS, there are several considerations. Master teachers have been well trained and do clearly define critical attributes when reflecting on their instruction after making a regular and high frequency of formative assessment. This is indicated by the two highest levels of frequency for critical attributes (160) and assessment (103). The mechanical operation of the field testing process would indicate that process is in place. Equally telling, however, is the continued trend to rely more on heuristics and habits of mind as they reflected on their practices. While there is not a more preferred thinking process for the master teacher to use, the charted affinity toward habits of mind and heuristics by this case study group does offer several implications to consider. First, does informed professional judgment for academic rigor affect student strategy design when field testers rely more heavily on thinking unique to their own personal academic journey? Second, does explicit student learning product expectation matter when conducting regular formative assessment and defining critical instructional elements? Both heuristics, the intuitive devices within individuals based on experience, and habits of mind, the imbedded routines developed as individuals have worked and solved tasks unique to their personal experience, have less to measure against established or defined information, content, operation, or publication. How then do the unique professional and academic paths of the master teachers directly affect the success of the students in the field

classroom and ultimately the school classrooms if empowered to design professional development on-site in a clinical environment?

Chapter V: Conclusion

This dissertation study explored the reflective actions of five master teachers and one mentor teacher responsible for leading the Teacher Advancement Program (TAP) model in an urban Midwestern school district. The model focuses on job-embedded professional development designed through clinical field test trials of master/mentor teachers conducted on-site. Through these field test trials, the master teacher designs student learning strategies based on formative assessment. Once defined gains are evident, the field test strategy is taught to core faculty at weekly cluster meetings. Over the initial years of the model's deployment in the Midwestern school district, a need was identified for chronicling the master teachers' reflective practices. Chronicling such as this could provide a compelling picture of the patterns and/or affinities used by the teachers responsible for conducting the field test trials. The researcher applied Bailin, Case, Combs, and Daniels' (1999) five standards of critical thinking to examine the reflective practice of the master/mentor teachers at three middle schools participating in the TAP model over the first two years of deployment.

Following an introduction to the study in Chapter 1, Chapter 2 framed research around critical thinking and educational practice. The chapter further emphasized how critically reflective practice has the potential to influence and transform the work of teachers. Chapter 3 outlined the qualitative research design and methodology for the study, and Chapter 4 presented a qualitative analysis and coding of the reflective practices of six practitioners during a specific field test trial that each conducted. Discussion in Chapter 5 provides a summary and conclusions around the five standards of critical thinking and offers consideration for future study and professional development for master and mentor teachers.

Research Discussion

The six master/mentor teachers taking part represented each of the three participating middle schools in the city school district. All have received identical training from the national institute and all master teachers have multiple years of experience in an urban environment. As participants conducted field tests, each examined her clinical field data through reflective practice guided by the researcher. Master teachers do not have an assigned class roster so field testing is conducted with a different teacher's class or sub-group of a class. This may have had an impact on reported findings. The following is a review of the research findings as related to each of the three research questions that guided the study.

Research Question 1: How do the master teachers make meaning from field tests to determine attributes of effective instruction?

The overall coded trends were more frequent around critical attributes and assessment. Master teachers exhibited knowledge for critical attributes (56 frequencies) of what worked in their instruction. Teachers made assessment for student learning (40 frequencies) during Phase I of the field tests. Master teachers generated the highest number of coded frequencies (34) or 22% under habits of mind. Use of background knowledge and critical concept knowledge was slightly less at 21% of the overall frequencies.

Total CAMSE- Combined Opening & Phase I

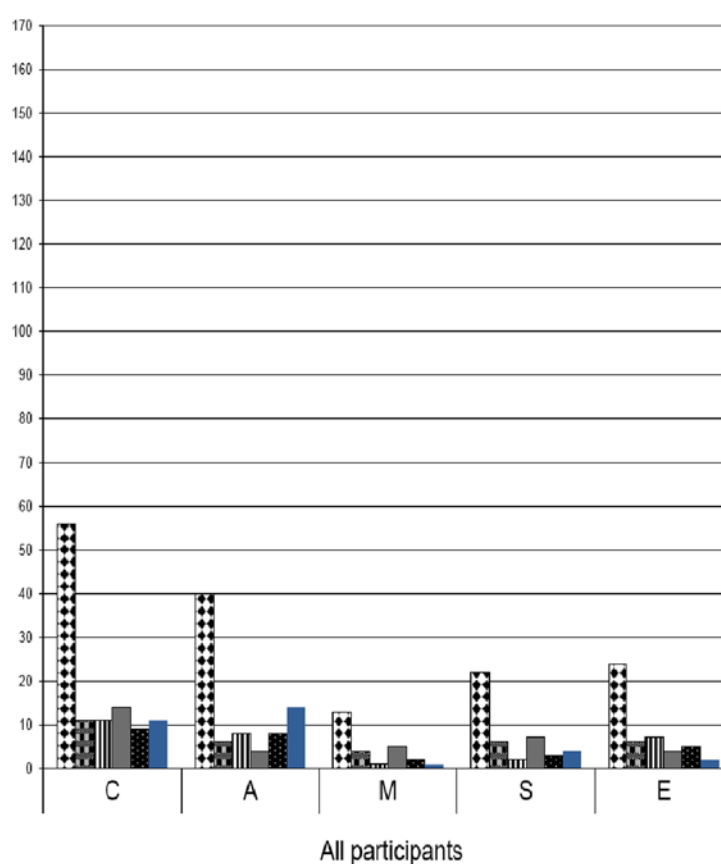


Figure 5.1 opening and Phase I

Note: Legend –left-right bar graph

–Background Knowledge

-Heuristics

-Habits of Mind

-Operational Knowledge

-Knowledge of Critical Concepts

Each of the master teachers had experience in an urban environment. From field testing, they learned and questioned students' willingness to take academic risks in order to extend what they know. Teachers acknowledged that students are frequently insecure about taking academic risks. It begged the question in the master teacher's reflective processing: Is it that students do

not know; lack the necessary prior knowledge; or is it that they do not trust their prior knowledge?

