

LEARNING FROM ONE'S OWN TEACHING: NEW TEACHERS ANALYZING  
THEIR PRACTICE THROUGH VIDEO RECORDED CLASSROOM  
OBSERVATION CYCLES IN AN E-MENTORING PROGRAM

by

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## TABLE OF CONTENTS

1. INTRODUCTION .....	1
Overview of the Dissertation .....	4
References .....	5
2. REVIEW OF LITERATURE .....	7
Introduction.....	7
Theoretical Foundation: Community of Practice.....	8
The Induction Landscape .....	12
National Induction Landscape .....	12
Program-Specific Induction Components.....	16
Induction Components .....	19
Mentors .....	20
Induction Curriculum.....	25
Focus on Instruction.....	27
Formative Assessment and Evaluation of Practice.....	29
Anticipated Impact.....	33
Changes to the Designed and Enacted Community of Practice .....	33
Increased Focus on Disciplined Inquiry in the Mentoring Relationships.....	36
Development of Novice Teachers’ Analysis-of-Practice Skills.....	38
Refinement of Mentors’ Educative Mentoring Stance .....	39
Improved Instructional Practice on the Part of Mentees.....	41
Conclusion .....	43
References.....	46
3. LEARNING FROM ONE’S OWN TEACHING: NEW SCIENCE TEACHERS ANALYZING THEIR PRACTICE THROUGH CLASSROOM OBSERVATION CYCLES .....	55
Contributions of Authors and Co-Authors.....	55
Manuscript Information Page .....	56
Abstract .....	57
Introduction.....	58
Theoretical Framework.....	59
Methods.....	62
Context and Participants .....	64
Phases of Activities and Data Collection.....	66

## TABLE OF CONTENTS - CONTINUED

Data Analysis .....	69
Results.....	70
Focusing on Concrete Evidence from the Teaching Episode .....	70
Addressing Specific Science/Mathematics Learning Goals .....	74
Analyzing the Relationship between Teacher Actions and Student Learning.....	75
Supporting New Teachers to Critically Evaluate Instruction .....	77
Inducing New Teachers to Provide Alternative Teacher Actions .....	82
Providing Opportunities for Feedback in a Low-Risk Environment.....	86
Supporting the Development of Strong Mentor-Mentee Relationships.....	87
Benefiting Mentors .....	90
Discussion and Conclusions .....	91
Benefits of Classroom Observation Cycles .....	93
What Happened to Science Content?.....	94
Recommendations.....	97
References.....	105
<b>4. TAKING PERSONAL RESPONSIBILITY FOR PROFESSIONAL GROWTH: CONTINUOUS LEARNING THROUGH CLASSROOM OBSERVATIONS.....</b>	<b>107</b>
Contributions of Authors and Co-Authors.....	107
Manuscript Information Page .....	108
Abstract .....	109
Introduction.....	109
Defining Classroom Observation Cycles.....	110
Engaging in Inquiry into Your Own Instructional Practice .....	112
Example .....	113
Concrete Evidence .....	113
Science Learning Goals .....	114
Student Learning.....	115
Critical Approach.....	115
Alternative Strategies.....	116
Summary .....	116
Conclusion .....	116
References.....	119

TABLE OF CONTENTS - CONTINUED

5. CONCLUSIONS.....120

    Conclusions.....120

    References.....127

REFERENCES CITED.....128

APPENDICES .....139

    APPENDIX A: Qualitative Data Collection and Analysis .....140

    APPENDIX B: Case Study – Nora and Keisha .....145

    APPENDIX C: Case Study – Becky and Pat.....156

    APPENDIX D: Case Study – Lynn and Collette.....167

    APPENDIX E: Case Study – Dawn and Armand.....178

    APPENDIX F: Case Study – Alissa and Sharon .....190

    APPENDIX G: Case Study – Tom and Emily.....202

    APPENDIX H: Case Study – Diana and Karen.....212

## LIST OF TABLES

Table	Page
2.1. Relationship of components of comprehensive induction programs (Glazerman et al., 2008) to e-Mentoring for Student Success .....	44
2.2. Discussion areas in e-Mentoring for Student Success that provide avenues for addressing issues of content (Simonsen et al., 2009) .....	45
3.1. Background information about participants in the classroom observation study .....	101

LIST OF FIGURES

Figure	Page
3.1. Observation cycles consist of three primary activities supported by program documentation and professional development mechanisms .....	102
3.2. The eMSS mentoring program includes activities for mentors and mentees that support ongoing professional development .....	103
3.3. The research study consisted of three phases of mentor and mentee activities and data collection .....	104
4.1. Classroom observations serve a range of purposes.....	117
4.2. Observation cycles consist of three primary activities .....	117
4.3. Sample questions and prompts to support the five research-based dimensions of disciplined inquiry .....	118

## ABSTRACT

Induction, or the first three years of a new teacher's career, is a particularly formative period yet there exists only a limited literature base to support teacher educators who work with this population. Induction phase teachers benefit from professional development experiences that support them to learn about teaching while they are teaching. This can occur when they receive feedback about their instructional practices and ideas on how to further improve their work. One means for providing this feedback is to engage new teachers with experienced mentors who observe a classroom episode and structure discussions before and after that observation. This classroom observation cycle can support new teachers to inquire into an aspect of their practice with the help of an experienced educator.

This study examined the implementation of video-recorded classroom observation cycles in an established online mentoring program, e-Mentoring for Student Success (eMSS). New teachers and their mentors were observed as they conducted an initial observation cycle. Based on the observed behavior of the participants, the researcher designed a professional development session that framed observation cycles in the context of disciplined inquiry and encouraged mentors to focus on concrete evidence, discuss science content, explore the relationship between teacher actions and student learning, support the new teacher to critically evaluate the instructional episode, and induce the mentee to commit to alternative strategies. Following this session, participants conducted a second observation cycle. At the conclusion of the study, all participants were interviewed to capture the experience of video recorded classroom observation cycles from each individual's perspective.

Qualitatively studying the interactions between mentors and new teachers helped to identify the conditions that supported disciplined inquiry and the impacts it had on new teachers' professional growth. New teachers expressed that they reflected on and implemented changes to their instructional practice following the observation cycles. In addition, they appreciated the opportunities to receive feedback in a low-risk environment and felt a stronger connection to their mentors. Classroom observation cycles have the potential to equip new teachers with the skills and dispositions to learn about teaching from the act of teaching each day of their careers.

## CHAPTER ONE

## INTRODUCTION

Teachers new to the profession, or in the induction phase of teaching, benefit from experiences that help them to learn from their own teaching practice (Feiman-Nemser, 2010). The induction phase presents a unique context for professional development in that teachers are shifting from learning about teaching through formal study in their pre-service preparation programs to learning while teaching in situations where they are charged with the full responsibility of the profession (Fletcher & Barrett, 2004; Watson, 2006). A common feature of many professional development experiences for early career teachers is mentoring, in which an experienced teacher, mentor, is paired with the new teacher, mentee, to support this transition. However, there is a limited research base on the activities within a mentoring relationship and their benefits to new teachers and their mentors (e.g. Luft, Firestone, Wong, Ortega, Adams, & Bang, 2011; Luft, 2009; Wang, Odell, & Clift, 2008).

An important focus for induction phase teachers is instructional practice (Glazerman, Isenberg, Dolfen, Bleeker, Johnson, Grider, & Jacobus, 2010). One means for supporting new teachers' practice is by providing feedback on instruction through classroom observations. However, there is much variation in the research literature on the purposes, types of feedback, and outcomes of observing new teachers' practice (e.g. Borko, Jacobs, Eiteljorg, & Pittman, 2008; Bunton, Stimpson, & Lopez-Real, 2002; Hiebert, Morris, Berk, & Jansen, 2007; Santagata, Zannoni, & Stigler, 2007; Soares &

Lock, 2007). What seems most promising is an approach to classroom observations that supports induction phase teachers' need to learn about teaching while teaching. Feiman-Nemser (2001) proposes that in the induction phase, teachers should work on, "turning confusions into questions, trying something out and studying the effects, and framing new questions to extend one's understanding." A mentoring activity that supports these aims is classroom observations characterized by disciplined inquiry, or investigating how one's teaching can be improved by carefully studying a specific aspect of that teaching practice (Santagata et al., 2007).

The integration of classroom observations to support disciplined inquiry into an existing mentoring program for teachers in the induction phase involves several considerations. First, the particular mentoring program that provided the context for this study is a wholly online program in which mentors and mentees may never meet face-to-face. Distance communication technologies, including telephone, email, online discussion forums, live two-way video chat, video recording and file sharing, were necessary to conduct the observations. What may be initially considered an obstacle, the necessity of video recording classroom episodes became a beneficial aspect of the program. Video recorded classroom practice has a growing research base of benefits for teachers (e.g. Kong, 2009; Rosaen, Lundeberg, Cooper, Fritzen, & Terpstra, 2008; Santagata et al., 2007).

In addition, while observing instructional practice and providing feedback is a staple of many professional development programs, it often occurs without much planning or forethought (e.g. Denton & Hasbrouck, 2009). In these cases, observers tend

to revert to one of two types of feedback: lesson design assistance typical of support provided to pre-service teachers or evaluative comments characteristic of summative teacher appraisal conducted by supervisors. To move mentors away from these approaches and toward inquiring about an aspect of the instructional practice together with their mentees, a classroom observation cycle structure and targeted professional development were developed and implemented. The classroom observation cycle involved three parts: pre-observation discussion, observation, and post-observation discussion. In the pre-observation discussion, the mentor-mentee pair identified the focus of the observation, framed it as a focus question, determined the data the mentor would collect, and discussed the instructional plan for the lesson. Then, the mentee video recorded the classroom episode and shared it with his/her mentor. Finally, the mentor and mentee engaged in a discussion to review the evidence in the video as it related to the focus of the observation and determined an action plan of next steps for the mentee's future actions.

Along with the defined structure for classroom observation cycles, ongoing and iterative mentor professional development supported the shift toward classroom observations for disciplined inquiry. An interactive online professional development session framed classroom observations in the context of disciplined inquiry, in that discussions (a) focused on evidence from the observation, (b) addressed specific mathematics/science learning goals, (c) analyzed the relationship between teacher actions and student learning, (d) supported the new teacher to critically evaluate the instructional

episode, and (e) induced the new teacher to provide alternative teacher actions (Hiebert, Morris, Berk, & Jansen, 2007; Santagata, Zannoni, & Stigler, 2007).

### Overview of the Dissertation

In my dissertation, I examined interactions between mentors and mentees as they conducted classroom observation cycles. I was particularly interested in identifying the conditions that supported mentors and mentees to engage in disciplined inquiry – to explore specific aspects of teaching and analyze evidence from the classroom episode collaboratively. This work not only helped to determine benefits mentees could gain by participating in classroom observation cycles, but it also informed the refinement of mentor professional development protocols related to classroom observations.

Background information on the induction landscape, components of induction programs, and the anticipated impact of successful experiences in the induction phase is included in chapter two. In chapter three, I described the findings of the qualitative analysis of mentor and mentee interactions in classroom observation cycles and the way they described these experiences to me in an interview. I presented a practical guide for implementing observations as a means for learning about teaching while studying one's own practice in chapter four. Finally, in chapter five, I provided a summary of the major findings from each chapter and discussed how these results may influence the future design, implementation, and evaluation of classroom observation cycles for induction phase and in-service teachers alike.

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## CHAPTER TWO

REVIEW OF THE LITERATURE ON  
INCORPORATING OBSERVATIONS INTO AN E-MENTORING PROGRAM:  
HELPING NEW TEACHERS LEARN TO TEACH WHILE TEACHING

National Center for Education Statistics (NCES) (2000) researchers estimate that the population of novice science teachers, those with one to three years' experience, represents 19% of all science and mathematics teachers in public middle and high schools. Professional development needs of these teachers are distinct from those of pre-service teachers' development and established in-service teachers' instructional refinement (Luft et al., 2011). Induction programs serve the needs of these novice teachers and provide comprehensive professional development as they transition from teacher preparation programs into the teaching profession. The literature review that follows examines the context, experiences, and anticipated outcomes of implementing webcam observation cycles in an established online mentoring and induction program for new teachers in the broader framework of the educational theory of communities of practice.

To frame the theoretical underpinnings of the entire study, the literature review begins with a section on educational theory, Communities of Practice. The section on context, the Induction Landscape, describes recent research on induction programs nationwide, then focuses the lens on the particular induction program investigated in this study, e-Mentoring for Student Success (eMSS). The next section on experiences,

Induction Components, outlines typical professional development activities within induction programs, both for new teachers and mentors. Finally the section on outcomes, Anticipated Impact, highlights practices that research suggests may be enhanced with the intervention in this study. Though not all of the outcomes explored in the Anticipated Impact section will be measured in the present study, the prospect of these ancillary benefits lends further importance to the study and outlines avenues for future research.

### Theoretical Foundation: Communities of Practice

The context for this research is the established novice teacher online mentoring program, e-Mentoring for Student Success, an online professional development program for novice teachers and their mentors that may be characterized as a community of practice. Communities of practice are rooted in constructivism and are dependent on interactions and learning amongst participants (Johnson, 2001; Wenger, 2006). Wenger, who coined the term “communities of practice” in relation to social learning theory and his research on the learning model of apprenticeships, describes the nature of communities of practice in his 2006 introduction to the theory.

People usually think of apprenticeship as a relationship between a student and a master, but studies of apprenticeship reveal a more complex set of social relationships through which learning takes place mostly with journeymen and more advanced apprentices. The term community of practice was coined to refer to the community that acts as a living curriculum for the apprentice... The practice of a community is dynamic and involves learning on the part of everyone. (p. 3)

Within communities of practice, participants share and learn from each other as they contribute to a common practice. Unlike formal educational environments, communities

of practice are fluid and exist within, between, and outside of established organizations (Wenger, 1998). The theory of communities of practice was originally designed to describe communities in which members meet face-to-face. A review of the literature, however, reveals that the theory has been extended to online communities with participants who never meet in person. Indeed, Wenger, White, and Smith (2009) have authored a text devoted to online communities of practice.

Communities of practice differ from professional learning communities and other collaborative learning groups in that members are brought together not only for a learning experience, but rather to contribute to a common practice. Wubbels (2007) distinguishes communities of practice from other groups by remarking that communities of practice embrace the “concept of legitimate peripheral participation of new members... that enables them to acquire and learn the professional knowledge, rules, and expertise of the domain of that particular community” (p. 226). The legitimate peripheral participation of new teachers in the eMSS community of practice provides an environment in which mentors can model for and scaffold their mentees’ work as each advances his or her instructional effectiveness. Indeed, Jaffe, Moir, Swanson, and Wheeler (2006) identified the presence of “invisible learning” in the eMSS community in their chapter of a best practices book for online professional development. They note that in large group discussions, “the mentees posted far less frequently than the mentors. Yet, interviews with mentees revealed that they were reading and thinking about the discussions regularly, and that they could describe specific ways they applied the information in their classrooms” (p. 20). Together, mentors and novice teachers are contributing to a

common practice through their tangible discussion posts and intangible personal reflections on their shared work.

In the strictest sense, communities of practice cannot be designed or created, but are rather the products of individuals and their actions relative to one another. In his literature review of communities of practice, Johnson (2001) distinguishes between organizations as designed communities and the communities of practice that emerge from individuals' interaction within those organizations. Johnson concludes, "the best one can do is to set up a design (e.g. a virtual community) and hope the emerging community of practice can achieve its goals of learning and growth within and around it" (p. 53). In other words, communities of practice are so dependent on their participants that interaction defines the environment. No matter how well-designed the learning environment, the members of the community and their interactions are what define the community of practice. If the members are not energized by the domain of the community and do not interact regularly to contribute to a shared practice, the community of practice will fail to form.

Despite the caution about the limitations of designers in the formation of communities of practice, a well-designed environment can foster the type of interaction that contributes to such a community. Even Wenger et al. (2009) offer practical recommendations for designers as "technology stewards" who "cultivate" communities of practice. Their text includes an entire "Action Notebook" chapter that outlines "the steps of stewarding technology and... what to keep in mind at each step" (p. 147). The virtual meeting places designed in the eMSS framework are aligned with key factors that

can facilitate the establishment of a community of practice: provision for times of togetherness and times of separation, structured participation and reification on topics of instruction, and support for the development of individual and group identities within the community.

In his review of published case studies of face-to-face and online communities of practice, Johnson (2001) alludes to several elements that support communities of practice: definition of the community's purpose and norms, development of safety and trust among members, facilitated discussion, and authentic activities. He advocates for research to be conducted to investigate the communities of practice that emerge from designed environments. What is notable, however, is that he recognizes the limitations of initial design and appreciates the importance of facilitation and scaffolding, which can be modified after the community of practice has been formed. Johnson (2001) describes:

Maximizing the development of a community of practice would be the ultimate goal; however, the reality would be setting up a virtual community (i.e. based on a complete review of the literature of virtual communities of practice), observing the emergent community behavior, and implementing support in the form of collaborative techniques, facilitation, and adequate scaffolding. (p. 57)

Even after a virtual meeting place has been designed and launched, technology stewards can cultivate a strong community of practice through participation in that community.

The design of eMSS is dynamic in a way to allow for these research-based recommendations. For instance, following program-specific research on the quality of reflection in the online dialogue in eMSS, facilitators were integrated into the eMSS community of practice. Taylor (2007) found that facilitators, individuals who received specific professional development, in the eMSS community of practice evoked more

frequent and higher quality dialogue amongst mentors and mentees. In this way, facilitators interact with the members to model and institute collaboration and provide scaffolding to strengthen the community of practice and its collaborative work.

The theoretical framework of a community of practice provides a useful reference point for examining research in the specific domains of this research study. In subsequent sections, the context, experiences, and anticipated outcomes of the specific program and intervention will be explored.

### The Induction Landscape: National and Program-Specific

The context in which an intervention is employed is shaped by large-scale and program-specific policies and practices. Overarching goals of induction programs are articulated in organizations' position statements and examined through research on a wide variety of programs nationwide in the National section. Research and policy statements on eMSS, the specific mentoring context for this study, are addressed in the Program-Specific section.

#### National Induction Landscape

Much research has been conducted in recent years on the needs of teachers entering the profession (e.g. Carver & Feiman-Nemser, 2008; Feiman-Nemser, 2010; Ingersoll, 2001, 2002; Kardos & Johnson, 2007; Kardos, Johnson, Peske, Kauffman, & Liu, 2001; Raizen, Paine, Britton, & Pimm, 2003; Roehrig & Luft, 2006). The impetus for this increased attention is, in part, due to the persistent teacher retention problem faced in America. Initially, educational policy makers sought to explain teacher turnover

in terms of a high retirement rate among the aging teaching force (Ingersoll, 2001). More recently, however, Ingersoll and Smith (2003) identify that “a larger part of the problem is teacher attrition – which is particularly high among teachers in their first few years of service” (p. 31). When examined broadly, teacher supply has recently approached or exceeded demand. However, the fields of mathematics and science experience staffing difficulties. Ingersoll and Perda (2009) find, “Mathematics and science teachers have about the same annual rates of turnover as other teachers. But, unlike, for instance, English teachers, the education system does not enjoy an overwhelming surplus of new mathematics and science teachers relative to total turnover” (p. 36). The persistent problem of teacher turnover negatively impacts the development of a cohesive school culture and has financial costs associated with it (Strong & Villar, 2007). As teacher induction advocate Darling-Hammond (2003) explains, “the education system never gets a long-term payoff from its investment in novices who leave” (p. 8). Understanding the factors that impact teachers’ decisions to remain in the profession beyond the first few years of service can inform school, district, and state policies regarding new teacher induction. Over time, induction programs that best serve beginning teachers’ needs exhibit payoffs for teachers and schools alike.