The master teachers found that, when planning for instruction, initial student engagement was best connected to familiar content of high student interest content. This bolstered student confidence and increased student willingness to participate. Once students could exhibit the willingness to test-out their understanding through discourse, the master teachers could probe more effectively with questioning and provide higher quality academic feedback to guide student understanding and refine thinking.

Master teachers used level of student engagement largely as a grounding point for decision-making. Student independence was considered in reflective planning so that student strategies were planned and taught in such a manner as to avoid too much teacher dominance. Students readily deferred to teachers and rarely questioned teacher thinking or accuracy. Because of this dynamic, teachers found that frontloading instruction with explicit explanation was more frequent versus testing out student's ability for self-discovery. Teachers believed it critical to communicate verbally first, then prompt students with the ultimate goal of independence.

Master teachers' expectation for student work was based around the use of graphic organizers. They strived for stronger evidence of student mastery; however, there was little evidence that master teachers had a clear picture of what they expected to see in student mastery. Teacher reflection included mechanical use of formal writing to add details, but did not include an example of criteria for an assignment that would explain, for example, expectations of an eighth grader's assignment to craft a treatise between two countries to bring resolution to a human interest conflict.

Consideration for independent student monitoring of text to self was present in teacher reflection. Master teachers learned that text to self thinking must be monitored through the teacher's explanation. Master teachers did not show evidence of their own learning as to the connection between this habit of mind and a higher quality learning product from the student.

Student/peer critiques in order to build and motivate student self-monitoring were findings from the field testing during the first phase. This learning did not include explicit connection to learning assignments or long-term units. The primary focus was for test question responses. Master teachers recorded that higher level students emerged earlier with a stronger ability to synthesize; hence, reaching independence sooner. They did not get to a point where they could define what higher level students did in their processing so that teachers could transfer or use this to increase academic achievement in lower performing students.

The master teachers defined operational progress with student's ability to self-select. This required additional self-monitoring and motivation from students. While master teachers did not want to create rigid self-compliance, they did want students to think about their operational thinking. There was limited evidence that operational use of student strategies was used against specific criteria for quality student learning assignments that the student had responsibility to create.

Research Question 2: How do master teachers use data from field tests to determine attributes of effective instruction?

A predominant affinity toward critical attributes and assessment continued through Phase II with a frequency of (32) for critical attributes and a frequency of (24) for assessment. The master teachers showed a proclivity toward habits of mind and heuristics as part of decision-making of 23% and 26% percent respectively.

Total CAMSE- Phase II

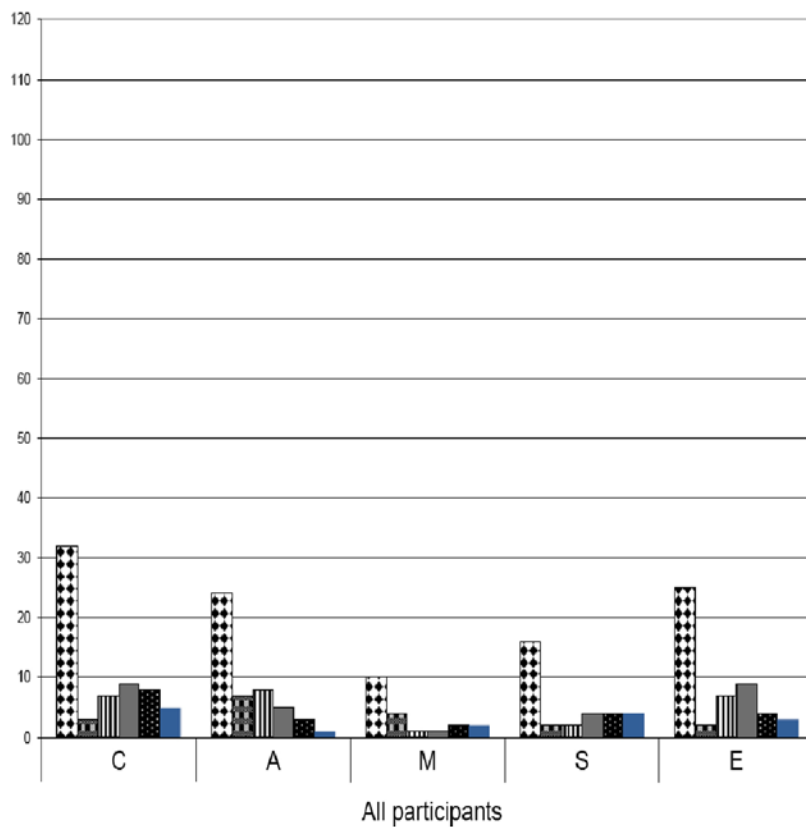


Table 5.2 Phase II

Note: Legend –left-right bar graph
 -Background Knowledge
 -Heuristics
 -Habits of Mind
 -Operational Knowledge
 -Knowledge of Critical Concepts

Master teachers used learned background beliefs with primary focus on student engagement and student comfort levels. They knew their student audience well and used this level of acquired student comfort as a gauge of success. Because students often lacked

motivation to complete assignments or respond to extended response items on a test, master teachers began at this point in order to keep students from giving up or shutting down.

Greater recall of prior knowledge with connections to previous student topics also was considered by master teachers. Since students had not had much exposure to the synthesis of putting ideas together for new understandings, master teachers found it necessary to plan these opportunities to infuse a sense of familiarity for the students in this type of thinking.