Teachers entering the profession are charged with a high degree of responsibility for their work. In their study of induction programs, Fletcher and Barrett (2004) explain that, “unlike other jobs, the expectations for new teachers are the same as, or higher than, the expectations for experienced teachers, especially in terms of student achievement” (p. 322). There is a steep learning curve for beginning teachers that is not necessarily

paralleled in other fields of work. Concurrently, teachers face work environments that are sometimes isolating and divisive. As Watson (2006) describes in her qualitative study of a new teacher induction program, “the issue of isolation is particularly problematic for beginning/novice teachers as it is during the early stages of one’s teaching career that support systems are most critical” (p. 168). An appropriate induction program responds to novice teachers’ need for resources and collaboration in order to ease the transition from student to teacher.

Given research on the impact of teacher quality on student academic achievement (e.g. Sanders & Rivers, 1996), advancing novice teachers’ effectiveness and retaining high-quality teachers is critical. The initial years of teaching are fundamental to whether individuals will remain in the profession. A comprehensive induction program can provide new teachers with the level of support and collaboration they need to become expert and remain in the profession. Moir (2009), in an article outlining best practices for induction programs, notes that “induction programs accelerate the effectiveness of new teachers, fast-tracking their progress to exemplary teachers with the ability to positively impact student achievement” (p. 16). New teachers who have adequate support are more likely to be satisfied by their work, have enhanced instructional abilities, and may be more likely to remain in the profession.

Comprehensive induction programs are designed to provide novice teachers with access to a structured curriculum of professional development experiences and an assigned mentor. Though the research base on new teacher induction programs is still relatively limited, Luft and her colleagues’ studies underscore the benefits of domain-

specific induction programs and programs offered using e-mentoring and online communication technologies (Luft, 2009; Luft et al., 2011; Luft, Roehrig, & Patterson, 2003). There remains a call for further research in the field, as Luft, Roehrig, and Patterson (2003) indicate, “appropriate research is needed to direct the development of induction programs and to influence national and state policy regarding the financial support” of novice teachers’ induction needs. The particular features of induction programs that strengthen new teachers’ practices need to be identified through research and replicated in the design of new programs and the continual refinement of existing ones.

Education associations, such as the National Science Teachers Association and National Council of Teachers of Mathematics, have published position papers outlining their ideals for subject-specific induction programs. Both advocate for content-based programs with a strong emphasis on mentoring, and ongoing training for mentors (NCTM, 2002; NSTA, 2007). For instance, the National Science Teachers Association (NSTA, 2007) position statement indicates that the organization “supports the development of science-specific induction programs with a strong mentoring component for all preK-12 new teachers of science” (p. 2). The key elements identified in the position statement include a training program for mentors, learning activities for new teachers that reinforce appropriate pedagogical strategies, and the establishment of a culture of collaboration amongst teachers and science professionals within and outside of the school environment. The National Council of Teachers of Mathematics (NCTM, 2002) position statement similarly outlines the need for sustained professional support for

novice teachers, and that a trained, supportive mentor “is crucial to this program” (p. 1). The vision for appropriate induction support for new teachers of science and mathematics is well-articulated. Program design, evaluation, and additional research are needed to assess the degree to which this vision is realized.

### Program-Specific Induction Components

The context for this study is e-Mentoring for Student Success (eMSS), a content-specific mentoring program offered by the New Teacher Center. Originating from a seven-year (2002-2009) National Science Foundation grant to the National Science Teachers Association, the New Teacher Center formerly at the University of California Santa Cruz, and Montana State University’s Science/Math Resource Center, the program has expanded to provide content-specific induction for novice science, mathematics, and special education teachers in 50 states.

Throughout its decade-long history, eMSS has provided an integrated learning environment in which novice teachers and their mentors interact in structured and unstructured online environments focused on pedagogy and content. A chapter by Jaffe, Moir, Swanson, and Wheeler (2006) in Dede’s text on online professional development for teachers provides an overview of the eMSS program philosophy and design. As they report, an overarching goal is to “balance attention to mentees’ immediate needs and concerns with engaging the mentees in experiences that will support their ongoing development as effective science [and mathematics] teachers” (p. 20). To accomplish this, a strong content-focused mentoring model is at the core of the program. As Jaffe and her colleagues report, not only do mentees have access to their assigned mentors, but

“this one-on-one relationship is embedded within a larger community of science [and mathematics] teachers and scientists” and mathematics content specialists (p. 3). This integrated model provides access to a variety of perspectives on instruction, a multitude of resources, and many opportunities for novice teachers to reflect on their practice.

In a whitepaper on the research base that supports eMSS methods, Kepp and Mike (2009) articulate the benefits of eMSS in that it “addresses the challenges of retaining beginning math and science teachers and accelerating their growth by leveraging an online technology network to extend flexible, personalized content-focused support to beginning teachers nationwide” (p. 10). The eMSS content-specific curriculum paired with structured mentoring support from experienced teachers in common subject areas and grade levels has been regularly evaluated and improved (i.e. Ford, 2004, 2005a, b, c; Jaffe, Moir, Swanson, & Wheeler, 2006; Horizon Research, 2003; Luebeck, 2006; McAleer, 2008; Pasley, Ford, & Fulp, 2004; Pasley & Madden, 2007; Pasley, Madden, & Ford, 2006; Simonsen, Luebeck, & Bice, 2009; Taylor, 2007). Though they may never meet face-to-face, mentors and new teachers regularly communicate and undertake “addressing the immediate needs of the new teacher and working to help them develop the knowledge and skills of an accomplished teacher” (Ford, 2005). Pre- and post-program evaluation surveys indicate that for new teachers who participate in eMSS, ratings of their preparedness to teach in a particular content area are higher after participating in this program (Pasley & Madden, 2007).

Several studies have examined the mentor-mentee interaction within the eMSS mentoring environment. For instance, in her monograph of preliminary findings of

research on early years of the eMSS program, Luebeck (2006) found that “the eMSS model has the potential to significantly alter the early experiences of beginning mathematics teachers who, rather than learning only from their mistakes, now have the means to learn by example and shared experience” (p. 15). In other words, the types of interactions observed in the online discourse between mentors and mentees was well aligned to the best practices for induction established in the research base. Later research by Simonsen, Luebeck, and Bice (2009) documents the co-construction of knowledge that mentors and mentees share. The researchers’ findings indicate that mentees who are in the eMSS program longer are more actively involved in knowledge co-construction with their mentors, especially in the realm of pedagogical content knowledge. This suggests that, consistent with the vision of eMSS, “beginning teachers shift their concerns as time passes, moving from a narrow focus on generic classroom issues to an expanded exploration of content-related issues” (p. 13). In other words, novice teachers progress beyond their short-term needs for information and resources to focus on their ongoing professional development.

Induction programs and mentoring, when well-designed can play a critical role in novice teachers’ professional development. Induction programs aim to enhance novice teachers’ instructional skills, increase the retention of teachers new to the profession, and positively impact student outcomes. To accomplish these goals, the design of induction programs generally includes some common features. Research on typical activities included in induction programs is addressed in the next section, Induction Components.

### Induction Components

Comprehensive induction programs take diverse forms, are of varying quality, and have differing results (Glazerman et al., 2010; Luft, 2009; Wang et al., 2008). What follows is an analysis of common induction program components, with a particular focus on the eMSS program. The components of comprehensive induction programs are derived from a randomized controlled study of induction programs (Glazerman et al., 2010). As shown in Table 2.1, the e-Mentoring for Student Success program includes many common induction components: carefully selected mentors who participate in specific professional development, an induction curriculum, a focus on instruction, and formative assessment and evaluation of practice, but may not focus as directly on outreach to district leaders for systemic support of the program as other, district-based induction programs may. While this may initially indicate a shortfall of the program, there are benefits to providing mentoring support outside of novice teachers' immediate contexts. Indeed, Simonsen and her colleagues (2009) speculate that "one advantage of this online mentoring model is the safe haven it provides for discussing sensitive issues. Beginning teachers can interact with mentors who are far removed from the politics of their own local school building or district" (p. 16). While eMSS may not serve all of the induction needs of novice teachers, it offers a content-focused mentoring model to fulfill needs that may be left underserved in districts with few content specialists in science or mathematics.

## Mentors

Many induction programs provide support by pairing new teachers with an experienced mentor. However, there is no single mentoring model, and the activities that are described as mentoring vary widely. Early research on mentoring (i.e. Abell, Dillon, Hopkins, McInerney, & O'Brien, 1995) reveals that, in general, nascent induction programs assigned compassionate mentors primarily to fulfill novice teachers' emotional needs, provide help and trouble-shooting, and build novice teachers' self-confidence in the classroom. Later research adds responsibilities to the role of mentor, including acting as sage advisor to the novice teacher. For instance, Ingersoll and Smith (2003) note that "mentors are especially crucial. Life for beginning teachers has traditionally been described as a sink-or-swim proposition" (p. 33). There is no doubt that mentors can be the lifeline to provide resources and support to keep new teachers' heads above water; however, recent research suggests that their roles extend beyond fulfilling novice teachers' immediate needs.

What is notable about the eMSS mentoring program is that it is delivered completely at a distance; the mentors and novice teachers may never meet face-to-face. Though literature published a decade ago on this "e-mentoring" identified it as distinct from traditional mentoring (i.e. Bierema & Merriam, 2002), there are common goals for all mentors, whether they collaborate with their novice teachers in person or online. For both face-to-face and e-mentors, building trust, communicating, and developing relationships with their mentees is critical; considerations specific to e-mentors follow.

With respect to the development of rapport and trust between the mentor and mentee, e-mentoring faces some unique benefits and challenges. One distinguishing feature of e-mentoring is that it crosses boundaries unlikely to be crossed in traditional mentoring relationships. Without the geographical and temporal constraints of face-to-face meetings, e-mentoring has the potential to pair mentors and mentees who would otherwise be unable to coordinate travel and schedules to meet. Not only does this provide an opportunity for mentoring between individuals who are physically distant from one another, but it also erodes at psychosocial barriers as well. Kasprisin, Single, Single, and Muller (2003) note that

based on the nature of mentoring, higher rank or status people serve as mentors to those with lower rank or status, which can lead, at least initially, to intimidation or lack of candor on the part of the protégé... eMentoring, however, may decrease those initial feelings of intimidation or of discomfort in new or unfamiliar environments because typical symbols of status are often unidentified. (p. 68)

In other words, a benefit of e-mentoring is that the relative anonymity of a distance relationship can equalize the status of mentors and mentees in the initial stages of establishing a mentoring relationship. In addition, compared to traditional mentoring programs that pair novice teachers with a colleague in the same school or district, e-mentoring provides a different degree of confidentiality in the mentoring relationship.

Face-to-face mentoring can take a variety of forms, including discussions, informal observations, and review of a mentee's work. Ensher, Heun, and Blanchard (2003) note that the "observational component is difficult to replicate in a virtual context, given the current constraints of technology" (p. 273). With recent advances in teleconferencing and streaming video content, Ensher and his colleagues' concerns

relative to e-mentoring may no longer hold the same weight. Several research studies (e.g. Borko, Jacobs, Eiteljorg, & Pittman, 2006; Hiebert, Morris, Berk, & Jansen, 2007; Santagata, Zannoni, & Stigler, 2007; Seidel, Sturmer, Blomberg, Kobarg, & Schwindt, 2011; Sherin & Han, 2003; Star & Strickland, 2008) have provided empirical evidence of the benefits of using videotaped classroom situations to improve teachers' disposition as reflective practitioners, a key component of educative mentoring, and will be addressed in greater depth in a subsequent section.

The nature of e-mentoring relationships necessitates that much of the interactions between mentors and mentees are text-based and asynchronous. While several studies classify the primacy of text-based communication as a challenge (e.g. Ensher et al., 2003; Suler, 2004), there are also benefits to this communication paradigm (Kasprisin et al., 2003; Reid & Reid, 2010). A recent psychological study by Barak and Gluck-Ofri (2007) on self-disclosure in online versus face-to-face relationships reveals "that personal self-disclosure in cyberspace appears to be characterized by attributes similar to those typifying self-disclosure in face-to-face interactions" (p. 413). Therefore, it is important to review the claims raised in early research studies to determine whether they hold true in an ever-advancing technology landscape.

Ensher et al. (2003) caution that the absence of non-verbal cues inherent in text-based communication may challenge online mentors. Early research on e-mail communication systems (e.g. Sproull & Kiesler, 1986) raises similar concerns about a communications medium that is now ubiquitous in modern society. Research on disclosure and impression-forming through computer-mediated communications is

ongoing. In their empirical research on impression-forming in face-to-face versus computer-mediated relationships, Tidwell and Walther (2002) find that participants in both groups use different approaches in pursuit of a common goal of reducing uncertainty about their communication partner. They conclude, “more effective communicators exchange more intimate questions and disclosures than they would in similar face-to-face contexts, and acquaintanceship develops in computer-mediated communication as it does in face-to-face” (p. 342). Though the methods by which individuals learn about their communications partners differ in face-to-face and virtual scenarios, individuals in both contexts form relationships. While nonverbal cues play a role in face-to-face contexts, their absence in virtual contexts does not preclude meaningful relationships from forming.

In addition, the asynchronous nature of much of the communication in e-mentoring systems can be considered a risk or an asset to developing relationships. In their empirical study of the impact of participant training on e-mentoring, Kasprisin et al. (2003) identify a benefit of e-mentoring is that “interactions are not synchronous, [so] respondents have time to consider message content” (p. 69). Mentors and mentees in an e-mentoring relationship have the luxury of time to reflect on and respond to the messages they receive. In their research on mobile messaging, Reid and Reid (2010) report a similar finding that text-based communication “can be carefully and thoughtfully fashioned to achieve important self-presentational goals, free from the multiple distractions of real-time social interaction” (p. 4). In other words, because individuals are physically separate when messages are sent and received, responses can be crafted in text

and reviewed before they are sent. This may result in more or less candid responses than face-to-face communication, depending on whether the one communicating prefers authenticity or a particular presentation of self.

As with all mentoring relationships, but especially in e-mentoring, the research base supports ongoing and regular communication between mentor and novice teachers. Bierema and Merriam (2002) advocate that “frequent exchanges are recommended because they help maintain the continuity and flow of the mentoring conversation. Long periods of absence online often lead to disinterest or misunderstandings and should be avoided” (p. 222). As with any type of communication, interaction in a virtual medium has particular communications norms that are learned and shared by participants. The importance of participant responsiveness is clear in relationships mediated virtually. Bruss and Hill (2010), in their empirical study on self-disclosure in online versus face-to-face communication scenarios, find, “trust and security are developed when two people respond to one another positively over repeated interactions, which continually strengthens the relationship” (p. 3). In other words, as communication partners interact on an ongoing basis and have positive experiences, their relationship develops similarly whether they are communicating online or face-to-face.

Just as Johnson (2001) advocates for facilitation and scaffolding within the community of practice, the research on e-mentoring echoes the recommendation. While online communities of practice and e-mentoring systems primarily use these forms of discourse, new communications technologies, such as audio tools, synchronous text communication, and videoconferencing, are emerging and prompting new research.

Mentoring promotes benefits that extend beyond only the new teachers served. Darling-Hammond (2003) advocates that “veterans need ongoing challenges to remain stimulated and excited about the profession. Many say that mentoring and coaching other teachers creates an incentive for them to remain in teaching as they learn from and share with their colleagues” (p. 12). Experienced teachers can feel as though they are making valuable contributions to their school culture and to the individual development of their assigned novice. As Moir (2009) concludes, “successful induction programs incorporate both the passion of new teachers and the expertise of experienced teachers to ensure that all students in America receive the best education” (p. 19). The relationship between mentors and their mentees can indeed be symbiotic.

### Induction Curriculum

An induction curriculum includes the professional development activities designed to further shape novice teachers’ beliefs, knowledge, and instructional repertoire. In some cases, comprehensive induction implies the context-specific support that school districts provide to introduce new teachers into their school culture. Along with the online, content-specific mentoring provided through eMSS, novice teachers’ professional development may be supplemented by district efforts to induct the new teacher into the local context. For the purposes of this study, research on the features of induction programs most consistent with instructional support and improvement is reported.

In her study of different induction programs, Luft (2009) found that content-specific induction curricula strengthened teachers’ instructional practices and that “there

should be ongoing discussions in the program about the teaching of the content area” (p. 2380). That is, the induction curriculum should be thoughtfully designed to complement and extend the collaborative work between mentor and new teacher. Though much of the research on induction programs focuses on the mentoring relationship (i.e. Evertson & Smithey, 2000; Fletcher & Barret, 2004; Stanulis & Ames, 2009; Stanulis & Floden, 2009), Luft contends that the mentoring relationship alone is not enough.

Indeed, the National Science Teachers Association position statement identifies an induction curriculum as a key element of a comprehensive induction program. NSTA (2007) advocates for:

the inclusion of a planned and intentional set of learning activities for mentees during the course of the program. This ‘induction curriculum’ anticipates what mentees want and need to learn, and identifies the resources and activities necessary to support each mentee’s growth and development. These resources and activities can take the form of modules, workshops, interactive group activities, tools for regular mentor/mentee collaboration or combinations of these activities. (p. 2)

Novice teachers’ need for professional development extends beyond a collaborative relationship with a mentor. Both NSTA and NCTM advocate for an induction curriculum that advances new teachers’ content knowledge, pedagogy, and management strategies.

The eMSS induction curriculum includes structured activities in several areas: Our Place, Explorations, Dilemmas, Topic of the Month, Mentor Place, and Content Areas. As Simonsen, Luebeck, and Bice (2009) found in their analysis of online discourse in eMSS, “the program provided three major avenues for addressing issues of content and pedagogy: instruction, resources, and reflection” (p. 4). The alignment of these avenues to the distinct discussion areas in eMSS is summarized in Table 2.2. In

Our Place, the new teachers and mentors engage in private discussions about their classroom experiences and guided discussions related to their context. The Explorations are conversation guides that are focused on new teachers' self-selected, classroom-based topics to guide them, with the support of mentors, to deepen their teaching practice and their effectiveness with students. Dilemmas provide short, open-ended scenarios that pose questions about specific teaching issues and engage mentors and new teachers in a lively discussion with a wide range of ideas and perceptions. Topics of the Month focus discussions on research and best practices in mathematics and science education. These facilitated and structured discussions offer beginning teachers an opportunity to examine relevant topics and explore pedagogical content strategies. Mentor Place is a discussion forum for the larger group of mentors and offers ongoing professional development and support for mentors. Finally, in the Content Areas mentors and content specialists such as research scientists and mathematicians are available to engage in conversation, provide resources, and answer questions. In this way, eMSS is structured to provide activities within and beyond the mentoring relationship to build novice teachers' content knowledge and instructional repertoire.

### Focus on Instruction

Induction programs engage novice teachers in professional development experiences that advance their instructional practice. A model of "educative mentoring" has emerged from recent research by Feiman-Nemser and her colleagues (1998, 2001). According to Feiman-Nemser (1998), educative mentoring is "mentoring that helps novices learn to teach and develop the skills and dispositions to continue learning in and

from their practice” (p. 66). Educative mentoring differs from earlier mentoring models in that it frames the interaction of mentor and novice teacher within the context of examining teaching authentically. A mentor is not simply an individual who provides emotional support or a role model to emulate; rather, mentors scaffold new teachers in their inquiries into their teaching practice.

Educative mentoring requires a unique skill set on the part of the mentor.

Bradbury, in her 2010 review of the literature on educative mentoring, outlines three themes of mentor behaviors: “respecting the developmental level of the novice, using teaching as a site for situated inquiry, and striking a balance” between the immediate needs of the novice teacher and a broader goal of lifelong reform-based teaching (p. 1053). The educative mentor recognizes that professional learning for novice teachers occurs along a developmental progression. Novice teachers’ pre-service backgrounds may be diverse, so flexibility on the part of the mentor is critical. As Bradbury contends, educative mentoring “prioritizes reflection and continued growth” on the part of the novice teacher (p. 1050). Educative mentors recognize their mentees as individuals and guide them to examine their beliefs about teaching and learning, reframe problems of practice from new perspectives, and offer assistance in content-specific dilemmas.

In an educative mentoring model, mentors collaborate with novice teachers to advance their teaching in situ. Bradbury (2010) explains, “mentors must model the characteristics of adopting an analytic stance toward teaching practice, using student thinking and work as a source of knowledge, connecting theory and practice, and using the expertise of both partners to develop new ideas” (p. 1056). Equipping novice

teachers with analysis-of-practice skills through modeling and scaffolding is an important activity for mentors.

### Formative Assessment and Evaluation of Practice

Comprehensive induction programs structure opportunities for novice teachers to receive feedback on their instructional practice. In many cases, a primary aspect of the mentor's role is to observe novice teachers' classroom practice. Moir, in her 2009 position statement on the lessons learned from implementing induction programs through the New Teacher Center, contends that a key feature of the mentoring model involves mentees who are "matched with exemplary teachers who analyze their practice and, using classroom data, offer constructive suggestions for improvement" (p. 16). Though the research base on the effects of mentors' classroom observation feedback is relatively limited, related research with pre-service teachers and experienced teachers highlights some outcomes that may be realized in induction programs.

There exists much variation in the research literature with regard to the stated intentions of classroom observations and instructional feedback with different groups of teachers. Early research with pre-service teachers as the subjects (e.g. Bunton, Stimpson, & Lopez-Real, 2002; Soares & Lock, 2007) tends to stress the evaluative quality of feedback from mentors. For instance, qualitative research on written observation notes by Bunton and his colleagues (2002) documents four broad categories for the content of the notes: descriptive, questioning, evaluative, advisory. Of these four categories, evaluative and advisory comments were present in all of the lesson observations. Bunton and his colleagues, through interviews with the pre-service subjects who received this

feedback, concluded that the pre-service teachers “want detailed written comments, including advice, suggestions and encouragement” (p. 243). In their research with pre-service teachers, Soares and Lock (2007) similarly find that their subjects sought critical feedback. They conclude, “we agree with the sentiments expressed by these pre-service teachers that the key element should be accompanied by an evaluative comment” (p. 86). When considered in the context of educative mentoring, however, evaluative feedback may not support the goal of instructional inquiry on the part of the novice teacher.

An alternative to evaluative feedback, which appears to be better aligned with educative mentoring, is disciplined inquiry. Hiebert, Morris, Berk, and Jansen (2007) propose a framework for this disciplined inquiry and contend, “in the absence of empirical and theoretical support for traditional forms of teacher preparation, it is appropriate to consider alternatives” (p. 47). They argue that it is not possible for pre-service teachers to learn all that is critical for effective instruction in teacher training programs, but that equipping them with skills to learn from their teaching is a superior model. The framework Hiebert and her colleagues outline includes four key components of analyzing instruction that warrant deliberate attention: specifying the learning goals, conducting empirical observations of student learning, constructing hypotheses about the effects of teaching on students’ learning, and proposing improvements to teaching. In this way, the framework “focuses reflective practice squarely on the relationships between instructional practices and students’ achievement of the intentional learning goals” (p. 50). This framework is similar to schemes used in empirical research conducted by Borko, Jacobs, Eiteljorg, and Pittman (2008) and Santagata, Zannoni, and

Stigler (2007), but has advantages over these two approaches. The Borko et al. framework examines the teacher's role and expounded on students' thinking, lacking the specific delineation of the intentional learning goals. The Santagata et al. framework includes three components for analysis: goals of the lesson, student learning, and teaching alternatives, each of which does not require teachers to reflect as deliberately on how the teaching supported or detracted from students' learning. Models of mentoring that support the development of these analysis-of-practice skills have been described and tested with pre-service and in-service teachers alike.

Programs that incorporate face-to-face mentoring in the service of disciplined inquiry have been studied with pre-service teachers and novice teachers. In her work with mentors and their pre-service teachers, Timperley (2001) finds that "mentors are able to improve the quality of their conversations with their student teachers in ways that are likely to enhance the professional learning of the student teachers if they are given the training in how to do so" (p. 122). Timperley's training focused on strategies for structuring dialogue with student teachers to collaboratively address strengths and problems and using observed data to support the claims.

In a controlled study, Stanulis and Floden (2009) investigated the impact on novice teachers of an induction program that incorporated mentor feedback in a model of disciplined inquiry. They found significant differences between the treatment and control groups and conclude, "intensive mentoring focused on balanced instruction improved teaching practice, as measured by an observation tool aligned with the specific program goals" (p. 120). In a subsequent study, Stanulis, Little, and Wibbens (2012) examined

the influence of intensive mentoring on the implementation of text-based discussions to promote higher-order thinking. Stanulis and her colleagues found durable benefits to disciplined inquiry facilitated by the mentors, “the mentoring intervention studied here had an effect on beginning teachers’ practice in leading classroom discussions after one year in the mentoring program” (p. 40). With targeted professional development complemented by classroom observations framed by disciplined inquiry, novice teachers may experience lasting improvements to their instructional practices in ways consistent with the goals of an induction curriculum.

Four components of the eMSS mentoring program: mentors, the induction curriculum, a focus on instruction, and formative assessment and evaluation of practice have been explored through recent research on various programs throughout the literature base. Mentoring, particularly educative mentoring, has been shown to enhance novice teachers’ disciplined inquiry skills and reflectivity on their classroom practice. The importance of a curriculum of learning activities for novice teachers is underscored by national organizations’ position statements and recent research. The eMSS induction curriculum is multifaceted and central to the interactions between participants in the program. Mentors have structured and unstructured opportunities to focus on instruction systematically in their work with eMSS novice teachers. Finally, through ongoing, joint disciplined inquiry, mentors can formatively assess and evaluate the practice of their mentees. In the next section, Anticipated Impact, specific research-based outcomes that may arise from this research will be analyzed.

### Anticipated Impact

Proposing changes to an established program requires an analysis of the research base and the identification of compelling reasons to pursue modifications. The review of the literature on common features of induction programs validates the overall alignment of the eMSS program with contemporary research on professional development programs for novice teachers and mentors. Yet, until 2010, mentees' classrooms were not visible to mentors, thus removing the possibility of focused discussion of an observed lesson that lies at the heart of many educative mentoring programs. Adding lesson observations followed by structured dialogue between mentors and mentees has the potential to affect a variety of outcomes for mentors and novice teachers. In this section, outcomes related to changes to the designed and enacted community of practice, increased focus on disciplined inquiry in the mentoring relationship, development of novice teachers' analysis-of-practice skills, refinement of mentors' educative mentoring stance, and improved instructional practice on the part of mentees will be explored. Though not all will be directly measured in the present research study, these outcomes foreshadow future research endeavors.

### Changes to the Designed and Enacted Community of Practice

Online communities of practice are dependent on communications technologies to establish and maintain the relationships between their members. Wenger et al. (2009), in their text on designing digital habitats to cultivate communities of practice, advocate for attention to be paid to digital habitats, that is:

How communities use technology, how they are influenced by it, how technology presents new learning opportunities for communities, and how communities continue to assess the value of different tools and technologies over time, and even how communities influence the use of technologies. (p. 12)

Their perspective highlights the dynamic interrelationship between the online space, or a digital habitat, in which communities work and how the provisions of that online space influence the social behavior of community members. Changes to the digital habitat influence the social interaction of individuals in that community.

Traditionally, online communities of practice relied primarily on communications technologies such as e-mail, threaded discussions, and repositories for documents and other artifacts (Bennett, Hupert, Tsilalas, Meade, & Honey, 1998; Ensher et al., 2002; O'Neill, 2004). There are now countless new communications technologies that are potentially useful to established communities of practice. Wenger et al. (2009) note that “today’s technology market is a kind of candy store for communities: it has an abundance of resources that can be useful to communities – to meet needs that may or may not be recognized” (p. 68). Communities of practice that have existed within the boundaries of early technologies have evolved to accommodate to and compensate for these limitations. New technologies exist that could better serve the communities and their members.

A new challenge has arisen: with the plethora of choices, which communications technologies should be implemented to cultivate a stronger community of practice? The research base on e-mentoring includes recommendations regarding “frequent and regular interaction” (Bierema & Merriam, 2002, p. 214); “multiple methods of contact” (Ensher et al., 2003, p. 294); and paralleling the “spontaneity” observed in face-to-face mentoring

situations (O'Neill, 2004, p. 184). These identified needs can be addressed in a multitude of ways by communications technologies that are readily available. However, Wenger et al. (2009) caution, "it presents both opportunities and challenges for communities: the potential to expand the experience of communities beyond our imagination and the risk of tearing things apart when the rate of change exceeds the community's capacity to adapt" (p. 173). With every change to a community's habitat there is augmentation of how the community members interact together. Changing too much within the community's habitat risks overwhelming the community members and distracting them from their purpose for joining together.

In 2010-2011 and 2011-2012, webcam observation and debrief cycles were piloted in the eMSS program. Through the course of the 2011-2012 implementation, webcam observation and debrief cycles will be systematically studied and refined. Recent research (e.g. Taylor, 2007 and McAleer, 2008) and annual program evaluations have indicated that the established mentoring curriculum and mentor and facilitator training protocols are effective for cultivating participation and professional growth through primarily text-based communications within the e-mentoring platform. However, program evaluations have revealed that the volume of text-based messages is increasing rapidly and that mentees may feel overwhelmed. Incorporating an alternative medium for interaction between mentors and new teachers may help to provide a consistent or increased level of support while mitigating the issue of unwieldy text-based discussion areas. On the whole, incorporating webcam observations may make e-

mentoring relationships more congruous to the activities that can occur with face-to-face educative mentoring.

#### Increased Focus on Disciplined Inquiry in the Mentoring Relationships

In addition to opening an alternative avenue for mentor and novice teacher communication, there are other anticipated benefits to incorporating webcam observation cycles into the eMSS program. Though there is a dearth of research on webcam observation cycles between mentor and novice teachers in an established e-mentoring program, research in related domains foreshadows some potential benefits. Various uses of video analysis in the service of disciplined inquiry have been studied. These range from video-supported self-reflection programs in which participants inquire into their own teaching practice, to video clubs in which groups of teachers meet to jointly inquire into a colleague's instructional practice, to professional development activities in which participants inquire into the practice of a stranger. Findings from research on these programs follow.

The research on using video analysis to prompt self-reflection on instructional practice seems to be dominated by studies with pre-service teachers as the subjects. The introduction of disciplined inquiry into professional development programs for teachers can be facilitated by the affordances of video technology. Teachers can videotape their classroom practice and review the recording multiple times in order to collect data or reflect on their instructional decisions. In their cross-case analysis of pre-service teachers, Rosaen, Lundeberg, Cooper, Fritzen, and Terpstra (2008) find that teachers

make more specific observations, discuss instructional elements more, and focus on children more than themselves when they reflect on video of their teaching practice as compared to when they reflect without the use of video directly after the teaching episode. Rosaen and her colleagues summarize that “the use of video to reflect on teaching slows performance down and thus facilitates specific and detailed noticing” (p. 357). By videotaping their practice, novice teachers can capture key moments in their instruction and replay them multiple times to further inquire into the effects of their instructional decisions on student learning.

Kong (2010) has similar findings in her study of pre-service teachers using a video system in which they could view and annotate classroom video to guide reflection. She finds that the participants “engaged in deeper self-reflection after browsing videos of their own teaching” (p. 1778). Kong also finds that teachers focus on concrete evidence and that the volume and depth of their reflective notes increases significantly when viewing video. Though the findings are promising, Kong identifies the importance of further supporting disciplined inquiry using video analysis. She advocates for additional research to “further investigate the synergy of professional mentoring and self-reflection with the use of web-based video technology to enhance the teaching quality of [teachers] in every key aspect of teaching competence” (p. 1781). Indeed, educative mentoring paired with video-based analysis-of-practice seems to be an apt match to promote disciplined inquiry for novice teachers.

Development of Novice  
Teachers' Analysis-of-Practice Skills

In addition to utilizing video analysis to support novice teachers' use of disciplined inquiry, enhancing video analysis skills has become a cornerstone of professional development activities. Since eMSS mentors are modeling and scaffolding analysis-of-practice skills in the disciplined inquiry process with their novice teachers, the key features and outcomes of these programs are worth noting.

Research on analysis-of-practice professional development activities that use classroom videos exists for both pre-service and in-service teachers. In their study of pre-service teachers engaged in a lesson analysis course, Santagata et al. (2007) evaluate the characteristics of participants' pre- and post- course video analyses. These analyses were coded using a scheme of five dimensions related to the framework that guided the development of the course, "(1) Elaboration; (2) Links to Evidence; (3) Mathematics Content; (4) Student Learning; and (5) Critical Approach" (p. 129). Santagata and her colleagues find that pre- and post- course video analyses differ significantly with regard to all five dimensions. Overall, teachers elaborated and provided greater reasoning for their statements, made reference to specific evidence from the video, discussed instructional content and pedagogical approaches, commented on students' learning, and proposed alternative teacher actions significantly more after the training. Santagata and her colleagues conclude, "in a relatively short period of time, [teachers]... improved their analyses of teaching by moving from simple descriptions of what they observed to analyses focused on the effects of teacher actions on student learning as observed in the

video” (p. 138). Structured professional development activities can strengthen teachers’ skills for disciplined inquiry.

### Refinement of Mentors’ Educative Mentoring Stance

The role of a mentor requires distinct skills that do not necessarily develop spontaneously. As Evertson and Smithey (2000) contend, “if we are to support new teachers as they learn to teach, then attention to what mentors know and how they support protégés’ practice is of paramount importance” (p. 303). The call for professional development for mentors resounds throughout the literature base.

Professional development for mentors, aligned with educative mentoring principles, may strengthen mentors’ skills for scaffolding and supporting disciplined inquiry with their novice teachers. Several research studies (e.g. Evertson & Smithey, 2000; Giebelhaus & Bowan, 2002; Gordon & Brobeck, 2010; Kasprisin et al., 2003; Stanulis & Ames, 2009) identify the outcomes of mentor professional development programs. These outcomes include the strengthening of mentors’ skills in using observation and evidence, and improving mentors’ conferencing skills.

Professional development for mentors can inculcate the skills of educative mentoring. In their action research study of an experienced teacher who learned to coach mentor teachers participating in an induction program, Stanulis and Ames (2009) identify that “observation and evidence were important elements in supporting the development of teaching practice and the work of mentoring” (p. 36). Over the course of the research

study, the mentor-coach developed these skills within herself and the individuals with whom she worked.

In addition to observation skills and a focus on evidence, mentors can strengthen their conferencing skills through professional development. In their controlled study of mentors who participated in a professional development workshop and those that did not, Evertson and Smithey (2000) find significant impacts on trained mentors. They report, “trained mentors also demonstrated superior conferencing skills, including more awareness of protégés’ needs to analyze their own teaching before being offered solutions” (p. 303). Given the importance of prompting self-reflection within novice teachers, as advocated in educative mentoring, effective professional development for mentors can offer important outcomes.

Specific to the eMSS program, several studies (e.g. McAleer 2008; Taylor, 2007) and program evaluations underscore the importance of ongoing mentor professional development. In her study of professional development for discussion facilitators in the eMSS program, Taylor (2007) found that structuring training to address the goals and philosophy of the program was critical. She contends, “This focus gave facilitators a common framework from which to work as they embarked on their duties to encourage and promote high quality dialogue” (p. 257). Working from a common understanding of the rationale, the participants in the study had a clearer conception of the program expectations and their responsibilities to reach them.

In her study of mentor outcomes in the eMSS program, McAleer (2008) found that mentor growth does not depend on activities specifically designed for the mentors.

Rather, the act of mentoring itself leads to positive impacts on the professional development of mentor teachers. McAleer (2008) concluded that mentor professional growth “occurred despite the fact that the eMSS program was not purposefully designed with the professional development needs of experienced mathematics teachers in mind, other than their need to learn online mentoring skills” (p. 220). Though incidental benefits for mentor teachers are inherent in the mentoring process, addressing the specific professional development needs of mentor teachers reaps benefits for mentors and novice teachers alike.

The skills mentors can develop in service to their mentees are applicable beyond the mentoring role; they support the improvement of teaching as well as the refinement of mentoring. As Feiman-Nemser (1998) claims, “the tools of mentoring – observation, co-planning, co-teaching, joint inquiry, critical conversation and reflection – are also the tools of continuous improvement in teaching” (p. 73). Indeed, the benefits of mentor professional development impact both mentees through the mentoring relationship, as well as the mentors’ own teaching practice.

#### Improved Instructional Practice on the Part of Mentees

Induction programs are designed to enhance the effectiveness of novice teachers. Outcomes related to mentees’ content knowledge and classroom practice can be supported directly through mentoring and participating in the induction curriculum and indirectly through mentor professional development.

Induction activities, including educative mentoring, that develop disciplined inquiry and support the development of novice teachers' analysis-of-practice skills, have ancillary benefits that include their enhanced content knowledge and improved instructional practice. For instance, in a study of in-service elementary science teachers, Roth, Garnier, Chen, Lemmens, Schwille, and Wickler (2011) find that analysis-of-practice professional development contributed to their science content learning. Likewise, Santagata (2009) and Borko et al. (2008) study the design and redesign of a mathematics professional development programs that utilize video analysis to support participants' development of mathematics content, understanding of student misconceptions, and ability to analyze students' reasoning. As these studies suggest, the content learning of eMSS mentees may be strengthened as they participate in webcam observation cycles.

In addition to building content knowledge, individuals who develop analysis-of-practice skills may also be more likely to attend to students' thinking and reasoning. In their study of in-service teachers participating in a video club, Sherin and Han (2004) find that the teachers "learned to pay more attention to students' ideas both when watching video and during instruction" (p. 180). In a subsequent study, Sherin and van Es (2009) make a similar finding. It appears that teachers who rehearse disciplined inquiry in the context of video analysis are prepared to bring these habits of mind back to the classroom where they continuously make instructional decisions.

While impacting mentors' skills is a worthwhile benefit to mentor professional development, mentees' skills in planning, instruction, and reflection on practice can be

indirectly impacted as well. Evertson and Smithey's controlled study (2000) documents outcomes for novice teachers with whom trained mentors worked. As they report, "this study provides evidence that preparing mentors for their task does enable them to be more successful if *success* is defined as supporting protégé's success" (p. 302). As compared to the control group, the mentees of the mentors who participated in the professional development scored higher ratings on classroom instruction indicators observed by independent evaluators.

These results are also supported by a controlled study of pre-service teachers whose mentors either participated in training or did not. Gibelhaus and Bowman (2002) report that the pre-service teacher participants who were assigned to mentors who participated in the professional development "demonstrate more compete and effective planning, more effective classroom instruction, and greater reflectivity on practice than those whose cooperating teachers received only the orientation" (p. 250). Mentors who participate in professional development that is aligned with the principles of disciplined inquiry and educative mentoring can more greatly impact their mentees' instructional practice.

### Conclusion

Taken as a whole, eMSS is a content-specific, online mentoring program that includes some induction components, offers educative mentoring, supports disciplined inquiry, and provides ongoing, targeted professional development for mentors. The implementation of webcam observation cycles into this established program espouses

common principles and can lead to meaningful outcomes on the part of novice teachers and mentors alike. These outcomes may include an enhancement of the overall community of practice, an increased focus on disciplined inquiry in the mentoring relationship, development of novice teachers' analysis-of-practice skills, refinement of mentors' educative mentoring stance, and improved instructional practice on the part of mentees.