All data was used in relation to state test questions and performance on exams. Little emphasis was placed on specifically defined performance expectations for all students at Clyde, Chester, and/or Saylor Middle Schools. Rubrics from state assessment were primary grounding points used by master teachers. Teachers considered student work from expired test questions and assessed the level of performance against them. Infrequent connection to long-term assignment performance existed. The master teachers articulated what they expected in terms of the student strategy instruction and assisted teachers to integrate them into core content; however, since class assignments were not explicitly planned out or coordinated in overall programming, it was difficult to transfer specific grounding defined by master teachers to specific assessment in classrooms as part of core curriculum.

Master teachers refined presuppositions for student engagement and the extent of student learning behind it by thinking from a student's point of view. Through a conscious framing of "how" and in relation to a student's thought processing with a particular strategy, master teachers could understand gaps and misconceptions. From this, instruction was fine-tuned. For example, cognitive modeling that was developmentally appropriate for a middle school student was emphasized to increase transfer.

Master teachers discussed the range of difficulty in finding an answer right in the text versus the cognitive processing expected in synthesis to create new knowledge. Below basic students listed irrelevant information that was not necessary. This operational discovery drove decision and strategy development. Master teachers focused on critical elements of reading the question and connecting cognitively to the question as a reader in order to gain a greater level of specificity. This cognitive operational transfer was difficult; students could verbally articulate at first, but could not easily transfer to paper.

Knowledge of critical concepts was used in relation to operations of the strategy. Critical concepts in relation to content or mastery of higher level performances were minimal. Master teachers considered the scaffolding of learning, but scaffolding for performance was not part of long-term assignment products. Master teachers defined the labeling of their cognitive modeling as critical for students.

Research Question 3: How do master teachers make application for student transfer of instructional learning strategies?

Critical attributes of instruction and assessment of instruction continued as the highest frequency with coded frequencies of (72) and (39) respectively. The standards of critical thinking also maintained the highest percentage around heuristics and habits of mind both at 25% of the total coded frequencies.

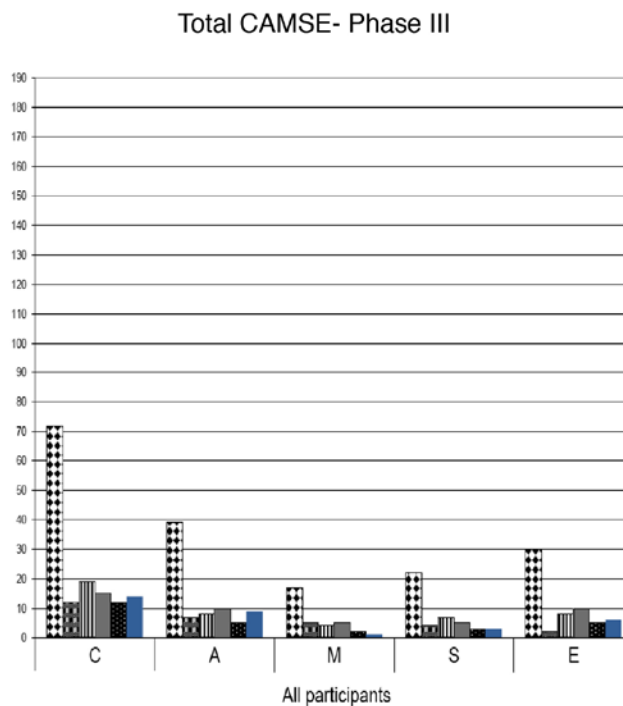


Table 5.3 Phase III Note: Legend –left-right bar graph
 -Background Knowledge
 -Heuristics
 -Habits of Mind
 -Operational Knowledge
 -Knowledge of Critical Concepts

In applications of strategies, master teachers became conscious of student thinking and processing rates. Master teachers noted student questions were more predominant based on lack of understanding rather than curiosity, inquiry, or extended thinking. Sample checklists provided students with needed security, encouraging active deployment.

The master teachers considered student shutdown of cognitive processing due to lack of familiarity with thinking and problem solving. Frequent repetition and practice were considered

an important grounding point for student success. From this, leadership was influenced to encourage whole school rollout to foster familiarity. A grounding point that represented student understanding was not discussed by the master teachers.

The master teachers noted that lack of familiarity with a word such as “mural” compromised student thinking and processing. Students could have refined and internalized a habit of mind for solving perimeter; however, because of an unfamiliar term such as “mural,” cognitive processing was affected. Lack of student background information surfaced as an important factor and deterred student progress; this affected formative assessment around critical concepts in relation to a content area. Teachers became aware of this potential.

Master teachers focused on a balance between keeping the operation for student thinking useful and engaging for student interest, but also giving students needed challenges to increase student ability. Time became a consideration at the point of application. Student processing was considered too slow with some; this influenced modifications made by master teachers. Since fewer students had strong skills in abstract thinking, master teachers placed their reflections in student terms and perspectives. This they thought would increase the likelihood of active engagement.

Master teachers taught students to think about their thinking. In mathematics, teachers began new forms of problem solving with concepts with which students were familiar. This was used as a form of scaffolding built from critical concepts in math content. Application of critical concepts was used in writing around adjectives and descriptors for increased use of detail. Master teachers continued to see an application trend in lack of transfer from student verbal communication to written communication.

Limitations of the Study

Since this researcher was known to all participants, a level of trust was established early. Research participants did not view the researcher as an outsider. This comfort level provided strength to the overall study; however, challenges also existed because of it. Over 20 visits were conducted through the course of the field test study. At times, this became an extension of work members had previously participated in as work during the previous seven to nine months earlier in the school year and the preceding summer. In addition to the field test interview conversations, follow-up included conversations around the individual growth plans, long-range plans, and school benchmark data from the city school district.