Table 2.1. Relationship of Components of Comprehensive Induction Programs (Glazerman, et al., 2008) to e-Mentoring for Student Success

Components of Comprehensive Induction Programs	Design of the e-Mentoring for Student Success Program
<ul style="list-style-type: none"> <li>Carefully selected and trained full-time mentors</li> </ul>	<p>eMSS recruits and prepares e-mentors to support novice teachers in the program. Mentors are not released from their teaching responsibilities (if any) but receive a stipend to compensate them for their time.</p>
<ul style="list-style-type: none"> <li>Curriculum of intensive and structured support for beginning teachers that includes an orientation, professional development opportunities, and weekly meetings with mentors</li> </ul>	<p>eMSS offers a structured curriculum through its virtual meeting places: Our Place, Explorations, Dilemmas, Topic of the Month, and Content Areas. Mentors and mentees interact several times weekly.</p>
<ul style="list-style-type: none"> <li>A focus on instruction, with opportunities for novice teachers to observe experienced teachers</li> </ul>	<p>The eMSS curriculum is focused on discipline-specific pedagogy. In the future, webcam observations may be used to offer opportunities for mentees to observe their mentors.</p>
<ul style="list-style-type: none"> <li>Formative assessment tools that permit evaluation of practice on an ongoing basis and require observations and constructive feedback</li> </ul>	<p>eMSS webcam observation cycles, in this pilot program, engage mentors and mentees in joint, disciplined inquiry into mentees' classroom practice.</p>
<ul style="list-style-type: none"> <li>Outreach to district and school-based administrators to educate them about program goals and to garner their systemic support for the program</li> </ul>	<p>eMSS is increasingly collaborating with districts to align the program with district induction requirements.</p>

Table 2.2. Discussion Areas in e-Mentoring for Student Success that Provide Avenues for Addressing Issues of Content (Simonsen et al., 2009).

Discussion Area	Instruction	Resources	Reflection
Our Place: A private area designed for three to six mentees to work with their assigned mentor. Mentees participate in guided discussions about their teaching practice with an experienced teacher in the same grade and subject.	X	X	X
Explorations: Self-selected small groups examine pedagogical or content practices that can be applied directly to the classroom. A foundational part of eMSS, this is a structured and facilitated curriculum, which guides participants through a plan/prepare, teach/assess, and reflect/analyze cycle.	X	X	X
Dilemmas: Short, open-ended scenarios pose a question about a specific teaching issue for mentees and mentors to consider. These lively discussions provide mentees with a wide range of ideas and perspectives.	X		X
Topic of the Month: A facilitated and structured discussion based on research and best practices in math, science, and special education. Topics of the Month offer beginning teachers an opportunity to examine relevant topics in their teaching practice and explore pedagogical content strategies.	X	X	X
Content Areas: A community of teachers, teacher leaders and practicing mathematicians, scientists, and special education university professors are available to provide resources and answer questions.	X	X	
Mentor Place: Discussion forums for larger groups of mentors. Mentor Place offers ongoing professional development and support for mentors.	X	X	X

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CHAPTER THREE

LEARNING FROM ONE'S OWN TEACHING:  
NEW SCIENCE TEACHERS ANALYZING THEIR PRACTICE THROUGH  
CLASSROOM OBSERVATION CYCLES

Contribution of Authors and Co-Authors

Manuscript in Chapter 3

Author: Jennifer A. Ceven

Contributions: Conceived the study, collected and analyzed output data, and wrote the manuscript in regular consultation with Committee members, who served as research team members. Collaborated with Committee members for guidance, feedback, and advice on successive manuscript drafts.

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Abstract

The first three years of science teachers' careers is an especially formative period, yet there remains only a limited literature base to support teacher educators who work with this population. Teachers in the induction phase benefit from professional development experiences that support them as they continue to learn about teaching by analyzing their own teaching experiences. The context of this qualitative study is the implementation of video recorded classroom observations within an established distance mentoring program, e-Mentoring for Student Success (eMSS) (Jaffe, Moir, Swanson, & Wheeler, 2006). These observations were designed to include a cycle of three activities: a pre-observation discussion in which the mentor-mentee pair set a focus for the observation, the sharing of a video recording of a short classroom episode, and a post-observation discussion in which mentor and mentee analyzed evidence from the video in light of the observation focus and determined an action plan of next steps for the new teacher to implement. Studying the dynamic interactions between mentors and mentees as they inquired into specific aspects of teaching and analyzed evidence from the classroom episode helped to identify the conditions that supported such collaboration and the impacts it had on mentees' professional growth. For science teacher educators who work with teachers in their induction years, this study suggests that observation cycles are an important activity to support teachers as they learn from the act of teaching, and can be incorporated into a mentoring program, whether it occurs at a distance or face-to-face.

Keywords: science teacher education, induction, mentoring, teacher education-practicing teachers, professional development, video-based analysis-of-practice

### Introduction

A significant proportion of science teachers in the United States are new to the profession. Indeed, the National Center for Education Statistics (2007) researchers estimate that the population of science teachers with one to three years' experience represents 19% of all science teachers in public middle and high schools. These teachers are in the induction phase of teaching and have professional development needs that are distinct from pre-service and in-service teachers (Luft, Firestone, Wong, Ortega, Adams, & Bang, 2011). Induction programs, which are designed to support early career teachers as they transition from their pre-service preparation to the full responsibilities of the classroom, are of varying quality and have differing impacts on teacher quality and career longevity (Glazerman et al, 2010; Luft, 2009; Wang et al., 2008).

While comprehensive induction programs that are targeted to the instructional needs particular to science teachers have been shown to be superior to induction programs without a disciplinary focus, there remains little research on the specific activities during the induction phase that promote teachers' development (Luft et al., 2011; Luft, 2009; Wang et al., 2008). Luft and her colleagues (2011) make a strong plea for education researchers to study the work of teacher educators who provide professional development experiences for early career science teachers. As Luft and her colleagues (2003) indicate, not only do science teachers face challenges common to all new teachers, but they also have the added complexity of "implementing inquiry lessons, planning and managing laboratory instruction, and fostering an understanding of the nature of science among students" (Luft, Roehrig, & Patterson, 2003, p. 79).

This study responds to Luft's call by examining a particular professional development activity for new science teachers: their interactions with assigned mentors as they engage in video recorded observations and the accompanying discussions before and after the classroom episode. The context of the study is e-Mentoring for Student Success (eMSS), a longstanding, online, content-specific mentoring program offered by the New Teacher Center. While the present study illuminates an activity as it occurs in a unique professional development context (e-mentoring), the structure is consistent with the New Teacher Center's face-to-face mentoring model, so the findings are also applicable to a variety of mentoring scenarios.

### Theoretical Framework

The framework for this study is aligned with Feiman-Nemser's (2010) perspective that the induction phase is a unique and critical stage in the progression of becoming a skilled teacher. According to Feiman-Nemser, for early career teachers "induction brings a shift in role orientation and an epistemological move from knowing about teaching through formal study to knowing how to teach by confronting the day-to-day challenges" (p. 1027). The induction phase presents a unique context for professional development in that teachers are learning to teach while teaching. Professional development for teachers in the induction phase should include activities that engage teachers in actively learning from their teaching experiences.

Confronting the challenges of teaching requires new teachers to refine their skills and shape their mindsets to advance in the classroom and fully participate in the school

community. Feiman-Nemser (2001) proposes that in the induction phase, teachers should work on:

Turning confusions into questions, trying something out and studying the effects, and framing new questions to extend one's understanding. Such work depends on skills of observation and analysis and the dispositions to seek evidence, take risks, and remain open to different interpretations. (p. 1030)

The types of experiences that Feiman-Nemser describes may best be characterized as disciplined inquiry, or investigating how one's teaching can be improved by carefully studying a specific aspect of teaching practice. Hiebert and his colleagues (2007) outline four primary skills of disciplined inquiry: specifying the learning goals, conducting empirical observations of teaching and learning, constructing hypotheses about the effects of teaching on students' learning, and using analysis to propose improvements in teaching.

It is interesting that many of the research studies that investigate disciplined inquiry incorporate the use of video recordings of classroom episodes. Though they use terms such as "reflect" and "notice" rather than "analyze," researchers seem to indicate that video recordings of teaching practice facilitate learning from practice (e.g. Kong, 2009; Rosaen et al., 2008). This is especially true when teachers view video of their own practice. For instance, there seems to be a benefit to using video recordings of one's own teaching practice as compared to analyzing teaching in the absence of a recording. Rosaen, Lundeberg, Cooper, Fritzen, and Terpstra (2008) found that teachers made more specific observations, discussed instructional elements more, and focused on children more than themselves when they reflected on video of their teaching practice as

compared to when they reflected without the use of video directly after the teaching episode. They summarized that “the use of video to reflect on teaching slows performance down and thus facilitates specific and detailed noticing” (p. 357). Teachers who videotape their practice can capture key moments in their instruction and replay them multiple times to further inquire into the effects of their instructional decisions on student learning.

Though their research focused on pre-service teachers participating in a lesson analysis course, Santagata and her colleagues (2007) illustrate that disciplined inquiry is a valuable approach to becoming adept at analyzing teaching. These researchers found that pre- and post-course video analyses differ significantly with regard to five dimensions of disciplined inquiry: the degree of focus on concrete evidence from the teaching episode, identification of student content learning goals, analysis of student opportunities for learning, critical evaluation of teaching, and a commitment to alternative approaches. Overall, teachers elaborated and provided greater reasoning for their statements, made reference to specific evidence from the video, discussed instructional content and pedagogical approaches, commented on students’ learning, and proposed alternative teacher actions significantly more after the training. It appears that disciplined inquiry can be a means through which teachers learn to continually analyze their teaching. Since this is a primary aim of professional development for science teachers in the induction phase, activities that support disciplined inquiry should be foundational to induction programs.

Given that learning from one's own teaching is difficult to accomplish independently, support from an experienced teacher, particularly a mentor, may be beneficial. Video recorded classroom observation cycles may be a means through which early career teachers engage the support of a mentor to practice such analysis in a structured environment so that they develop the necessary skills to independently learn from the day-to-day act of teaching. Not only do classroom observation cycles represent the potential to equip new teachers with the skills to drive their lifelong professional development, but the approach may benefit mentor teachers as well. Feiman-Nemser (2001) summarizes the role of the mentor in induction phase activities:

As they hone their skills of observation and analysis, coaching and assessment, collaboration and inquiry, mentor teachers are developing the tools for the study and ongoing improvement of teaching with fellow teachers. In this way mentor teachers become a resource for schools and districts as well as for teacher education programs. (p. 1037).

When new teachers and their mentors collaborate to inquire into instructional practices, both partners learn in and from the day-to-day act of teaching.

### Methods

This study was a qualitative investigation into the interactions between mentors and mentees as they engaged in an intensive pilot program to implement video recorded observation cycles into an established e-mentoring program. A social constructivist worldview framed the study along with the goal of inductively generating an understanding of what it meant to participate in the program from the perspective of both mentor and mentee (Denzin & Lincoln, 2005). The value and outcomes of classroom

observations, in terms of mentee and mentor development, likewise emerged from the data. These methods also supported program evaluation and refinement in that these data illuminated the degree to which the planned design of observations was actualized by mentors and mentees. In addition, it offered participants' insights into possible refinements that would further advance the program.

Observing instructional practice and providing feedback is a staple of many professional development programs for teachers. However, it often occurs without much planning or forethought (e.g. Denton & Hasbrouck, 2009). In these cases, observers tend to revert to one of two types of feedback: lesson design assistance typical of support provided to pre-service teachers or evaluative comments characteristic of summative teacher appraisals conducted by supervisors. For this study, observations of teachers' practice were intended to support disciplined inquiry. That is, mentors and mentees conducted classroom observations around a focus question and used evidence from the classroom episode to support mentees' self-assessment and instructional self-adjustment.

To accomplish this, a classroom observation cycle was designed that involved three parts: pre-observation discussion, observation, and post-observation discussion, as shown in Figure 3.1. First, in the pre-observation conversation, the mentee identified the focus of the observation, framed it as a focal question, determined the data the mentor would collect, and discussed the instructional plan for the lesson. Then, the mentee videotaped the classroom episode and shared it with his/her mentor. Finally, the mentor and mentee engaged in a discussion to review the evidence in the video as it related to the

focus of the observation, and determined an action plan of next steps for the mentee's future actions. The guiding questions that framed this study were:

- What are the characteristics of the interactions among mentors and new science teachers as they engaged in observation cycles before and after mentor professional development promoting disciplined inquiry?
- What benefits do mentors and mentees identify when they discuss observation cycles?

### Context and Participants

The context for this research, e-Mentoring for Student Success, originated from a five-year National Science Foundation award to the National Science Teachers Association, the New Teacher Center, and Montana State University. Throughout its decade-long history, eMSS has expanded to provide content-specific induction for early career science, mathematics, and special education teachers in 50 states. The program offers a variety of mentor professional development activities and supports as well as mentee activities (Figure 3.2). Mentees interact with mentors and mentees in structured and unstructured discussions related to their specific contexts (Our Place), particular classroom scenarios (Dilemmas), and science content and pedagogy (Content Areas). In addition, they explore professional development activities centered on best practices in science education through Explorations. These extended investigations into pedagogical or content practices involve mentees in planning, implementing, and reflecting on a classroom improvement. A more comprehensive description of the program philosophy

and design can be found in a chapter by Jaffe, Moir, Swanson, and Wheeler in Dede's 2006 text on online professional development for teachers.

A unique characteristic of eMSS is its ongoing and iterative approach to program design and mentor professional development. Mentee learning experiences are framed by a structured curriculum. The eMSS program involves facilitators, individuals who have received specific professional development, in the online learning environment to identify and respond to emerging needs among mentees and mentors. Facilitators are active contributors to discussions to prompt interaction and guide conversations. For mentors, eMSS provides summer and school-year professional development offerings aligned with topics identified through facilitation, program enhancement efforts, and mentor input. All mentors participate in a three-week online summer professional development sequence tailored to offer new topics as experienced mentors continue to participate in the program for multiple years.

The implementation of video recorded classroom observation cycles within the mentoring relationship involved seven mentors and eight mentees who agreed to pilot the use of observation cycles. Background information about the mentees and their mentors is summarized in Table 3.1. The participants represented the larger population of mentors and mentees in eMSS and exhibited great diversity in geographic location and teaching assignments. All mentees had less than three years' experience as a teacher of science (or mathematics, in one case) at the beginning of the 2011 school year. The mentees in the study represented a broad spectrum of development with some focused on foundational classroom management skills and others implementing sophisticated

inquiry-based investigations with their students. Five of the mentees were high school science teachers, two were middle school science teachers, and one was a middle school mathematics teacher. The mentors were assigned to the mentees upon entry into the eMSS program and pairs were matched with regard to their grade span and subject assignment. Mentors in this study had more than ten years of experience in their fields and had worked as eMSS mentors in previous years.

### Phases of Activities and Data Collection

The research study involved three phases of activities, as indicated in Figure 3.3. In this fully online mentoring program, mentors and mentees were hundreds of miles apart, so video recorded observations were designed to be as congruent with live, face-to-face observations as possible. Through the course of the 2011-2012 implementation, pre-observation discussions to focus the observation, video recorded observations, and post-observation debrief discussions were systematically studied and refined.

In the first phase of the study, experienced eMSS mentors participated in an online professional development sequence centered on video recorded classroom observations. This three-week sequence occurred during the summer and included webinars, readings, and a facilitated discussion area in which mentors accessed information and responded to prompts on topics such as: purposes for observation, video observations of beginning teachers, the observation planning conversation, collecting data during the classroom episode, and preparing for a reflective post-observation conversation. Participant teams consisting of a mentor and mentee pair were selected and demographic information was collected from existing eMSS pre-participation surveys.

As the first phase continued, mentor and mentee pairs scheduled and conducted their first observation cycle. The telephone interactions between mentors and mentees in their observation cycles were recorded, transcribed, and reviewed. These data included pre-observation telephone discussions, video recorded classroom observations, and post-observation telephone discussions. These data revealed that while several mentors were collecting data and sharing it with their mentees, all mentors still delivered direct, evaluative feedback typical of supervisory observations. Based on the observed behavior of the mentors and mentees during this cycle, the researcher designed a follow-up interactive professional development session for mentors.

The professional development session delivered in the second phase of the study was intentionally designed to require a minimal time commitment so as not to interfere with mentors' workload during the school year. Short seminars are characteristic of the ongoing mentor professional development in eMSS. These seminars are designed to iteratively address mentors' progress and emerging needs as they hone their practices. Since the professional development sessions are short in duration, they are manageable for mentors while they are balancing the demands of their mentoring and other roles. The online format also allows for scalability to reach dozens of mentors involved in eMSS.

This 90-minute professional development seminar framed classroom observations in the context of disciplined inquiry, defined in terms of five critical dimensions identified by Santagata and her colleagues (2007). These dimensions were modified to reflect the nature of interactions that may be expected of mentors and mentees as they engaged in classroom observation cycles. It was expected that interactions would: (a)

focus on evidence from the observation, (b) address specific mathematics/science learning goals, (c) analyze the relationship between teacher actions and student learning, (d) support the new teacher to critically evaluate the instructional episode, and (e) induce the new teacher to provide alternative teacher actions (Santagata, Zannoni, & Stigler, 2007). Mentors viewed video examples of a face-to-face mentor and mentee that approximated each dimension described above, reflected on their personal experiences with classroom observation, and set an action plan for how they would carry out their next cycle of observation discussions with their mentees. Since it was delivered as an interactive webinar session, it could be recorded to capture mentor communications.

Following the professional development session in the second phase of the study, participants scheduled a second classroom observation cycle with their mentees. After that debrief conversation, mentors completed a mentor reflection survey that elicited evidence regarding the degree to which the mentor believed he/she attempted each of the five dimensions in this discussion.

Finally in the third phase of the study, mentors and mentees were interviewed. The semi-structured interview sought to capture the experience of video recorded observation cycles from each individual's perspective. Interview questions prompted participants to comment on their opinions of the purposes and goals for the observation cycles, recall key points from each observation cycle, discuss the differences they noticed between the first and second cycles, consider the benefits for participating, and state any impacts on mentees' teaching practice that they could perceive.

### Data Analysis

Transcripts of the pre-observation and post-observation discussions between mentors and mentees were analyzed in light of the five aforementioned dimensions of disciplined inquiry as the basis for developing grounded theory. Coding of texts generated from observation cycles followed a somewhat informal process advocated by Peräkylä (2005). The observation discussion transcripts were read and reread to identify key themes related to the five dimensions of disciplined inquiry. The qualitative descriptions used in Santagata et al.'s (2009) research guided the selection and coding of utterances that related to each dimension. Participating mentors and mentees were assigned pseudonyms, which are used throughout the manuscript. Each mentor-mentee pair was treated as a case study to discern changes and trends between the first and second cycle of observations for each pair.

Then, each case study was analyzed alongside interview transcripts, the mentor professional development evaluation, and the mentor reflection to discover the relationship between these interaction profiles and participants' stated perspectives of the first and second observation cycles. The identified themes were examined across cases to form a collective case study to confirm and extend findings with regard to the five dimensions of disciplined inquiry. As Stake (2005) contended, with collective case study, cases within the collection "may be similar or dissimilar, with redundancy and variety each important" (p. 446).

## Results

To begin this discussion, findings are organized by the five dimensions of disciplined inquiry that framed this study. Additional emergent themes and new dimensions are then introduced and discussed. These additional findings suggest that classroom observation cycles also (a) provided more frequent opportunities for new teachers to receive feedback in a low-risk environment, (b) supported the development of strong mentor-mentee relationships, and (c) offered benefits for mentors as well.

### Focusing on Concrete Evidence

All of the participants discussed how engaging in observation cycles provided them the opportunity to discuss classroom episodes in concrete terms. Several themes emerged with regard to this dimension: having a window into mentees' classrooms benefitted both mentor and mentee, focusing on one aspect of the classroom episode responded to mentees' needs and made the process manageable for mentors, and a disciplined inquiry approach helped to steer observation cycles away from an evaluative approach typical of supervisory observation and toward an approach that supported mentees to learn about teaching from their own teaching practice.

Several mentors appreciated having the video as it provided a first-hand perspective about what was happening in their mentees' classrooms. Mentor Alissa said that teachers sometimes have a "warped idea about what's happening" and that the video allowed her to "actually see into the classroom, what was going on." Mentor Diana seemed to have a similar perspective when she said, "I can guess at what the problem is,

but actually seeing it makes it a whole lot easier.” The ability for a mentor to get an unfiltered perspective into the classroom was particularly helpful to Tom, who found that, “what I hear the mentees tell me in theory, in emails, in conversations and so forth, is often very different from what I see happen in the classroom.” Tom was speaking specifically about the discrepancy between the way his mentee described an inquiry approach to her physics instruction and how she actually enacted it in her classroom. Given the advanced teaching and learning strategies involved in implementing science inquiry, it is important for mentors to have an unfiltered window into mentees’ instruction to best support their development.

It seemed that watching the video recording of their own teaching provided a similar unfiltered awareness for mentees. Many mentees expressed that watching the video of their teaching practice was beneficial. Mentee Sharon, who was new to teaching after transitioning from a career as an industrial chemist said, “I was able to extract information just from looking at the videos” about how she sequenced the information that she delivered to her students throughout the course of a lesson on pH indicators. Mentee Karen seemed to agree when she said, “by watching myself, it was helpful to realize things that I did that I didn’t even know.” Karen noticed how individual students were responding to her instructions when she prepared them for a kinesthetic modeling activity to demonstrate the formation of hail. The act of video recording practice can provide a common experience that mentors and mentees can discuss and analyze.

Not only does the video provide a means for mentors to view the mentees’ classroom, but it also provides a third-person perspective through which mentees can see

their own classrooms. Both seem to be valuable assets of a video-based, disciplined inquiry approach. Viewing the video of her mini-lesson introducing probability to her middle school mathematics students was particularly important to mentee Keisha, who said, “Actually the video of myself was, I think, the best part of it.” Keisha’s mentor Nora capitalized on Keisha’s interest in analyzing the video and had her cue up the video to particular parts during their post-observation conversation so that they could discuss student engagement and interaction. It is interesting that Nora placed a similar high regard on the benefits of using video:

To me, it’s better than being in the classroom observing. We have a video to go back and look it over together. We don’t often see ourselves as teachers. So there are benefits, not just for me, but for the mentee. Growth would progress at a faster rate as far as self-analysis, self-reflection.

Mentor Diana seemed to share Nora’s perspective that asking mentees to observe and analyze their practice is a critical aspect of the classroom observation cycle process. Her mentee did not watch the video prior to their post-observation conference. Diana said, “I think if Karen had re-watched her lesson, it would have been a more rich conversation. She hadn’t picked up on that yet because she hadn’t re-watched the lesson.”

Mentees seemed to appreciate when their mentor collected data on the focus area they selected during the pre-observation discussion. Mentee Chloe put it this way: “there may be a lot of things to focus on, but these are the things I’m particularly interested in. It focused on my needs a little bit, which is nice.” Mentor Dawn said that having mentees select an area of focus can “empower them to say, ‘OK, here’s an area where I’m weak and this process is going to help me see myself more objectively.’”

Focusing on a specific aspect of classroom practice also benefitted mentors.

Mentor Lynn explained that she and her mentee Collette focused on a specific aspect of her teaching, which made the approach “not as overwhelming. The goal seems more achievable when you focus on just one aspect of it.” The data that Lynn collected by tallying and counting teacher interactions with groups using microscopes to classify organisms was influential to her mentee Collette, “I think maybe it made me take it more seriously... It had evidence behind it... I’m a numbers person, so that tends to stick with me more than just a descriptive comment might.”

Focusing on concrete evidence provided a degree of dispassionate distance for mentors. The data that mentor Becky collected for her mentee allowed her to present feedback without it seeming evaluative. Becky’s mentee Pat was interested in the degree to which his students added to group discussions to design an experiment to test whether jewel weed was an effective remedy for poison ivy. She said, “It’s all data-driven. It’s not me saying, ‘Oh, you did this.’ It’s all counting. ‘Well, I noticed you went to this table this many times and this table this many times.’ That was really nice that it could be data.” Mentor Nora seemed to agree because she described video observations as a way to “objectively look at teaching.”

Only one mentor, Tom, did not attempt to collect and present objective data through this process. He explained that “looking at data requires, in my opinion, that you view it again and maybe even more than two times. I have to admit that I didn’t do that.” Surprisingly, the pre- and post-observation discussions in which Tom engaged with his mentees were the longest of any other pair. Perhaps if Tom had structured classroom

observations with a disciplined inquiry approach he would have found that the time commitment required was not any greater than he was already devoting. As mentor Nora shared, “I thought it would be tedious, but it’s really not hard.”

### Addressing Specific Science/Mathematics Learning Goals

The research base on involving early career teachers in the work of disciplined inquiry suggests that an important aspect of this process is for teachers to attend to specific content learning goals. However, the participants in this study did not reliably discuss content as may be expected from the existing literature (Santagata, Zannoni, & Stigler, 2007). This anomaly and its implications will be addressed in the Results section.

Though most mentors and mentees did not engage in elaborated discussions of science content in the observation cycles, it seemed that content expertise did play a role in the process. Several mentees expressed the importance of having, as mentee Sharon said, “an experienced viewpoint” provided by their mentors, who had decades of experience in their respective fields. Mentee Chloe was even more specific in the benefit that she found in her mentor’s expertise, “Feedback from somebody who actually taught the same exact subject that I taught; not just a science teacher, but a physics teacher – that was really valuable to me.”

It seemed as though mentees appreciated that their mentors brought a knowledgeable perspective to the classroom observations. As mentee Pat said:

A lot of times, I feel that a lot of the administrators I’ve had in my few short years are out-of-touch with what it’s like currently in the classroom.

To have someone who's teaching right now, her feedback meant a lot to me.

For some mentees, this knowledgeable perspective extended to include content-specific understanding. As mentee Collette said, "science is its own animal, so even an administrator who's sitting in your classroom may not have the insights that another experienced science teacher would." It is interesting that Collette's mentor Lynn had a similar impression. She said, "It's hard for people to understand some of the dynamics of a science classroom because you have so much of that inquiry go on and so much of that hands-on stuff." While mentors and mentees did not always explicitly discuss the content of the lessons, it appeared that many found value in sharing a common content background.

#### Analyzing the Relationship between Teacher Actions and Student Learning

One key aspect of disciplined inquiry is to frame the observation as an investigation into a cause-effect relationship between the teacher's instructional decisions and the impact on student opportunities for learning. In this study, not all mentor-mentee pairs framed the observation focus in this way during their pre-observation discussions.

For many mentors, a disciplined inquiry approach was different from their previous experiences with classroom observations. They had become accustomed to delivering evaluative feedback rather than investigating with their mentee a hypothesis about teaching. As mentor Nora shared, in her previous instructional coaching experience, she had been trained by her state with "a more direct approach... It's just 1-2-3 steps: positives, negatives, and improve by the next time." Following the professional

development session, most mentors committed to changing their approach to be more consistent with a disciplined inquiry stance. In their professional development evaluations, they shared intentions to change, such as: “start setting more measurable goals with my mentee,” and “focus on points that deal with specific outcomes from observed data.”

The shift toward disciplined inquiry required mentors to focus more on specific questions and data about the classroom observation, but also to relate these data to “goals” or “outcomes,” in terms of students’ opportunities to learn. Many mentor-mentee pairs seemed to struggle with this dimension, perhaps because few clearly outlined a hypothesis about teaching in terms of the focal teacher behavior and how that action may impact students. As a result, many pairs discussed data, but did not explicitly link teacher behaviors and their impacts on students.

One mentor-mentee pair in particular, Dawn and Armand, successfully outlined a hypothesis about Armand’s teaching and its proposed impact on his students in their pre-observation discussion in preparation for the second observation cycle. Armand was interested in knowing if his approach to dealing with disruptive behavior was effective in stopping the behavior and minimizing time away from instruction. Dawn summarized the data that she planned to collect during the observation, “First, I’ll collect data on what the disruptive behavior is, then what I’ll do right after that is your response, and right after that I’ll do the student response.” Dawn explained the difference she noticed between her first observation with Armand and the second, “The first time we just looked

at the methods and how many times he had to use them. This time... we added another piece, which was really important to know the effectiveness of it.”

Mentee Karen and her mentor Diana likewise outlined a clear hypothesis in their second observation cycle. Karen was interested in knowing whether her attention-getting techniques impacted her students’ ability to listen to and follow directions in a hands-on lab setting to maximize instructional time. Diana collected data about Karen’s actions, her students’ responses to those actions, and a qualitative note about how quickly they started to follow her instructions. Karen shared in an interview at the conclusion of the project that in subsequent lessons:

I was much more aware. When I was giving instructions, were kids writing or cutting things out? Were they doing something else? So when they would do that, I would say, “Stop. Put everything down. Let’s make sure you’re paying attention.” It made me much more aware of their inability to do multiple things at once.

Other mentor-mentee pairs seemed to fall short with regard to this dimension because they focused solely on teacher behavior and did not seek data on the outcomes in terms of student behavior or opportunities to learn. While there were some missed opportunities, the overall experience seemed useful in that it prompted mentees to inquire into a specific aspect of classroom practice.

#### Supporting New Teachers to Critically Evaluate Instruction

All of the mentors and mentees in the study remarked that classroom observations provided the opportunity for mentees to critique their practice alongside a knowledgeable peer. For many mentors, there was a notable difference in their approach to critical

feedback between the first and second cycles of classroom observations. As Nora noted, her previous instructional coaching experience, which is likely similar to other mentors', had a three-step approach in which the mentor would provide positive feedback, critical comments, and work toward an action plan of next steps for the mentee. The dimension discussed in this section required many mentors to change their approach to feedback. The following section addresses "step three," or identifying action steps.

The direct positive and critical feedback Nora alluded to was evident in the first cycle of observations. All of the mentors seemed inclined to begin their post-observation discussion with comments such as, "I just want to give you some good, positive feedback here" (Nora); "I thought as far as what you're doing in the classroom is that there's a lot of wonderful stuff that's working very well" (Becky); "I thought the discussion was fantastic" (Lynn); "You're quite brave in trying these things. Hats off to you!" (Tom); "I think teaching is your passion and this is where your heart is" (Dawn); "It was good. I was impressed. I was like, 'Wow, that's good'" (Alissa); and "Well, I think you did an awesome job" (Diana).

In addition, mentors continued and offered direct, critical judgments of mentees' practice in the first observation cycle. These included: "One comment that I had was to be sure that they're all getting it" (Nora); "I was concerned about the room arrangement" (Lynn); "I think it's really important to ask questions and get the students into a questioning mode" (Tom); "The first two [attention-getting attempts], I would say, were pretty ineffective" (Dawn); "I did notice that you seemed to interrupt yourself a bit"

(Alissa); and “the problem, why I think you’re getting no response from the kids... is that you don’t have their attention” (Diana).

Following the professional development session, several mentors committed to specific changes in their approach to the post-observation discussion so that it would be better aligned with a disciplined inquiry stance. Nora expressed her new perspective in this way:

Time and focus is given to analysis and input from the mentee, not from the mentor. I would personally like to develop these tools so the new teachers do the analysis while drawing conclusions and projecting change. I only guide through the process.

Several other mentors commented that a focus on data would lead their mentees to self-assess their work. Dawn committed to honing her role in the post-observation discussion, focusing on “asking leading questions, sharing the data, helping the mentee self-assess and self-adjust.”

In the second observation cycle, there were fewer direct appraisals of mentees’ teaching and many more examples of mentors asking guiding questions to support mentees’ self-assessments. The questions they asked led their mentees to do some of the analysis and appraisal of their own work. Some examples of these questions were, “I noticed that you moved at a fast pace through your review. Do your students respond to this pace?” (Nora); “What did you think about the difference in time between how much you spoke versus the students?” (Becky); “Like you said... that was distractive behavior and it drew more attention than [another student] needing the help. Have you thought of a way to try to focus on that more?” (Lynn); “How typical was this class? Is it pretty much the way it is there?” (Dawn); “I could hear you giving some individual help to

students as you walked through. Did you stop at everybody or just a few?” (Alissa); “I believe your biggest concern based on our pre-conference call was that you didn’t want to answer your own questions. So, how do you think that part went?” (Tom); and “You did a nice job of counting [to get students’ attention]. The kids in front of you stopped where they were... Did you see what the students behind you were doing?” (Diana). Mentor Lynn reflected on her own development in this area and the ways in which she saw even more potential for growth. In her interview she said:

How can I continue to pose questions that elicit deeper responses from [my mentees]? I don’t know if that’s my end or their end. But, I feel that if I ask better questions, I might get more than a few word responses. Get them to reflect.

Mentor Nora pointed out, “with our teachers today, it’s obvious they have been trained in reflection... That’s their strength – they can take that reflection and analyze where they want to strengthen. With our probing questions and encouragement, they are going to be better teachers.”

The questioning techniques that mentors used seemed to influence mentees’ perception of the observation cycles. Many of them described the observation cycles in terms of the reflection opportunities that they presented. For instance, mentee Keisha described observation cycles as “an awesome reflection tool. It gave me the chance to reflect on my performance as a teacher and actually critique myself with the help of more experienced teachers.” Mentee Collette seemed to have a similar appreciation for the observations, but alluded to a longstanding benefit of engaging in disciplined inquiry with her mentor. She said that the observation cycles helped her to:

Keep an open mind and try to look at my own teaching through a different point-of-view. It can help you to do that more habitually... It's easy to close your door and do what you do, but I think the observations keep you on your toes a little bit.

In a similar way, mentee Karen indicated that the observation cycles allowed her to reflect on her immediate teaching environment, but also prompted ongoing inquiry into her teaching. She said, "it made me more aware of the areas that I can immediately improve and the areas that I'll continually need to work on."

Though observation cycles supported mentees' ability to self-reflect on their work and self-critique aspects of their performance, it was clear that the mentors nevertheless played an important role in the process. For instance, while mentee Keisha spoke highly of the reflective experience of watching the video of her own teaching, when asked whether her mentor Nora was necessary, she said:

Yes, she was! Definitely! Sometimes I feel like I would lose my mind if I didn't have Nora. Sometimes you think as a teacher, or really any job that you have, that you're doing a great job. You can do so much better with the help of other people if you're open to criticism. I was so happy I had Nora!

Other components of the eMSS e-mentoring program encourage collaboration among groups of mentees. One mentee, Chloe, seemed to compare those experiences with the one in which she received advice from her mentor as he provided feedback on how well she was prompting students to support predictions with evidence from the investigation they were conducting with electric circuits. She said of the classroom observations:

I didn't feel like it was the blind leading the blind. I felt like I had somebody who kind of knew what he was doing. I wasn't hearing many voices; I was hearing the voice of a person I trusted and learned from. Sometimes reducing your options in terms of inputs and having somebody

who understands your situation and where you're at makes a huge difference in terms of what they're able to accomplish.

For many mentees, classroom observations provided the opportunity for them to reflect on their own practice along with a single, more experienced peer. Both the act of viewing their own performance again and of inquiring into their practice with a trusted mentor seemed to be critical aspects of the process.

All of the mentees expressed that the classroom observation process supported their ability to self-critique their work and gain a new perspective on their teaching. Reviewing the video recording of their teaching practice allowed them, as mentee Emily said, "to pick up on things I might not have picked up on." What mentors and mentees discussed during their post-observation discussions was, "not actually what you're thinking about while you're teaching," according to mentee Sharon. Mentor Dawn seemed to agree when she said, "I think Armand gathers from the data a perspective he isn't able to receive on his own." All in all, a disciplined inquiry approach to the observation cycles seemed to support mentees to self-critique their classroom instruction and gain from their mentors a knowledgeable perspective on their teaching practice.

#### Inducing New Teachers to Provide Alternative Teacher Actions

Just as mentors seemed to move from direct, evaluative comments toward questioning mentees for self-reflection, so too did their interactions in the second cycle demonstrate that they were supporting mentees to identify ways to self-adjust their practice. Many mentors expressed a commitment to a more collaborative approach to

identifying alternatives that mentees may want to try in future lessons. For instance, mentor Lynn said:

I'm really bad sometimes about trying to offer a quick solution to something. I have to work on myself. How am I going to word this or question this to get her to think more deeply about it, rather than just say, "Maybe you want to do this? Maybe you might want to do that?" To get her to develop a solution because she knows what's going to work for her and her students.

Mentor Dawn seemed to concur with Lynn's statement that quick solutions may not be effective, and added that collaboration on the part of the mentee is important for instructional change to occur. She said, "We're teachers – we want a quick fix. I know in the long run that doesn't change behavior, when we just tell people what to do."

Supporting mentees to determine next steps involved mentors helping them to explore alternatives and think about their instructional decisions. Mentors and mentees alike noticed ways in which the second observation cycle, in particular, provided the opportunity to consider instructional approaches. The actual process of teaching the observation lesson prompted such deliberation in mentee Chloe. She said:

I was thinking a lot harder about what I was doing and why I was doing it. It made me second-guess in the moment. There was more immediacy in what I was doing. I would say the value in that was that it made me very aware of everything that happened. When I went back to reflect on it, I was able to say, "This worked. This didn't work." I had a much stronger memory of it.

Mentor Nora seemed to notice that her mentee Keisha became more attuned to her instructional decisions as well. She said, "I saw progress in Keisha's self-realization of things that needed to be changed, improvements that could be made." Indeed, Keisha herself noted, "I always try to improve... This definitely let me know, 'Hey, girl, you've

got this. You can teach this. You're doing an excellent job.' But, of course, who cannot do better? There's always room for improvement." Mentee Pat also seemed to be considering various options and choices that he could make when he said, "I'm still trying to find my style as a young teacher."

Supporting mentees to self-identify instructional changes they wish to make allowed early career teachers to, as mentor Nora says, "internalize" the disciplined inquiry process. However, there were times when it was necessary for mentors to seed some ideas into the conversation as well. These more direct recommendations may seem like a traditional style of evaluative feedback, in which the third step of the process is to outline strategies "to improve by next time." For example, mentee Sharon said of her mentor Alissa:

She was able to offer a few suggestions that really had a disproportionate impact. Here's this thing that is obviously a problem. "What can I do about this?" A simple fix that I might never have thought of that works! That happened a couple of times.

Alissa agreed when she said, "I do not think she would have picked up on that if I had not seen it."

In another case, mentor Diana introduced her mentee Karen to a teaching strategy that Karen then adopted as a major component of her professional development plan for the year. Karen explained it this way:

After the first time Diana watched me, she said, "Do you use Exit Tickets [a classroom strategy for collecting formative assessment data]?" That was something I had never heard of. That was something that I had never been introduced to. She told me a little more about it. I chose "Formative Assessment" as the topic for my next Inquiry [eMSS professional development activity], so I could learn more about it. I actually use formative assessment fairly regularly now, and I have also encouraged my

colleagues to do it. I feel like, because of that conversation, it has not only changed my practice, but it changed my colleagues' practice, too.

Had Diana refrained from offering the suggestion to use Exit Tickets to formatively assess her students' developing understanding of weather processes, Karen's classroom observation experience and professional development path may have resulted differently.

It seems that when mentors support their mentees to self-adjust their practice, their interactions may necessitate offering suggestions and choices to spur conversation and deliberation. The spirit of this feedback is to encourage mentees to weigh their options and carefully consider their instructional decisions, not offer quick fixes.

For most mentees, there was evidence of changes in their instructional practices following each observation cycle. Mentees spoke openly about how they adjusted their practice between the first and second observation cycles, based on the experience of examining their classroom episodes in the post-observation discussion. For instance, mentee Chloe spoke about how her students were "responding to the adjustments that I was making" to encourage her students to support their scientific reasoning with evidence and mentee Armand reflected on the "things that I actually am applying" to improve his classroom management so that students will attend to his short lectures on recent earthquakes and their impacts on ecosystems.

Mentors were not always certain that their mentees would implement changes in subsequent lessons when they spoke during their post-observation discussions. This occurred with mentor Becky and her mentee Pat as they analyzed the data that teacher-talk far outweighed student-talk in Pat's group activity to design an experimental procedure. When asked whether she thought the observation cycles had any impact on

Pat's ability to teach science, Becky said, "That's a great question! I don't know. I mean, he seemed to reflect on my statements, but it's hard to tell if he made changes in the classroom."