A second limitation of the study involved overall sample size. While three middle schools were included from the urban Midwestern school setting, they were just that; three schools from a specific district complete with its own set of challenges and politics. Transferring the findings from this study to other school settings has its limits; however, replication of the study is increased since the critical thinking standards were used as a basis for interviews and could be used as anchors for future inquiry around teacher reflection on practice. Still, a significant amount may be learned from this case study with replication. Through the collection of adequate data and analysis of the patterns and trends documented around the master teacher reflections, a foundation for future research may be constructed which is discussed later in this chapter.

Although not all schools participate in the Teacher Advancement Program, all schools and their staff members are charged with raising student achievement. The extent to which all teachers reflect on their practices and the quality with which this takes place is an important part of the teacher quality equation. As Fullan (2003) offers as a caveat, “[i]t takes capacity to build capacity, so providing professional autonomy to groups of teachers who don’t have the

commitment and the wherewithal to conduct their work with disciplined knowledge inquiry and moral purpose will do no more than squander resources” (p.7).

The master teacher at Clyde Middle School who was not able to participate after the study commenced was a limitation. The mentor teacher willingly accepted the offer to participate; however, the overall job responsibility and experience level in relation to the master teacher position was somewhat compromised.

Triangulation of data collection methods was the primary strategy to address the limitations described. This included class observations, three phases of the interview process, and document analysis from teachers and students. In addition, the coding team consisted of a state department of education consultant who participated in 100% of the coding process.

Despite the fact that case study is a research strategy that is frequently contested for reliability, Yin (2003a) confirms its need exists out of the desire to dissect and interpret complex social phenomena. Both qualitative and quantitative data collection are part of this design. Real-life events, such as that of the field testing and critical reflection, exist within a formative state. It is only through holistic investigation that captures these real-life events that further evolution can take place through analysis, interpretation, discussion, and planning.

Since this researcher conducted all data collection and analysis, certain limitations should be considered. A human element exists in all leadership practice so, when analysis is done, there is an opportunity for personal biases, missed opportunities, and/or other unexpected events. Since the researcher conducted all data collection and analysis of data, limitations should be considered. “[T]he investigator as human instrument is limited by being human—that is, mistakes are made, opportunities are missed, personal biases interfere. Human instruments are as

fallible as any other research instrument” (Merriam, 1998, p. 20). Supplementary coders were included as an additional reliability check.

Elements were included in the research design to ensure transferability, credibility, confirmability, and trustworthiness, as part of the case study design. As mentioned, with any human instrument, potential threats exist. The research design of this study addresses these threats to validity. Yin (2003a) states that internal validity may be threatened by unsound or weak casual relationships that attempt to explain events and their subsequent occurrences. This study, however, purports to connect experimental findings from the qualitative data to theory, in this case the standards for critical reflection.

The design helped to reduce potential biases, because the evidence from the data collection was connected to the standards. Missed opportunities and unexpected effects are reduced because the study itself is framed within the container of the Teacher Advancement Program and follows its established protocols. The work in which this research was conducted is not additional or capricious for the master teacher. It is within the confines of responsibility which each master teacher is expected to fulfill.

This multiple method design within the case study maintains the standards of rigor for qualitative study in addition to construct validity, both internal and external. Multiple method includes qualitative data that was collected through interviewing of master teachers and emergent coding of evidence gathered. Quantitative analysis was then made in accordance with data collected from student achievement scores on district benchmark assessments. A comparative analysis was made between the identified areas of student need, which master teachers made and designed professional development, against actual student data from district benchmarks test

and/or state achievement tests. This use of multiple method strengthens construct validity within the design.

Yin (2003a) maintains that potential risks of design construct validity exist because “investigator[s] fail to develop a sufficiently operational set of measures and that ‘subjective’ judgments are used to collect data” (Yin, 2003a, p. 35). An operational set of measures included five standards established for critical thinking and reflection. Interview questions were developed based on theoretical grounding of critical thinking and empirical research on student learning strategies. Additionally, a state department of education consultant, trained in the TAP model, served as a systems check for TAP process and protocol.

Yin (2003a) further maintains that internal validity checks are necessary for causal relationship checks and making of inferences. Within the data analysis stage, emergent themes were constructed in relation to the five established elements of critical thinking. These themes were substantiated by theoretical and empirical data presented through key questions within the literature review. This provided necessary internal validity checks against established criteria as the chronicling is built around master teachers’ critically reflective practices.

External validity (Yin, 2003a) is inherent within the research design itself. Results were generalizable beyond the two case districts. This is because of the context in which critically reflective practices exist within all teaching practices. Since coding involves interplay with standards of critical reflection, generalization was made in the form of chronicling, tracking the extent to which teachers use them in their reflective practices. The TAP model serves as the container within which to study critical reflection around student learning strategies. This is analogous to methods scientists use when taking results from experiments and connecting them to theory (Yin, 2003a).

Finally, reliability was confirmed so that a future investigation conducting the same results would arrive at similar findings (Yin, 2003a). This was confirmed around the question design and the theme analysis built on the standards of critical thinking. This chronicling and analysis of the critically reflective teachers' thinking provides opportunity for future study and development around the unwritten rules teachers use as they reflect on their practice as it relates to student learning strategies. Replication design increases external validity and transferability.

Transferability to Teaching Practice

The iterative nature teaching requires integrated consideration when reflecting upon ways to improve practice. To address these limitations, the literature was reviewed through the five standards for critical thinking and then clustered and critiqued under three provocations (What does it mean? How is it used? How is it applied to secondary school teaching and student learning?). Furthermore, interview questions posed to master teachers on their field testing were developed around the five elements for critical thinking. This promoted movement from the theoretical to the practical. Reflective journaling captured master teachers' thinking and processing between the field testing and composition of written long-range plans. Then, through further analysis of the long-range plans, extensions were made possible to the application level within the TAP model as the long-range plans serve as the capsule in which the most immediate product exists from field testing and critical reflection.