What Becky did not know is that Pat went back to the video recording after his post-observation discussion with her. He said, "I didn't really pause as much as I should have. I didn't really give students the wait period as they call it, to really answer the question some of the time." While it may not be immediately apparent to mentors that their mentees are committing to changes in their classrooms, the disciplined inquiry process seems to support self-adjustment even if it occurs outside of the observation cycle discussions. As Becky said, "it could be something that hits him a year from now, too. I think there's so much to being a new teacher, some things don't hit you until later." Quick fixes and immediate changes may not be well-aligned with disciplined inquiry. Mentors may need to look across a longer time range to see evidence of their success with mentees.

#### Providing Opportunities for Feedback in a Low-Risk Environment

The new teachers in this study commented on how they appreciated receiving feedback on their instructional practices. Several noted that formal evaluations are, according to mentee Sharon "limited in number" and that it is, according to mentee Chloe, "far too uncommon for people to be in my classroom giving me real feedback that's very concrete." One mentee, Collette, remarked that even by May, "I have actually yet to be observed by a principal or administrator or even another teacher."

Not only do classroom observations for disciplined inquiry increase the frequency by which new teachers receive valuable feedback on their practice, but the non-evaluative nature of the observations also provides a low-risk environment for mentees to explore their practice. Nearly all mentees expressed the benefits of being observed by an experienced teacher who was not in any way associated with their evaluation process. For example, mentee Sharon elaborated on this point when she said about Alissa's observations:

I got an impartial observer's viewpoint. Not filtered through the opinion of anybody – not me, not a faculty member who might observe me, not a student. I got a completely dispassionate and complete record of what I'm doing and how I'm actually doing it... Under ordinary circumstances, anybody observing you has a stake in the outcome, which changes everything.

Indeed, mentee Armand seemed to agree with Sharon's perspective when he said, "well, obviously she's in another state... I didn't feel threatened at all. I just thought it was a very, very positive experience." Mentee Pat explained it this way, "It's like having an evaluation without the pressure... when it's not your supervisor who controls the fate of your job, it's just a lot easier to take."

#### Supporting the Development of Strong Mentor-Mentee Relationships

The role mentors adopted in these classroom observation cycles positioned them to be a reliable and compassionate supporter of the mentees' disciplined inquiry. Mentee Pat described Becky as someone who "wanted me to improve my teaching the best I could, which is what it should all be about." Mentee Collette was inspired by her mentor's commitment in the process; she said, "it encourages me that much more because

somebody will take the time to do that.” For some mentees, their mentors were the only source of objective feedback about their teaching. This seemed especially powerful for mentee Armand who said:

Because it’s been such a tough year this year, a benefit for me was getting the positive reinforcement that I really wasn’t getting here at school. I’m kind of debating the whole teaching thing, so I think the observations, and the whole mentee process, gave me hope. There are things that I do need to work on, but they’re workable. It was very nice to get an objective, outside opinion. It was critical in a positive way. Positive criticism, not just criticisms.

Armand did not appear to be alone in his appreciation of constructive feedback. Mentee Keisha also spoke of the encouragement she received from Nora:

I do feel like I am still a growing teacher; I’m always going to be a growing teacher. I’m at the beginning of my career and people can be very judgmental and harsh. Nora wasn’t that way. She was very sweet, she was open-minded and very encouraging. It makes a big difference when you’re a young teacher.

To mentees, their mentors were “helpful,” “encouraging,” “useful,” “cooperative,” and made them feel “comfortable.”

It is not surprising, then, that mentors and mentees both spoke of how the observation cycles, as mentor Diana stated, “help build the mentor-mentee relationship.” Her mentee Karen indicated this when she said, “I thought it gave Diana and me a much different relationship than what she may have had with some of the other mentees... I think it deepened that relationship and made it a little more personable.”

While mentees may not have had direct experiences with the difference between the mentoring relationship with observation cycles and one without, all of the mentors in the study were also paired with mentees they did not observe. When mentors spoke of

the difference in the depth of the relationship with mentees involved in the observation study, they could truly make the comparison. Mentor Alissa noted that the observation cycles deepened her relationship with Sharon and helped them to “become more trusting of each other.” Mentor Becky explained that “we had a little more knowledge of each other” and that a benefit of participating was that “I bonded more with my mentee.” Her mentee Pat seemed to agree when he said, “I think I know Becky really well. I think it was because of this. She has actually seen me teach in my classroom.”

The experience of conducting classroom observations seemed to benefit the mentor-mentee relationship as they participated in mentoring activities other than observation cycles. As mentor Lynn stated, “I really enjoyed the relationship with Collette as a whole, even outside of the observations.” Having a common experience of seeing mentees’ classrooms and students made it so mentors felt, as mentor Diana said, “I know her kids now. I know the ponytail girl.” This provided a context for mentors and mentees to discuss at greater depth as they interacted online and by phone following each classroom episode. Mentor Diana compared her conversations with Karen to those she had with other mentees when she said:

It also provides something for a dialogue when I call her without having the video. If I haven’t done observations with a mentee, I call them and it’s like, “How are you?”

“OK, I’m fine.”

“OK, that’s good. Have a good day. Bye.”

Whereas this way, I can say, “My goodness! What was going on with that girl with the ponytail?”

Mentor Becky seemed to have a similar experience when she said of her mentoring relationship with Pat, “I can talk about specifics. Even if it’s about his room or how tall he is or something, it’s him.”

Perhaps because of the deeper and more personal relationship mentors were able to develop with their mentees, all mentors spoke of the advantages of observation cycles.

Mentor Alissa seemed to weigh the time investment versus outcomes when she said:

I think it’s worth it, I really do. I really hope that eMSS incorporates this more into our interactions with our mentees. Even though, yes, it was time-consuming, it was worth it to get an eye into the classroom. I hope it becomes part of our repertoire of things that we can do or should do with our mentees.

For mentees, the classroom observation cycles also required a significant time commitment. As mentee Karen said of the entire mentoring experience:

When I realized everything that we had to do, I was like, “Wow. This is a lot of work.” I had not anticipated as much work. Now that I look back on it, it would be better framed as, “Wow. I didn’t realize how much support I was going to have.”

It seems that for both mentors and mentees the benefits of classroom observation cycles outweighed the investments and challenges.

### Benefiting Mentors

Though it seems clear that mentors benefitted from the satisfaction of supporting their mentees, they also expressed personal benefits that extended to their own teaching and professional development goals. Several mentors spoke about how viewing their mentees’ classroom provided them with ideas for instructional approaches they would like to try. For instance, mentor Alissa said that she enjoyed “getting ideas for my own

classroom.” Mentor Lynn seemed to agree when she said, “Although I’m a veteran teacher, I’m always looking for new ways to do things... Even though she’s a newer teacher, she still had some great ideas and I learned along with her.” Mentors also spoke about how they were invigorated by watching new teachers in action. In particular, mentor Diana said, “I think new teachers are so excited. They kind of energize you.”

In addition to gaining instructional ideas and vitality by observing their mentees, mentors also spoke about how they started to become more mindful of how they inquire into their own teaching practice and that of others. As mentor Dawn stated:

I love watching people teach. I learn something from a new teacher, a veteran teacher, just watching how people interact. I also learn about student behavior. I feel like it’s a benefit for me, because I can see, “Oh, yes. This is a good thing to do.” Or, “This is something maybe we had better watch – are we doing that?” You reflect on your own teaching... It gives me more experience to help others in this same type of method.

For all mentors, the experience of conducting observation cycles was beneficial, whether it supported their development as mentors, gave them ideas to try in their classrooms, infected them with the energy they saw in the new teachers, or spurred their inquiries into their own classrooms.

### Discussion and Conclusions

Classroom observation cycles can support the professional development of early career science teachers by structuring opportunities for them to learn from their own teaching practice. These observation cycles demonstrated outcomes similar to those reported in similar studies in the existing literature base. For instance, this study extends research conducted by Santagata and her colleagues (2007) in that it broadens the

audience to include science teachers in the induction phase of their careers and offers another effective approach to incorporating video-based analysis-of-practice into a professional development experience. Not only is a structured, pre-service course in analyzing the teaching practices of experienced professionals an effective strategy for enhancing disciplined inquiry skills, but new teachers can also develop these skills by video recording and analyzing their own teaching practice. In addition, this study also confirms Rosaen and her colleagues' (2008) findings that video is an effective medium for learning from teaching. The teachers in this study confirmed the benefits of video to slow down the practice of teaching so that they could notice and analyze aspects of their teaching. Finally, there is evidence to support Feiman-Nemser's (2001) proposal that by conducting classroom observations mentors can effectively engage new teachers in continuing to learn about teaching by teaching.

Professional development opportunities for mentors that frame classroom observations in a disciplined inquiry stance draw mentors away from direct, evaluative feedback and toward a focused and collaborative experience between mentors and mentees. This is consistent with Evertson and Smithey's (2000) finding that it is necessary to provide professional development to equip mentors with the distinct skills of mentoring so that they can support new teachers' development. The mentors who participated in this study refined their skills and demonstrated noticeable differences between the initial cycle of classroom observations and the one following the professional development session. Mentors had a clearer vision for how to support their

mentees to learn to teach from the act of teaching and were committed to incorporating disciplined inquiry into their interactions with their mentees.

### Benefits of Classroom Observation Cycles

There are several benefits for mentors and mentees that emerged from this study. Classroom observations provided a new method of contact between mentors and mentees in a distance mentoring program. Not only did this offer a novel context for supporting new teachers to refine their practice, but it also strengthened the mentor-mentee relationship and enhanced other aspects and activities in the mentoring program. The experience of viewing video recordings of their own teaching practice seemed to enhance mentees' self-reflection, confirming Kong's (2009) research that concluded that teachers made a greater quantity of reflective comments when they viewed video of their teaching practice. Mentees in this study spoke about how powerful it was for them to view the video recordings and that the experience prompted them to think about their teaching from a different perspective than they can achieve while they are in the act of teaching. Finally, as Santagata and her colleagues (2007) found in their study, viewing video recordings of their teaching promoted mentees' self-analysis of their practice. The new teachers in this study critically evaluated their performance and worked with their mentors to generate alternative strategies that they were willing to try in subsequent lessons.

Though not measured directly as it was in the work of Stanulis and his colleagues (2009; 2012), there was evidence of instructional improvement in the mentees' work. The new teachers in this study all spoke of the changes they made to their instruction

following each of the observation cycles. The early career science teachers in this study were eager to learn what they could by analyzing their current practice and identifying ways of improving it to the benefit of their students. Mentee Keisha summarized this nicely when she said, “it definitely helped me grow as a teacher and make changes necessary and needed for my students’ success.”

### What Happened to Discussing Science Content?

It was surprising that mentors and mentees engaged in few discussions of the science content of the lessons they were collaboratively analyzing. While the absence of content in participants’ discussions may initially seem alarming, a closer examination of this phenomenon brings to light the complexity of mentor-mentee interactions and offers some possible avenues for future program refinement and research opportunities. It is important to note that although engaging in elaborated discussions about content and content-specific pedagogical approaches was seemingly absent from the data in this study, participants were guided by a goal to improve science instruction for the benefit of their students. As mentee Keisha stated in her interview, “Ultimately, these kids’ futures are in my hands, so I want to do the best job possible and give them the best education possible.”

There are several factors that may contribute to the diminished treatment of science content as compared with previous research (e.g. Santagata et al., 2007). Here, I speculate that this inconsistency may be due to: task differences between protocols in this study and Santagata’s, the nature of early career science teachers’ needs, or the presence

of other components of the eMSS mentoring program specifically designated for science content discussions.

It is important to recognize that there were substantial differences between the research methodologies in Santagata's study compared to the present study. Whereas Santagata and her colleagues coded written reflections that pre-service teachers made after viewing video models of teaching from the TIMSS collection, the present study provided new science teachers with the opportunity to direct an inquiry into their own teaching practice. In summarizing and contextualizing the video they viewed, Santagata's participants may have noticed and described the actual content of a lesson more predictably. Since the focal question of the observation was where participants' attention was directed in the present study, they may have been less inclined to describe the content of the lesson.

In this study, early career teachers were involved in directing the focus of the activity towards their needs and concerns. Since, as several mentees expressed, they had few opportunities to be observed and receive feedback on their instructional practice, it seems as though they were eager to take advantage of these observation cycles to address their needs. It is interesting that, when provided the latitude to select any area of focus, all of the mentees selected foci that were instructional in nature. The areas of focus they selected included engaging their students in short lectures presenting evidence of continental drift; pacing of instruction as students performed increasingly complex chemistry unit conversions; techniques for gaining students' attention to give instructions

to act out a kinesthetic model of the formation of hail; and how frequently they interacted with students or groups viewing and classifying cells using a microscope.

It seems that, out of pedagogical knowledge, content knowledge, and pedagogical content knowledge (PCK), the early career teachers in this study were most concerned about pedagogy at the expense of content and PCK. What is interesting is that Luft and her colleagues (2011) found that participants in a variety of content-specific and general induction programs shared similar PCK after two years, regardless of the program in which they were involved. However, “teachers in the science specific induction programs continued to enact more interactive learning environments and had more investigations and laboratories than did their peers in other induction programs” (p. 1199). Perhaps the needs of new science teachers are initially instructional in nature and only after time and experience will significant impacts occur with regard to content knowledge and PCK.

Finally, the specific mentoring program with its structured curriculum and other components of support may have contributed to the relative lack of discussion of science content in observation cycle discussions. The eMSS program includes facilitated discussion areas, repositories of vetted content resources, and access to scientists and other content specialists to support the content needs of the early career teachers it serves. As mentees and mentors developed a schema of their roles and the purposes for the observation cycles, it seems as though they characterized them as opportunities for instructional support and used the other components of eMSS to meet their content needs.

In the future, classroom observation cycles could be framed to more expressly address content-specific pedagogical practices and PCK. For instance, with the release of the Next Generation Science Standards (NGSS) and its explicit descriptions of investigatory practices in which science students should be engaged, mentors and mentees may be supported to outline hypotheses into teaching that are more content-specific in nature (National Research Council, 2012). Indeed, perhaps the structure of future observation cycles could outline guidelines that would induce mentees to select content-focused observations throughout the course of a year. In addition, facilitation may be a mechanism for promoting a more explicit content focus in future implementations of observation cycles.

### Recommendations

Incorporating classroom observation cycles in a mentoring relationship is a beneficial activity for mentors and mentees alike. If the goal for observing new teachers is to engage in disciplined inquiry into instructional practice, mentors and mentees must make data – and a hypothesis about the impact of teacher actions on student opportunities for learning – the central focus of the observation cycle. With a clear observation focus, mentees can examine these data in light of student opportunities for learning alongside an experienced peer who shares a common understanding of the subject and grade level the mentee teachers. Together, the mentor and mentee critically analyze the successes and pitfalls of the approaches the mentee used and collaboratively identify an action plan of next steps.

By adopting an approach such as this, mentors scaffold the process of learning to teach while teaching to build mentees' independence with disciplined inquiry. Not only does this experience help to build trust in the mentoring relationship, but it also supports early career teachers to build confidence in their ability to teach and learn from teaching. In addition, mentors gain new ideas and new perspectives into their own classroom inquiries.

The findings from this study indicate that the critical features of successful observation cycles include:

- Structuring a low-risk, non-evaluative environment;
- Pairing mentees with mentors who have an understanding of and an appreciation for the grade levels and subjects that mentees teach;
- Focusing the observation on a clear hypothesis about how teacher actions may impact student opportunities for learning;
- Supporting mentees to engage in self-assessment to develop skills to learn to teach from the act of teaching;
- Collaboratively developing an action plan of alternative teaching approaches, selecting from options identified by mentee and mentor alike; and
- Continuing to provide professional development opportunities for both mentors and mentees to hone their disciplined inquiry skills.

An important outcome of the induction phase of teaching is for new teachers to develop the confidence to face challenges and seek continual improvement in their practice. Classroom observation cycles that are conducted with a disciplined inquiry

approach have the potential to equip new science teachers with the skills and dispositions to learn about teaching from the act of teaching each day of their careers.

This qualitative research study provides a first step into examining the impact of classroom observation cycles on the mentoring relationship and on mentors and new teachers. There are opportunities for further research into the structure and outcomes of classroom observation cycles.

For instance, the relative lack of discussions about science content in the observation cycles monitored here can be more systematically studied to shed light on the needs of early career science teachers and how best to support the development of pedagogical knowledge, content knowledge, and pedagogical content knowledge (PCK). Are mentees using other components available in subject-specific mentoring programs, such as eMSS, for content support? Given that the vast majority of mentoring programs are not subject-specific and may pair mentors and mentees who do not share common teaching assignments, observation cycles in these contexts may differ in their treatment of science content.

A challenge for many induction programs is to meet the immediate needs of the early career teachers while at the same time anticipating future avenues of professional growth. While enabling new science teachers to select their own areas of focus prior to the observation cycle may be empowering for them, the appropriate balance between choice and guidance is an ongoing concern. If classroom observation cycles are structured to guide mentees to select particular areas of focus, will they express similar value of the experience as compared to mentees who were offered free choice?

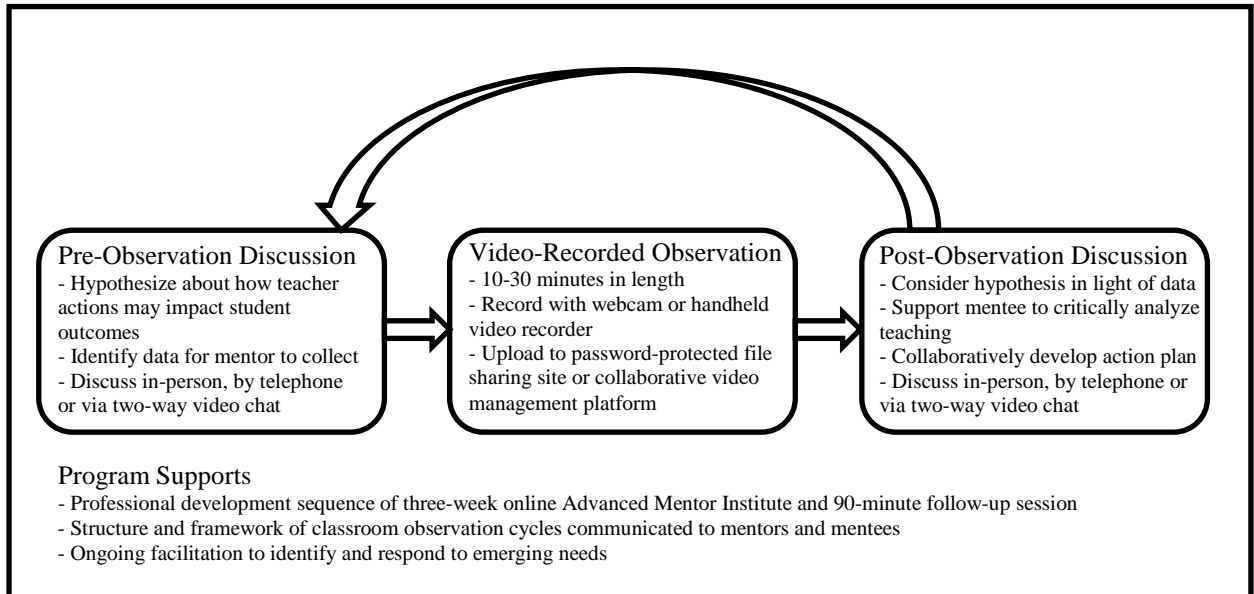
In addition, professional development programs are increasingly held accountable for demonstrating their value to the private foundations, urban jurisdictions, and state and federal funders that support their implementation. What are the measurable impacts of classroom observation cycles on teachers' instructional practice and PCK? Just as Luft and her colleagues measured PCK change over the course of an induction experience and Stanulis and his colleagues documented instructional improvement following observations using disciplined inquiry, future research could reveal empirical evidence of changes in teachers' practice.

Finally, anecdotal evidence suggests that mentees became more self-reflective within and beyond the classroom observation cycle interactions. A more systematic investigation of mentees' utterances in the classroom observation discussions and of their written posts in various areas of the eMSS mentoring environment may confirm or qualify this notion.