Mezirow (1991) states that:

Jerome Bruner (1957) sees a universal direction of intellectual development moving from action—knowing by knowing how to do—to symbolic representation (conceptual development) which primarily involves the use of language, specifically rules for forming and transforming propositions and permitting representations not only of what is but also of what is not and what might be. (p. 146)

What then do the practiced, unwritten rules that critically reflective teachers use look like for forming and transforming presuppositions and permitting representations of effective teaching?

Mezirow (1991) further states that “to make the crucial distinction between our own psychological reactions (*or actions*) and external events (*instructional practice and related student work*) requires the development of our capacity for self-consciousness” (p. 146).

Developing teacher capacity for this *self-consciousness* will directly affect instruction and connect to student achievement, because a raised self-consciousness in teachers crystallizes in their repertoire the “whys” of the particular practice. Capturing what this looks like in exemplary practicing teachers is the first step. Once defined, it can serve as a base for raising teachers’ consciousness because they will have an authentic model of what it might look like.

Implications for the School District and Future Research/Training Needs

Within this case study which included six teachers, dominant thinking by the master teachers was illustrated toward both heuristics and habits of mind. This chronicling of the reflective practices of practitioners serving in a leadership school role has implications to consider since they serve as a conduit between theory and practice and then deliver/transfer the results of their defined field work to others. The paths and practices which form thinking patterns and instructional planning trends are significant to note when considering overall effectiveness and future training needs.

A compilation and analysis of all phases with all study participants indicates 100 coded frequencies with use of heuristics and 107 coded frequencies with use of habits of mind or 23 and 24 percent respectively. Critical attributes and assessment remained the highest coded with 160 and 103 respectively. This is illustrated in Figure 5.4.

Total CAMSE- All Phases

	C	A	M	S	E	Total	%	
	All participants							
Total CAMSE - All phases	160	103	40	60	79	442		
Background Knowledge	26	20	13	12	10	81	18%	
Heuristics	37	24	6	11	22	100	23%	
Habits of Mind	38	19	11	16	23	107	24%	
Operational Knowledge	29	16	6	10	14	75	17%	
Knowledge of Critical Concepts	30	24	4	11	10	79	18%	

Figure 5.4 total codes from all schools combined

Both individually and collectively, master teachers anchored most of their reflective processes using their own heuristics based on many years of teaching practice and their own habits of mind from personal academic experiences. If heuristics serve as a grounding point or a foundational anchor consulted during unpredictable situations, and if habits of mind are considered as patterns and paths developed for thinking about shared assumptions for teaching and learning, then choices made using these two dimensions would come primarily from a teacher's anecdotal and/or experiential teaching collective.

One must consider the level of autonomy promoted by each of these and the effect it has on the teacher's decision making during the field testing process. What is the informed professional judgment then brought to the leadership table by the individuals within a school's Teacher Advancement Program? It takes capacity to build capacity and how will this "capacity" be recruited, professionally developed, and sustained over the long-term by the school organization? It is a necessary question for the school leadership teams as well as senior leadership at the district level.

As the Midwestern district moves forward and continues to expand, it is important to consider the distinctiveness of the master teacher position within the TAP model. The level of autonomy is significant and is what sets the position apart from most others. Since the master teacher is charged with both developing and transferring high quality instructional practice to colleagues, the level of rigor reached is directly contingent upon the skills and knowledge brought to the position by the master teacher. First, the selection process becomes an important consideration and, second, how should the master teacher be academically extended throughout the work experience? Fullan comments on informed professional judgment of practitioners empowered to lead academically; “[it] is collective, not individualistic. It must be driven by best knowledge, which must be pursued continually through cultures of interaction inside and outside the school” (Fullan, 2003, p.7). What then is “best knowledge” as an expectation and how is it best defined for both master teacher selection and long-term development? Who will lead this and how will it be led?

Within the coded text, critical attributes of instruction and assessment of instruction received the highest frequencies. What is the expectation for student performance as related to a specific performance product? It was not clear how master teachers connected student learning strategies to higher extensions from what classroom teachers expected; while learning targets are implied within state standards, they were not explicitly communicated within long-term learning assignments. This is an important next step for the school sites within the district to consider. As a result, student gains existed from below basic to proficient on teacher pre- and post-tests, but did not realize significance at the higher end of advanced proficient. Further, annual state tests are representative of different cohorts of students, but if classroom performance assessments are based on higher expectations in student products rather than state tests alone, then gains should

be more visible on annual achievement data because the established expectation is well beyond answering a question or passing a test. The state test gains over a two-year period were minimal and some regressed. Politically, state test results serve as an important measure for a school's overall success and certainly a measure of any element of reform.

Total CAMES across all areas of critical thinking indicate that master teachers define critical attributes with a high degree of frequency. In addition, master teachers assess at a level of high frequency. Modification of instruction occurs at a much more infrequent level relative to the high occurrences of critical attributes and assessments. Interestingly, the lower frequencies relative to operational knowledge and knowledge of critical concepts are in response to low frequency levels in modification of instruction. Modification in the instructional process occurs when a teacher has clarity around the end product which the student must master. While state standards would seem to indicate clarity of content, at this time in most schools, it exists primarily at a cursory level; it has not evolved at most school sites, particularly at the secondary level, to a student performance product. So, for example, an experienced art teacher has clarity around the elements of design that include balance, color, form and message. As an art student progresses through the creation of a product, the art teacher formatively assesses student work relative to his/her intimate understanding for these elements. When student progress is compromised, he/she directly modifies instruction by combining that intimate understanding of the end in mind, against the student's current understanding; the end result of a modified instructional path for the student to follow. Without clarity of critical concepts relative to subject matter and operational knowledge for strong adjudication of relative student work, modification would naturally be much less likely to occur.