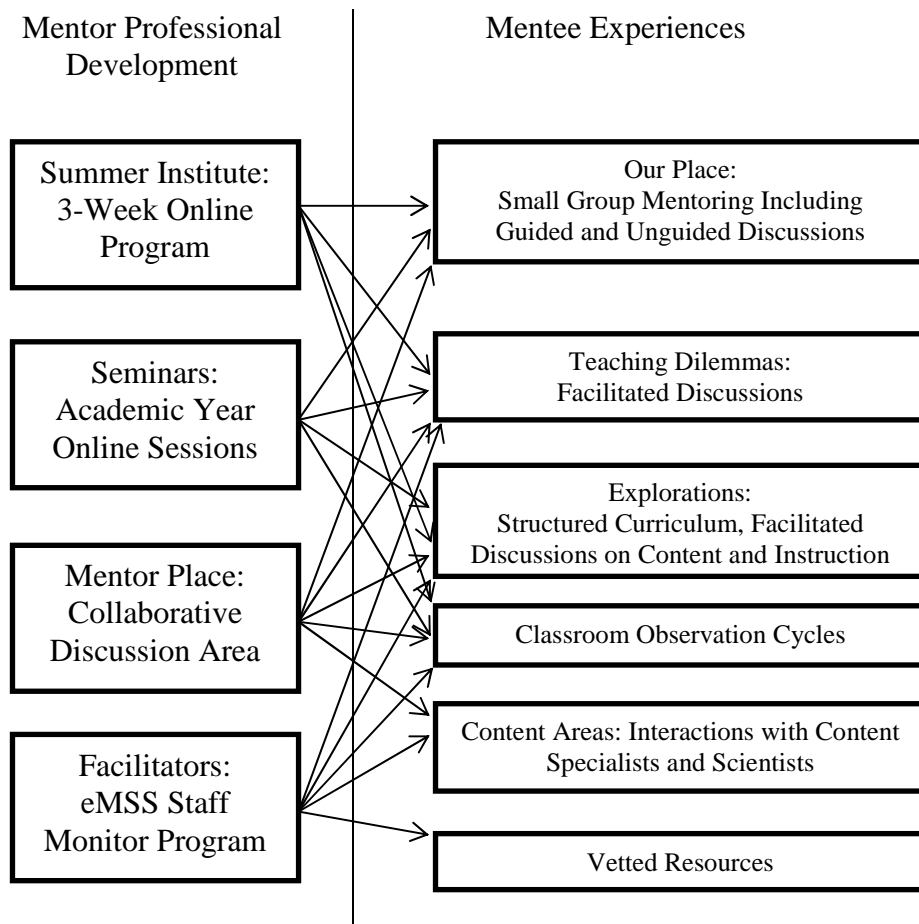
Table 3.1

*Background Information about Participants in the Classroom Observation Study*

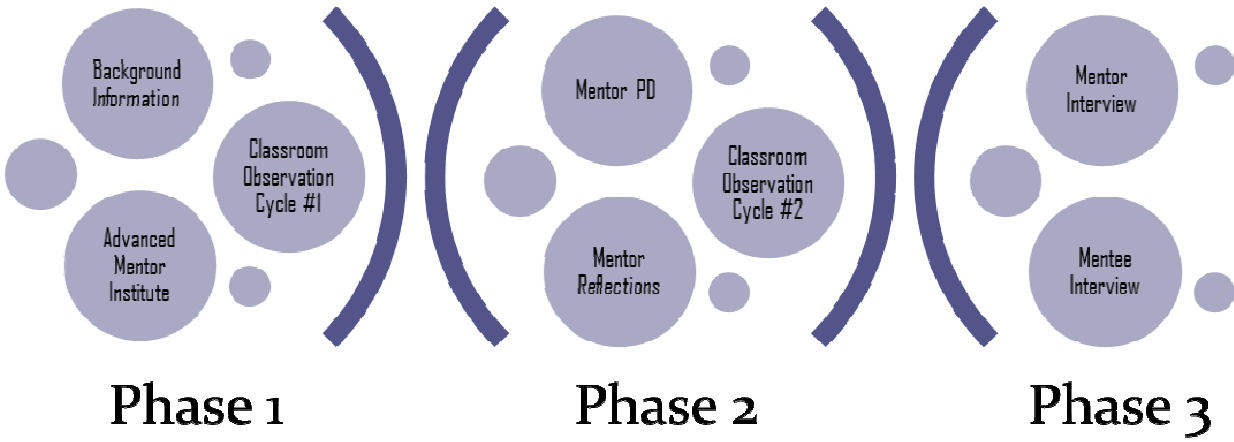
Mentee's Name	Degree	Years Teaching	Teaching Assignment	State	Community Type	Institution Type	Mentor's Name	Years Experience	Teaching Assignment
Keisha	Bachelor's	2	Middle School Mathematics	Louisiana	Rural	Public	Nora	21+	Middle School Mathematics (ret.)
Pat	Master's	1	High School Science	Indiana	Suburban	Public	Becky	21+	High School Science
Colette	Bachelor's	1	High School Science	Indiana	Suburban	Private	Lynn	21+	High School Science (ret.)
Chloe	Bachelor's	2	High School Science	Pennsylvania	Urban	Charter	Tom	21+	High School Science (ret.)
Armand	Bachelor's	1	Middle School Science	Arizona	Suburban	Private	Dawn	11-20	High School Science
Sharon	Bachelor's	0	High School Science	California	Urban	Public	Alissa	11-20	High School Science
Emily	Master's	1	High School Science	Pennsylvania	Suburban	Public	Tom	21+	High School Science (ret.)
Karen	Bachelor's	0	Middle School Science	Texas	Suburban	Private	Diana	11-20	Upper Elementary Science



*Figure 3.1.* Observation cycles consist of three primary activities supported by program documentation and professional development mechanisms.



*Figure 3.2.* The eMSS mentoring program includes activities for mentors and mentees that support ongoing professional development.



*Figure 3.3.* The research study consisted of three phases of mentor and mentee activities and data collection.

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CHAPTER FOUR

TAKING PERSONAL RESPONSIBILITY FOR PROFESSIONAL GROWTH:  
CONTINUOUS LEARNING THROUGH CLASSROOM OBSERVATION CYCLES

Contribution of Authors and Co-Authors

Manuscript in Chapter 4

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Contributions: With regular consultation with Committee members, conceived the study, collected and analyzed data, and wrote the manuscript. Committee members served as a research team, providing feedback and recommendations throughout the process.

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### Abstract

This article examines the second principle of professionalism, that science teachers take personal responsibility for their professional growth, which is included in NSTA's *Principles of Professionalism for Science Educators*. One means for committing to lifelong learning and professional growth is for teachers to investigate their own classrooms, inquire into their instructional practices, and receive formative feedback from trusted colleagues. This article outlines the rationale for and structure of classroom observations in the spirit of inquiry into our teaching practice. Since these observations can occur face-to-face or at a distance using video technology, they are easy to implement whether your trusted colleague is in your school building or hundreds of miles away.

### Introduction

You may be skeptical about how classroom observations could support your own professional development path and goals. Like many of us, you may define observations as high-stakes, evaluative, and infrequent. However, if we rethink and reframe classroom observations as opportunities to inquire into teaching practice with a trusted colleague, we may be more willing to incorporate observations in our own professional development plans.

In its position statement on Principles of Professionalism for Science Educators, NSTA (2010) declares four ways science educators can promote quality science instruction. This article presents one framework for achieving the second principle, “the

importance of taking personal responsibility for professional growth.” Like many science educators, I concur with NSTA (2006, 2010) when they contend that science educators should “promote their own personal professional development and recognize that becoming an effective teacher of science is a continuous process that requires a commitment to lifelong learning.” While we strive to contribute to a highly professional and respected discipline, little research exists on just how to take personal responsibility for our growth.

The vignettes and recommendations presented in this article come from work conducted within The New Teacher Center’s e-Mentoring for Student Success, an established online mentoring program that serves beginning teachers nationwide, including members of NSTA’s New Science Teacher Academy (<http://www.nsta.org/academy/>). Though the examples include new teachers and their mentors, the inquiry approach we used can work with teachers along the entire spectrum of development. It empowers us to set professional goals and enact changes in our instructional practice to advance the learning of all students.

### Defining Classroom Observation Cycles

No matter how experienced we are, many of us shudder at the thought of a formal classroom observation. Too often, the only time we’re observed is as an end-of-year evaluation of our performance. In this high-stakes environment, we expose our classrooms to judgments and critique. For some of us, our future employment hinges on

how many times our supervisors check “Effective” or “Highly Effective” on a form that becomes part of our permanent employment record.

The classroom observation cycles described here are different (Figure 4.1). They are low-risk opportunities to work with a colleague to gain feedback about a self-selected aspect of your teaching practice. Just as our students benefit from low-stakes formative assessment and the feedback associated with it, so too can we as professionals.

Classroom observation cycles start with a pre-observation conversation in which you talk about your current practices and any areas of uncertainty or concern you may have (Figure 4.2). For instance, you may have started considering how you can ensure that your instruction is well aligned to the new Practices dimension of the Next Generation Science Standards (National Research Council, 2012). Maybe you have been noticing lately that students are not justifying their predictions with evidence, or perhaps you are wondering if you are appropriately balancing teacher-talk and student-talk as students develop empirically testable questions or design systematic investigations. Together with a colleague, you hypothesize about how one aspect of your actions as a teacher is influencing your students’ opportunity to learn.

Following this conversation, you select a short classroom episode to videotape for you and your colleague to view. While you may be intimidated by the thought of watching yourself on video, have confidence – many of the teachers with whom I worked told me that it was one of the most valuable aspects of the process! You and your colleague will view the classroom episode to collect data regarding the hypothesis you developed in your previous conversation.

Finally, the focus of your post-observation discussion is that hypothesis you set in your initial conversation. Together, you and your colleague examine the data and consider the effects of your actions on your students' learning.

Sure, this process may seem familiar. After all, most formal observations also consist of pre-observation conversation, observation, and post-observation discussion. However, this process is designed for you to take ownership of aspects of your teaching practice that you would like to improve. Classroom observation cycles in this framework are intended for you to inquire into your own instructional practice.

### Engaging in Inquiry into Your Own Instructional Practice

Over the past decade, science educators have worked to create a shared definition and commitment to inquiry-based practices for the teaching of science. Now it's time to apply the principles of inquiry to investigating our own professional growth. Disciplined inquiry into instructional practice has only limited exposure in the research base (e.g. Hiebert, Morris, Berk, & Jansen, 2007), but has the potential to revolutionize the way we direct our professional development and growth. The five dimensions of disciplined inquiry are:

1. Concrete evidence. Your conversations revolve around data.
2. Science learning goals. You consider the content or content-specific instructional strategies in the lesson.
3. Student learning. You explore the impact of your actions on your students' opportunities for learning.

4. Critical approach. You take responsibility for your professional growth and identify areas for improvement.
5. Alternative strategies. You identify adjustments and commit to implementing them.

Whether you're the observed teacher or the trusted colleague who is supporting a classroom inquiry, these five dimensions can help to keep you focused on the goal of the observation – gaining valuable feedback about classroom practice (Figure 4.3). Here's a constructed vignette of a series of observation discussions to help frame your thinking about inquiring into your instructional practice.

#### Example – Sarah Inquires into Evidence-Based Reasoning with the Help of Michelle

Sarah had just returned from the NSTA national conference bursting with new ideas to try in her classroom. She was excited to engage her students in the practices of science exploration, and had already started reading the Next Generation Science Standards (NGSS) on the flight home. As the only science teacher in her building, she was eager to collaborate with her online mentor, Michelle, to explore the practical applications of what she had learned.

#### Concrete Evidence

Sarah and Michelle started their pre-observation discussion by outlining the area of focus, how well Sarah is prompting her students to support claims with evidence. Then, Michelle collected data on whether Sarah asked, “What evidence do you have to

support that?” each time a student stated a claim and what the student’s response was. In this excerpt, they spoke about her student, Thomas, who made a claim about the effect of mass on the period of a spring and, when prompted, supported it with evidence.

*Sarah:* So, at first Thomas did not give evidence. He just said, “Of course mass affects the period. If it’s heavier, it has to.”

*Michelle:* Right, and you asked him for evidence.

*Sarah:* Yeah. When he went back to his data, he saw that mass had no effect. I think it might have helped him have an “a-ha moment.”

Sarah and Michelle focus on the data that they determined would be useful. They examine these data collaboratively and objectively to learn more about Sarah’s practices.

### Science Learning Goals

Sarah and Michelle both teach high school physics and have had elaborated conversations about student misconceptions and potential pitfalls. Michelle is pleased that Sarah is embracing NGSS and committing to practices that will help her students confront misconceptions. They continue their conversation about science learning goals related to this lesson.

*Michelle:* So, we talked about how several students might think that mass affects the period of the spring. And here Thomas says it! I think you’re right that your question prompted him to rethink that misconception. Do you have any idea if other students also have that misconception?

*Sarah:* Well, I had the students do an Exit Ticket question to assess whether they could categorize the factors that affect period and those that don’t. It was still a mixed bag – maybe still about 10% with that misconception. I realize now that the Exit Ticket didn’t ask for evidence. I could have done that better.

*Michelle:* Oh, right. Maybe if they had been asked for evidence here, too, they would have thought through their conclusions.

Sarah considers how her approach interacted with the content goals for the lesson.

### Student Learning

Throughout the process, Sarah is interested in how she can provide the best possible learning environment for her students. As she and Michelle begin their post-observation discussion, it is clear that Sarah is willing to take responsibility for making changes to further promote evidence-based claims in her classroom.

*Sarah:* Well, I guess I found something I can try differently next time. I was wondering why I had a better feeling about the number of students who got it during class compared to their Exit Tickets.

*Michelle:* Eventually, your students should be able to sort the factors like you asked in your Exit Ticket. But maybe it was a little too early to give them that level of cognitive complexity just yet.

Sarah seems to be truly interested in examining how her behaviors impact student learning opportunities.

### Critical Approach

Sarah and Michelle discuss the data and Sarah's desire to foster an environment of scientific practice. As they continue their conversation the role of evidence, Sarah's commitment to professional growth is clear.

*Sarah:* Well, I'm willing to try it again with a more structured question. I'm really interested to know whether my students are getting the right ideas from our lab investigations.

*Michelle:* I think it can't hurt. After all, you're asking them to put into writing something you already require in your verbal interaction in your classroom.

Sarah takes responsibility for setting up the most optimal classroom environment. She seems to have embraced the classroom observation cycles as an opportunity to interact with her mentor to identify new and different ways to engage her students in scientific practices each day in her classroom.

### Alternative Strategies

Sarah and Michelle explore potential next steps for Sarah's future lessons.

*Sarah:* I'm definitely going to think about this as we transition to the period of a pendulum. Since the ideas are similar, I think it will be a good opportunity to transfer more responsibility for evidence and support onto my students.

*Michelle:* Right. And, you might want to give them a real-life problem with data, like kids on a playground swing, to see if they're able to transfer the learning and practices to new contexts.

The interaction between Sarah and Michelle complements Sarah's recent professional development experiences. Not only did she hear how other science teachers promote evidence-based reasoning in their classrooms and read about its importance in the NGSS, but she also sees first-hand how to continually make changes in her own classroom.

### Summary

This episode provides just one example of how colleagues inquired into a classroom practice, directed by the teacher's goals for professional growth. Notice that the inquiry approach to the observation discussions resulted in an experience quite different from traditional, evaluative observations. Rather than having her teaching *evaluated by* an outsider with regard to standards external to her, Sarah had Michelle *inquire with* her into an area of focus that she was committed to improve.

### Conclusion

Advancing the professionalism of science educators is our shared responsibility. Classroom observations allow us to learn from the practice of teaching and determine the best courses of action in our particular instructional scenarios. As observed teacher Pat



Dimension	Pre-Observation Discussion	Post-Observation Discussion
Concrete Evidence	What, in particular, should we focus on? What data will help us better understand [focus area] better?	So, I was watching for [focus area]. I noticed [concrete data]... When I watched the video, I noticed...
Science Learning Goals	What learning objectives do you have for this lesson? What percentage of students do you expect to reach this goal? What misconceptions or challenges may stand in the way?	We expected the students to achieve [learning objective]. What did you notice relative to that? Were you surprised?
Student Learning	Why hypothesis do you have about how your actions may impact your students? What evidence should we be looking for? How will we know if students are reaching the learning objective of the lesson?	We were interested in how [teacher action] impacted [student opportunities for learning]. What did you notice?
Critical Approach		How do you feel the lesson went? With regard to your hypothesis, what did you notice?
Alternative Strategies		Where would you like to improve? What ideas do you have? In the past I've heard of/read about/seen/tried [alternative action]. Do you think that would work in your situation? What do you plan to do differently? When would you like to do this again?

*Figure 4.3.* Sample questions and prompts to support the five research-based dimensions of disciplined inquiry.

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## CHAPTER FIVE

## CONCLUSIONS

Learning to teach from one's own teaching practice is an important approach to professional development for teachers in the induction phase and beyond (Feiman-Nemser, 2001, 2010). Each day, in-service teachers confront new scenarios, questions, and challenges that prompt new approaches and professional growth. Supporting new teachers to develop the skills to undertake disciplined inquiry should be a central focus of comprehensive induction programs. Experiences for veteran teachers that promote disciplined inquiry should likewise be a fundamental component of professional development plans. Not only does disciplined inquiry provide for continuous development and change, but it also empowers teachers to direct the paths of their own professional development.

The goal of this dissertation was to characterize the interactions between mentors and new teachers as they began implementing video recorded classroom observation cycles into eMSS, the established online mentoring program in which they were participating. More broadly, eMSS served as a context in which to study an under-examined mentoring activity – classroom observation cycles. The findings I report have implications for professional development providers who structure experiences for teachers online, face-to-face, and in a variety of other formats.

The existing literature base and knowledge gaps related to video recorded classroom observation cycles to support disciplined inquiry in an online and face-to-face

mentoring environment are described throughout the dissertation, and specifically in Chapter Two. In Chapter Three, I reported the overall design and findings of my qualitative investigation into the interactions between mentors and new teachers participating in the classroom observation study within the context of eMSS. Chapter Four extended the target audience of the findings beyond only new teachers in the induction phase to consider the benefits of inquiry-based classroom observation cycles for experienced teachers as well. In this Chapter, I provide a summary of the principal findings from each chapter and discuss how these results may influence decisions regarding professional development activities for in-service teachers, whether they are in their first three years or have decades of experience.

Since classroom observations are a typical means for supervisors to assess teachers' performance, there seems to be a shared definition of classroom observations as high-stakes, external, top-down, and evaluative. Though they are also used for purposes other than evaluation, the prevailing approach to classroom observations seems to be highly influenced by the evaluative approach. In traditional classroom observations, the observer views the classroom episode, delivers feedback, and suggests changes that could be made. To be an effective vehicle for professional development, classroom observations may be better framed as inquiry-based, collaborative, and formative. In this study, classroom observation cycles were designed to include three activities: a pre-observation discussion in which mentor-mentee pairs hypothesize about how one aspect of their actions is influencing their students' opportunity to learn; a video-recorded classroom episode that the mentor uses to collect data regarding the hypothesis

established in the pre-observation; and a post-observation discussion in which both individuals examine the data and how they relate to the hypothesis. In this way, classroom observations empower the mentee to inquire into his/her practice with the support of the mentor, receive objective feedback about the classroom episode, and collaboratively determine an action plan that addresses their findings.

Adopting an inquiry stance to classroom observations did not happen overnight. The initial cycle of observations demonstrated that mentors would benefit from ongoing professional development to reframe their thinking about classroom observation cycles towards an inquiry approach. After a targeted professional development session, the interactions between mentors and mentees were notably better aligned with disciplined inquiry than the first cycle of observations. Even so, most mentors expressed a desire to participate in additional professional development to gain further practice and refinement of their skills.