As schools move forward with clinical professional development with time and resources embedded into the work day for teacher collaboration, it is valuable to consider the place a particular organization finds itself relative to student learning products and the uniformity which they are communicated through class instruction and the consistency which they are juried relative to state academic content standards. A curriculum/assessment map can serve as a mechanism for organizational self-audit and grade/subject level development for student learning products. Further, clear adjudication processes should be designed with performance rubrics relative to state standards and grade band benchmarks. Trainers in the TAP model or other similar models with clinical field trials for teacher professional work should consider school organizational placement on its faculty evolution between state standards and explicit alignment to student performance/learning products. The greater the clarity, the higher the likelihood for appropriate modification of instruction with strategies designed to move student to higher levels of performance.

Implications for future research methodological fit from nascent levels to intermediate levels. Further study relative the critical thinking standards for knowledge of critical concepts and operational knowledge. A particular focus on these areas in multiple sites relative to modifications of instruction would track teacher frequency and correlation to student gains. Higher levels of instructional modification with increases in these two standards would begin to establish a correlation that could be explored future research.

Concluding Remarks

This chapter began with a review of the dissertation study and its significance as part of the Teacher Advancement Program. This was followed by a summary of the findings related to the three research questions. Next, a discussion of the study's limitations and possible potential

for transferability within educational practice was considered. Finally, implications for the school district program and future research and training needs were drawn.

This dissertation study was a case study with replication within a larger context of the Teacher Advancement Program within a Midwestern school district connected to a larger state initiative. For the purposes of this study, the researcher conducted the case study with middle school master teachers and a mentor teacher on-site currently serving in the role and fulfilling all job responsibilities. Because of this, no additional work was expected from any of the participants in the study. Data was collected throughout the field test process and coded by a team that included a state department of education consultant.

Results of the data collection present a chronicling of the master teacher reflective process and capture a picture revealing decision-making and the affinities which the participants displayed during an established time frame. They support the imperative for school curricular leadership that is informed with clear academic expectations, then planned with uniform measures of defined performance rigor, and finally measured by student success equal to other students across the city, state, or country. It is of value for the leader to establish this with clarity within the organization and maintain it as an expected part of how the school is defined. These findings lay a theoretical basis for future study and research.

APPENDIX

Appendix A
Antioch University
PhD in Leadership & Change
INSTITUTIONAL REVIEW BOARD
Human Subjects Research Review

Informed Consent Statement

I am participating in a research project at the graduate school of Antioch University. One of the primary purposes of this research is to enhance instructional leadership and encourage and support excellent teaching.

Study overview: This study will gather data from interviews with educational leaders who are currently master teachers in K-12 schools. Once this data are gathered and synthesized, it will be used to chronicle patterns that emerge during conversations. Implications for professional practice will be made after the analysis. a) Voluntary participants will take part in the interviews. All transcript documentation will be reviewed by participants.

I understand there is a minimal risk that I will share confidential information from interviews. This risk will be minimized by

1. my review of the transcript checking for accuracy or misunderstandings;
2. the confidential handling information;
3. the removal of my name or my organization's name prior to publishing the final report; and
4. by the destruction of all electronic recording and transcripts at the completion of the project.

I am aware that my opinions may be utilized for research purposes, but that I will not be identified by name in the final written document.

I understand the research findings may benefit future organizations engaged in change of role position development by increasing their longevity and reducing their potential for failure.

I understand my participation is voluntary and I may discontinue participation at any time. I have the right to express my concerns and complaints to the University Committee on Research Involving Human Subjects at Antioch University (Dr. Elizabeth Holloway, Professor of Psychology, Ph.D. in Leadership and Change, Antioch University, eholloway@phd.antioch.edu)

This project requires the collection of data from taped interviews, observation of field testing, document analysis of long-range plans, and reflective journaling.

No first or last names will appear on any materials that are collected. Conversations will serve as an iterative form of the process. The form below will be used to document your permission for the use of these materials.

I agree to participate in this study which I understand to be part of a dissertation to be submitted in partial fulfillment of the degree of Doctor of Philosophy at Antioch University.

I understand if I have any additional questions regarding my rights as a research participant, I can contact the investigator, Greg Paulmann or his advisor, Dr. Elizabeth Holloway, Professor of Psychology, Antioch University (eholloway@phd.antioch.edu, 805-898-0114).

Sincerely,

Greg Paulmann
PhD Student
Antioch University

Consent Slip**Your Name** _____**Business Address** _____
(School) _____**e-mail** _____Name of project: *Impact of Critical Reflection in School Professional Development Design*

___ **I DO** give permission to you to include my contributions from the interviews in the project.
No names will be used.

___ **I DO NOT** give permission to use my contributions from the interviews.

Appendix B
Antioch University
PhD in Leadership & Change
Human Subjects Research Review

January 7, 2008

To whom it may concern:

I am a doctoral candidate in the Leadership and Change Program at Antioch University. I am currently participating in a dissertation research project to enhance instructional leadership and support excellent teaching. I am interested in pursuing a research project based around the field testing component master teachers use for the Teacher Advancement Program in three City middle schools: Starling, Clinton, and Champion.

In addition to my work at Antioch, I serve as the Teacher Advancement Program director. Studying these three middle schools is an extension of much of the work that has been started over the last three years in Columbus and in the state. We have made great progress, but we have also discovered a need to increase the effectiveness of our training in the area of field testing.

There are six masters teachers at the three middle schools mentioned. Each will be asked if she would like to participate in the project. I will serve as the primary researcher collecting evidence from interviews, reflective journals, and long-range plans based on field testing observations. With the exception of the reflective journal, all work is part of the expectation of the master teacher positions. Master Teachers will not be required to do any extraneous work for this research project.

All research information will be kept confidential and no personal information will appear in the published work. The research will help extend the participants thinking as well as increase the overall effectiveness of their field testing because of the additional time spent reflecting on their field testing and their long-range plans.

I have attached a list of observation dates outlining the data collection portion of the research and a copy of the informed consent from Antioch University. Thank you for your assistance with my research. It has been a pleasure working with City Schools.

Sincerely,

Greg Paulmann
PhD Student
Antioch University

Appendix C
Antioch University

February 2008

Dear TAP Middle School Master Teacher:

As we begin a new semester, I want to extend my appreciation of your support and leadership of TAP in each of your schools. Over the last two years, we have made marked progress in the establishment of the TAP model. We have now begun to build a critical mass of teachers in our state. Along with our continuous success, we have also discovered a need to increase the effectiveness of our training in the area of field testing.

To address this need, I am participating in a thesis research project at the graduate school of Antioch University. One of the primary purposes of this research is to enhance instructional leadership and encourage and support excellent teaching within the TAP model schools. I would like to invite you to be a part of this research process designed primarily around your work of field testing and the defining of critical attributes, relevant examples, modeling, and CAMS.

The work would involve approximately four-five sessions. I would observe field testing, script the lesson while you are teaching, and then we would begin having conversations around critical thinking and CAMS. This would work right alongside of my regular visits with you. The extended time we spend together should have a positive impact on your work in field testing and the development of your long-range plans. We as a foundation are working to expand training around the field testing process. Extended thinking into field testing will move conversations from the conceptual to the concrete levels.

The primary observation work will occur in March and April of this year. No first or last names will appear on any of the materials that are collected. Conversations will serve as an iterative form of the process. You will have opportunity to review all transcripts before the final analysis.

I would welcome the opportunity to study with you on this endeavor. The current three City TAP middle schools would be the only participants in the case. I will be in touch in a few days to give you the details.

Sincerely,

Greg

Appendix D
Interview Protocol

Phase I—<i>opening questions/what does it mean?</i>
Pre-field test interview with master teacher
Field test observation study
Researcher scripting in service to the field test
Student data collection at the conclusion of the lesson by field test teacher
Interview with master teacher
<i>Assignment: the reflective journaling process between field testing and long-range plan</i>

Phase II—<i>how is it used?</i>
Full-length interview in service to long-range plan progress/development

Phase III—<i>how is it applied to secondary teaching and learning?</i>
Full length interview at the completion of the long-range plan with metrics from the city benchmarks assessments aligned to Ohio Achievement Tests.

Interview Schedule

Planning Sessions

March 12	planning meeting	Saylor MS
March 13	planning meeting	Chester MS
March 14	planning meeting	Clyde MS

Phase I Interviews

April 2	full day observation/ <i>Mercury</i>	Chester MS
April 3	full day observation/ <i>Andrews</i>	Chester MS
April 7	full day observation/ <i>Bolton</i>	Saylor MS

Phase II Interviews

April 8	follow-up interview/ <i>Mercury</i>	Chester MS
April 14	follow-up interview/ <i>Andrews</i>	Chester MS
April 15-PM	follow-up interview/ <i>Bolton</i>	Saylor MS

Phase I Interviews

April 15	full day observation/ <i>Wolf</i>	Clyde MS
April 16	full day observation/ <i>Raven</i>	Clyde MS
April 17	full day observation/ <i>Baldwin</i>	Saylor MS

Phase II Interviews

April 18	follow-up interview/ <i>Wolf</i>	Clyde MS
April 21	follow-up interview/ <i>Rapp</i>	Clyde MS
April 30	follow-up interview/ <i>Baldwin</i>	Saylor MS

Phase III Interviews

May 2	concluding interview/ <i>Mercury</i>	Chester MS
May 5	concluding interview/ <i>Bolton</i>	Saylor MS
May 6	concluding interview/ <i>Raven</i>	Clyde MS
May 7	concluding interview/ <i>Baldwin</i>	Saylor MS
May 8	concluding interview/ <i>Andrews</i>	Chester MS
May 9	concluding interview/ <i>Wolf</i>	Clyde MS

Interview Questions Organized by Study's Phase

Phase I Interview Questions

Pre-Field Test Observation Questions

- 1) What are you field testing in today's lesson?
- 2) Who are the students participating in the field test?
- 3) What is the student need as it relates to academic mastery?
- 4) How does the field test fit into the larger scope of student mastery?
- 5) What do you want to find out from the field test?
- 6) Is there anything else you would like me to know?

Opening

- 1) Tell me about the process of field testing today? What was successful?
- 2) How did you know when your instruction was effective?
- 3) How did student accuracy inform you?
- 4) How did student error inform you?
- 5) Are there similarities (things that you repeat) in the sequence of the field test?
- 6) Why do you think this?

What does it mean?

- 1) What do you agree most with in today's lesson as it relates to the identified need you have for your students?
- 2) What do you think is important about your instruction? Why do you think so?
- 3) What did you see today that confirmed student mastery? Is there anything you are still wondering about?
- 4) Did anything unexpected happen today? How did you respond to this?
- 5) What were the points in the lesson that clicked? How do you know?

Phase II Interview Questions

How is it used?

- 1) What did you learn that made you wonder if students had gained understanding or mastery? Why do you think this is so?
- 2) What is the best place to meet you teachers in the development of this new learning? Why did you choose this?
- 3) What in your understanding of (math, reading, writing) informed you in both planning and delivery of the lesson?
- 4) Based on what you know now, what do you want to find out more about? Why do you think this?
- 5) When considering your students and their mastery, what comes to mind? When teaching colleagues and their mastery, what comes to mind?

Phase III Interview Questions

How is it applied to secondary teaching and learning?

- 1) What did you learn from students that tells you the extent of their ability to monitor their understanding?
- 2) How will your students monitor their own comprehension? When they detect that their comprehension is compromised, what do you expect to occur? Why? How do you consider this in crafting the long-range plan?
- 3) Based on your knowledge of (math, reading, writing) and mastery around identified student need and strategy use:
 - a. what did you detect were student's greatest strength?
 - b. their greatest challenge?
 Why?
- 4) From what you have learned from your lesson, what new knowledge influenced you in formulating this leg of the strategy?
- 5) When you think about your lesson, what struck you as significant about student engagement with the strategy? Why?

Appendix E

Dear Parent:

As part of a research study to increase instructional effectiveness, Antioch University is conducting a field observation. You son/daughter would be asked to provide feedback to the field test teacher as to the aspects of the lesson that increased understanding. Providing feedback is voluntary. Our goal is to increase academic achievement.

Sincerely,
School Study Team

Permission Form

Research Study
Antioch University
150 E. South College Street
Yellow Springs, OH 45387

Project Title: Critical Practice in Professional Development Design

As part of a research study to increase instructional effectiveness, student feedback after field testing will be included as part of the study's analysis.

I hereby consent for my son/daughter to provide feedback to the field test teacher as to the aspects of the lesson that increased understanding;

at _____ in City Schools.
(location)

Student Name: _____

Legal guardian: _____
(sign/print name)

Address: _____ City: _____

State: _____ Zip Code: _____

Date: ____/____/____

Appendix F

Process for Coders

- 1) Each interview transcript is read by phase (I, II, III) and individual question according to the standard. (Background Knowledge, Heuristics, Knowledge of Critical Concepts, Operational Knowledge, and Habits of Mind).
- 2) Each coder codes silently, then after the complete question is read, coders go back through and discuss the preliminary code assignments .
- 3) Once the code is identified, coders run it through the code's definition (below) as well as the green and red descriptive flags.
- 4) If it passes the criteria, then the appropriate label is assigned and the page and descriptor is recorded on each coder's coding sheet.
- 5) If it does not pass the criteria, then further deliberation continues and the isolated text is marked as emergent.
- 6) When coders encounter discrepancies, further deliberation continues around the definition and clarity is drawn from the text as supported by the green and red descriptive flags.
- 7) Discussion is led specifically around the evidence as cited from the transcript itself. All coders must reach agreement before the label is assigned.
- 8) Discrepancies have occurred less than 5% of the time and have primarily occurred between an element of CAMS and/or an emergent theme

Coding Criteria—CAMS

Label: (C) Critical Attributes of Instruction

Define: What were the critical parts of instruction where student understanding was evident in relation to the intended objective?

Descriptive Flag

Green: Specific learning objective with clearly defined measures aligned to state standards

Red: No evidence that student work informed decisions and no consideration to support learning and understanding

Example: "They did not have those separating skills and they lack the number sense, and so by giving them that simpler problem, I was building a concrete experience for them."

Label: (A) Assessment of Student Learning

Define: What was the teacher looking for at significant points during the lesson?

Descriptive Flag

Green: Clear articulation of difficulties students encountered

Red: No discussion how student work exhibited a lack of understanding; no clarity for how to measure progress

Example: *“When they were working I noticed Timothy’s strategy and a lot of kids had that strategy, but some kids still were questionable on “not really sure what to do.” They would start and...but they wouldn’t get all the way to 20 less; they would stop, maybe, like at 10 less. And so, he actually completed that, and so that was one way to do it and then I noticed that Balecy had another way. His way was faster; it was more efficient. And really, if they have the hundred’s chart, by this point...looking at the hundred’s chart and saying 8 is 20 less than 28 because 18 is 10 less; 8 is 20 less; they’re looking at the patterns on the hundred’s chart.....”*

Label: (M) Modifications of Instruction Based on Student Need

Define: How was the modification decision made in relation to the state standard?

Descriptive Flag

Green: Articulates what and why in relation to the modification; explanation for adjustments and would use them again

Red: Lack of clear connection between adjustment made and what served as information for the teacher

Example: *“...when you plan activities you plan activities that obviously meet the grade level indicators and the standards that you’re...you’re teaching, but it’s more than that because you have to connect it to other things that you expect the kids to know. And so you have, it’s that teacher content knowledge again, you have to have that...the whole big picture in your head, but then you also have to have the i-n...you know, the standards in your head and the benchmarks in your head so that you are constantly teaching all of those things all of the time. And so when I look at activities I want to know, first of all, do they have multiple entry points. I want to...I want to plan activities that have multiple entry points so that I know that everybody in that classroom is going to find some success with this activity.”*

Label: (S) Sequencing and Segmenting of Learning Strategy

Define: Based on what was indicated, what is the best way, at this point, to segment the learning strategy?

Descriptive Flag

Green: Logic is used for the most appropriate order in which to present the new learning in relation to student mastery

Red: No connection to the broader understanding or the “big idea” around the learning strategy

Example: *“But it also requires that content knowledge that you can break it down in a way so that you know that kids are going to have multiple entry points. And so some of that is, maybe, you know, there’s a simpler number that they can use, or maybe it’s creating a problem that you know that they’ve had the actual life experience of, you know, maybe it’s a measurement problem that had the actual life experience of measuring out, you know, flour to make cookies or whatever it is...”*

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