The implementation of classroom observation cycles aligned with disciplined inquiry confirmed findings from studies on video-recorded analysis-of-practice that had pre-service teachers as participants. That is, this study provided additional evidence that there are five critical dimensions of disciplined inquiry, that discussions (a) focus on concrete evidence from the teaching episode, (b) address specific science/mathematics learning goals, (c) analyze the relationship between teacher actions and student learning, (d) support the new teacher to critically evaluate the instructional episode, and (e) induced the new teacher to provide alternative teacher actions (Hiebert, Morris, Berk, & Jansen, 2007; Santagata, Zannoni, & Stigler, 2007). In addition, emerging findings

include that classroom observation cycles (f) offer opportunities for new teachers to receive feedback in a low-risk environment, (g) support the development of strong mentor-mentee relationships, and (h) offer benefits for mentors.

By studying mentors and mentees' interactions around classroom observation cycles, I discovered that the benefits of observations may not be limited to teachers in the induction phase. Chapter Four presents inquiry-based classroom observations to practitioners of all levels of experience. Practitioners can use classroom observations to guide their professional development paths and take personal responsibility for their professional growth. By directing the inquiries into their own classroom practice, in-service teachers learn from the act of teaching and determine the best courses of action for particular instructional scenarios.

The findings of this study have implications for teachers, teacher educators who work with professionals in the induction phase, and designers of professional development for in-service teachers. A common implication for all of these impacted groups is that our definition of "classroom observation" needs to be both extended and differentiated. Classroom observations for evaluation serve a definite purpose in our profession and will persist. However, not all classroom observations are evaluative, and those that are not have a distinct purpose and structure. Extending the definition of classroom observations to include observations for inquiry and formative feedback and differentiating these observations from the high-stakes, supervisory ones is a critical need.

Teachers, whether they are new to the profession or have years of experience, can benefit from classroom observation cycles as a means of learning from the act of teaching while teaching. The process of inquiring into one's own teaching practice supports professional self-direction and growth. Participating in classroom observation cycles helps teachers to view their teaching from a different perspective, consider alternatives, and commit to changes for the benefit of their students. In addition, serving as the observer offers benefits, including the opportunity to gather new instructional ideas, study student behavior and learning, and share energy and enthusiasm for teaching with another professional. Joining together and developing a shared definition of inquiry-based classroom observations is an important first step. Teachers may then be more willing to ask for classroom observations, advocate for teacher video clubs and other professional activities of the sort.

There has been a resounding call in the literature for research on particular activities for teachers in the induction phase (Luft, Firestone, Wong, Ortega, Adams, & Bang, 2011; Luft, 2009; Wang, Odell, & Clift, 2008). This study provides evidence that classroom observation cycles framed by disciplined inquiry support new teachers' development. Observations increased mentors' and mentees' awareness of what was happening in mentees' classrooms, empowered mentees to focus on their needs, and allowed mentors to provide feedback with a degree of dispassionate distance. In addition, classroom observations supported mentees to develop an awareness of how their actions impact their students, critically evaluate those relationships, and determine alternative courses of action. Overall, the experience strengthened the bonds between

mentors and mentees and provided a new avenue of professional development for seasoned mentors. While disciplined inquiry may require ongoing and iterative mentor professional development and a time commitment on the part of all involved, mentors and mentees expressed the high value of the experience and that the payoff was greater than the investment.

Finally, this study has implications for professional development designers who work with in-service teachers at varying levels of experience. Since classroom observations are teacher-directed, they are flexible and can meet the needs of teachers along the entire spectrum of development. Whether they are investigating a classroom management procedure or a sophisticated, inquiry approach to introducing a new physics concept, teachers direct the observation and its focus. The process is empowering and the formative feedback teachers receive benefits ongoing development and professional growth.

The critical features of classroom observation cycles for disciplined inquiry include:

- Structuring a low-risk, non-evaluative environment;
- Pairing observed teachers with observers who have an understanding of and an appreciation for the grade levels and subjects they teach;
- Focusing the observation on a clear hypothesis about how teacher actions may impact student opportunities for learning;
- Supporting teachers to engage in self-assessment to develop skills to learn to teach from the act of teaching;

- Collaboratively developing an action plan of alternative teaching approaches, selecting from options identified by both the observed teacher and the observer;
- Continuing to provide professional development opportunities for all teachers to hone their disciplined inquiry skills.

Teachers need the confidence and skills to face instructional challenges and continually improve their practice. Inquiry-based classroom observation cycles equip teachers with the skills and dispositions to learn about teaching from the act of teaching in a collaborative environment.

This qualitative research provides a first step into examining the impact of classroom observation cycles on the mentoring relationship. Future research could extend the study population to include experienced in-service teachers or could adopt mixed methods or a quantitative approach to better communicate the outcomes of this activity on the work of teachers along the entire spectrum of development. In addition, the need for research on the concerns of early career science teachers with regard to content knowledge, pedagogical knowledge, and PCK emerged through this study as well.

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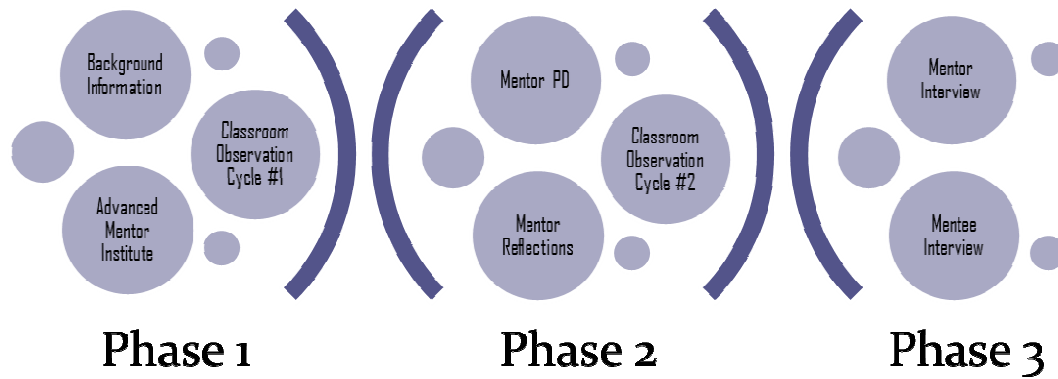
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APPENDICES

APPENDIX A

QUALITATIVE DATA COLLECTION AND ANALYSIS

The research project consisted of three phases of activities and data collection, occurring over the period of 2011-2012.



In the first phase of the study, participants volunteered to be involved in the project and background information about these mentors and mentees was collected from existing eMSS pre-participation surveys. These data were organized into a table to better display the teaching background and current positions for each mentoring pair.

Mentee	Degree	Years Exp.	Teaching Assignment	State	Community Type	Institution Type	Mentor	Years Exp.	Teaching Assignment
<b>Keisha</b>	Bachelor's	2	Middle School Mathematics	Louisiana	Rural	Public	Nora	21+	Middle School Mathematics (ret.)
<b>Pat</b>	Master's	1	High School Science	Indiana	Suburban	Public	Becky	21+	High School Science
<b>Colette</b>	Bachelor's	1	High School Science	Indiana	Suburban	Private	Lynn	21+	High School Science (ret.)
<b>Chloe</b>	Bachelor's	2	High School Science	Pennsylvania	Urban	Charter	Tom	21+	High School Science (ret.)
<b>Armand</b>	Bachelor's	1	Middle School Science	Arizona	Suburban	Private	Dawn	11-20	High School Science
<b>Sharon</b>	Bachelor's	0	High School Science	California	Urban	Public	Alissa	11-20	High School Science
<b>Emily</b>	Master's	1	High School Science	Pennsylvania	Suburban	Public	Tom	21+	High School Science (ret.)
<b>Karen</b>	Bachelor's	0	Middle School Science	Texas	Suburban	Private	Diana	11-20	Upper Elementary Science

Also, during this initial phase, mentors involved in the study participated in the Advanced Mentor Institute, a 3-week online professional development sequence that focused on the use of video recorded classroom observations in the mentoring relationship. In particular,

this sequence included readings, facilitated discussions, and a webinar that introduced mentors to: purposes for observation, video observations of beginning teachers, the observation planning conversation, collecting data during the classroom episode, and preparing for a reflective post-observation conversation.

The first phase concluded when mentors and mentees scheduled and participated in their first classroom observation cycles. The cycle consisted of audio recorded telephone conversations for pre-observation and post-observation discussions and the recording and sharing of the classroom episode video via a secure, password-protected file sharing website. Discussions were transcribed and video episodes were viewed for context.

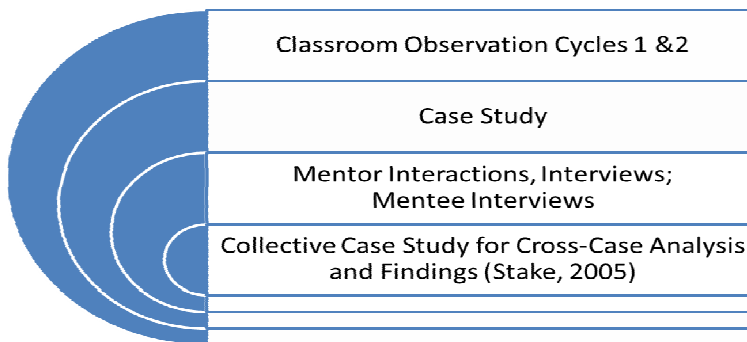
In the second phase of the study, a follow-up professional development seminar was designed and delivered. This interactive online webinar engaged mentors in discussions and activities aligned with disciplined inquiry and the five critical dimensions identified in Santagata and her colleagues' research and modified by the researcher to better reflect what may be expected in the context of observation cycles. Mentors viewed video clips of a face-to-face mentor-mentee pair that approximated each dimension, discussed the implications of disciplined inquiry on their work as mentors, and determined next steps that they planned to implement in the subsequent observation cycle. Mentors' interactions in the webinar and their responses to a professional development evaluation were recorded as text and used as a source of data in the analysis.

The second observation cycle occurred in the second phase of the study. Again, telephone discussions were recorded and transcribed and videos were viewed for context.

Following the second observation cycle, mentors completed a mentor reflection survey. This survey asked them to gauge to what degree they had enacted each of the five dimensions of disciplined inquiry.

In the third phase of the study, mentors and mentees were interviewed by telephone. These semi-structured interviews sought to capture the experience of video recorded observation cycles from each individual's perspective. Interview questions prompted participants to comment on their opinions of the purposes and goals for the observation cycles, recall key points from each observation cycle, discuss the differences they noticed between the first and second cycles, consider the benefits for participating, and state any impacts on mentees' teaching practice that they could perceive.

Data were analyzed iteratively through a systematic process.



To begin, each mentor-mentee pair was treated as a distinct case. Both sets of pre- and post-observation discussions were coded with regard to the five dimensions of disciplined inquiry and compared to determine what differences existed between the first and second observation cycles for each pair. Descriptions of the five dimensions in the Santagata (2007) article guided the selection and coding of utterances that related to each dimension. Data from each pair's interviews, the associated mentor's interactions and

evaluation from the professional development session, and the mentor reflection were then collated with these case narratives to illuminate patterns and trends for each pair. In this way, what mentors and mentees said about their experiences was compared to their actual practice in each observation cycle and organized into the five dimensions of disciplined inquiry.

Once the pairs were characterized in these case studies, the cases were read side by side to identify trends and themes across cases. As Stake (2005) contended, with collective case study, cases within the collection “may be similar or dissimilar, with redundancy and variety each important” (p. 446). These themes were categorized by the five dimensions when possible, and into an emergent findings category when unrelated to those dimensions. In all, there were themes related to each of the five dimensions along with three additional, emergent themes.

APPENDIX B

CASE STUDY – NORA AND KEISHA

*I am still a growing teacher; I'm always going to be a growing teacher. I'm at the beginning of my career and people can be very judgmental and harsh. Nora wasn't that way. She was very sweet; she was open-minded and very encouraging. It makes a big difference when you are a teacher, when you see people praising you for the great things you're doing and trying to help you get better at the things that you are kind of weak on.*  
– Keisha

### Background

Nora has been an eMSS mentor for five years and also serves mentoring roles in her local school district. Her content specialty is middle school mathematics, pre-algebra, and algebra. She has several assigned eMSS mentees, and Keisha is one of her mentees who has chosen to participate in the pilot program for implementing webcam observation cycles in the mentoring relationship. Keisha is in her third year of teaching mathematics at the sixth grade level. In a survey administered prior to the commencement of eMSS mentoring, Keisha indicated that she felt “very well prepared” to plan lessons and question students for understanding, and “fairly well prepared” to set and achieve professional goals. Keisha’s video recorded teaching episodes demonstrated that her lessons were interactive and engaged students in accessing the content Keisha had planned.

### Development of Joint Disciplined Inquiry

Through their webcam observation cycles, it appeared that Nora was keen to support the development of Keisha’s analysis-of-practice skills and improve her practice as an educative mentor. Both Keisha and Nora perceived differences in their discussions for the second video recorded observation as compared to the first, and Nora attributed these changes to a shift in her focus toward educative mentoring. In the following

sections, their observation discussions will be analyzed in light of the research-based dimensions of educative mentoring using direct evidence from the discussion transcripts and indirect evidence about how Nora and Keisha describe their experiences in interviews with the researcher.

### Concrete Evidence to Inform Decisions about Teaching

In both rounds of webcam observation cycles, Nora elicits from Keisha her focus for the observation and collects data while viewing the video recorded lesson. However, Nora's focus on using concrete evidence to support Keisha's analysis of an aspect of her teaching was more pronounced in the webcam observation cycle following the professional development. In her professional development evaluation, Nora wrote:

I have already begun to think about how this will impact my work with mentees in a local middle school as well as online in eMSS. This is a more professional and scientific approach based on data. Time and focus is given to analysis and input from the mentee, not from the mentor. I would personally like to develop these tools so the new teachers do the analysis while drawing conclusions and projecting change. I only guide through the process.

Nora's approach to the second round of observation cycles was data-centric, and she presented objective information about Keisha's verbalizations to students and elapsed time for particular segments of her lesson. In an interview following the observation cycle, Keisha described the differences that she perceived between the first and second observations:

The first time it was more, "Here's what I observed. Here's how you can improve." This time it was more, "So do you think if you tried this it would work?" Like trial and error, question and answer... "Here's my suggestion, you should try this. Do you think this is going to work? If

you try it, what should you change or what kinks need to be taken out?”  
Make it fit your life.

Nora’s intention to place responsibility for the analysis on the new teacher seems to be actualized in a way that Keisha noticed. Keisha indicated that she preferred the second observation because she felt Nora “was being way more honest with me” and found that Nora’s questions helped her more effectively analyze her own teaching. In her interview, Nora shared that she felt that Keisha “seemed to be more responsive about what I had to say and what she could conclude from the lesson.” In this case, the experience for both mentor and mentee seems to have been enhanced through a greater focus on objective evidence to analyze a particular instructional focus.

#### Identification of Mathematics Content Learning Goals

Nora and Keisha discussed the mathematics content of the lessons in the pre-observation discussions for both rounds of webcam observations. However, in the second observation cycle, the discussions about content were more limited compared to the first. Since Keisha’s focus for the second lesson was on the delivery of instruction and not necessarily on the content itself, it is not surprising that less time was devoted to the mathematics concepts and skills as a discrete topic in the conversation. Indeed, neither Nora nor Keisha elaborated on conversations about content in their interviews at the conclusion of the study.

It seems that to this mentor-mentee pair, webcam observations were primarily a tool to analyze instructional practices and not necessarily a vehicle for discussing content. When she was asked how she would describe webcam observation cycles to another

eMSS mentee, Keisha said, “I would definitely tell them that it’s a reflection tool... It gave me the chance to reflect on my performance as a teacher and actually critique myself with the help of more experienced teachers.” Nora’s description of webcam observations as a tool to “objectively look at teaching” seems to coincide with Keisha’s perspective as well. Though there was little discussion of instructional content, it did not appear to adversely affect the observation cycle process.

### Analysis of Student Learning Opportunities

While there was some discussion about student learning opportunities in Nora and Keisha’s discussions regarding the first webcam observation, there was a greater emphasis on this dimension in their second observation cycle. Given the broad focus of the initial observation – how well Keisha executed the lesson – there were many directions that Keisha and Nora’s conversation could have taken.

In their second observation cycle, the focus for the lesson – teacher interactions and their impact on students – was intricately related to student opportunities for learning. In their post-observation discussion, they discussed Keisha’s pace during the review portion of the lesson and its impact on students:

Nora – I noticed that you moved at a fast pace through your review. Do your students respond to this pace? The reason I ask is that in your December observation there was a slower pace...

Keisha – If they respond quickly, like if they respond before I ask the question, I go faster... As far as the review, they were getting it. If I feel like they are getting it, I will go faster, just so I can see the response time...

Nora – I see. Well, now, the students usually respond at your faster pace, then. Is that what you’re saying?

Keisha – Yes. Some of them. Not all of them. The ones that do not I take them to the side. After review some days, we start on homework and I

work with just those ones... They need to show me while I'm sitting there with them.

Nora prompted Keisha to consider whether the pace at which she conducted the review was appropriate for her students. In her mentor reflection for this observation, Nora recalled that she “guided her to discuss if all students were engaged when she moved at a faster pace.” Nora identified an opportunity to raise questions and prompt Keisha to consider the impact of her actions on student learning opportunities. Though in the end Keisha may not have drawn the conclusion that her pace was too fast to engage all of her students, Nora has nevertheless scaffolded and modeled the process of examining an instructional decision and its impact on student outcomes. The dimensions of self-analysis and self-adjustment, addressed in the following sections, are intricately related to this analysis of student opportunities for learning and provide additional evidence of Nora and Keisha’s progress toward joint disciplined inquiry.

### Critical Approach

One of the most evident differences between the first and second observation cycles was related to critical approach. In the first webcam observation cycle, Nora offered judgments – both positive and negative – of Keisha’s teaching. As Nora explained in her interview, her prior experience with classroom observations was based on a different model. She shared, “I had been trained by the state. It’s just 1, 2, 3 steps: positives, negatives, and improve by the next time.” Keisha seems to have perceived this evaluative stance in the first observation cycle as well. In her interview, she shared that, “The first time it was like, ‘Mentor’ and ‘Mentee.’ You know, you can’t cross those

lines.” Nora, Keisha, and outside observers could see evidence that Nora’s initial approach, based on her prior experience with classroom observations, was mentor-directed and evaluative.

After the professional development session in which the importance of novice teachers developing their own self-assessment skills through educative mentoring was presented, Nora changed her interpretation of her role as mentor. In the second observation cycle, Nora refrained from offering critical judgments and seemed to assume the role of facilitator. Rather than presenting conclusions to Keisha, Nora presented data about Keisha’s verbalizations and students’ time-on-task and asked questions of Keisha. As she noted in her mentor reflection, “I was pleased when the teacher acknowledged that the kidding around may be getting out of hand and she did not want to lose instructional time. This is exactly what I hoped she would conclude.” By structuring a conversation around the instructional episode, Nora helped Keisha take a critical stance toward her own teaching and identify areas to improve.

In her interview at the conclusion of the project, Nora related that she was pleased with the outcomes of this observation. She said, “I saw progress in Keisha’s self-realization of things that need to be changed, improvements which could be made.” Keisha echoed that sentiment in her interview when she said, “It definitely helped me grow as a teacher and make changes necessary and needed for my students’ success.” Placing the responsibility for self-assessment in the hands of the novice teacher was a charge that Nora assumed following the professional development. Both mentor and

mentee seem to recognize the value and benefit of this dimension of joint disciplined inquiry.

### Alternative Teaching Strategies

Nora's approach to alternative teaching strategies shifted from the first to the second webcam observation cycle. In the first cycle, few recommendations emerged for alternative teacher actions, and those that did were offered by Nora directly. In the second observation cycle, Nora was careful to not personally recommend any changes about the pacing of the lesson, but rather guide Keisha to identify them for herself. However, despite Nora's best efforts in the debrief conversation Keisha did not state intentions for trying an alternative strategy. In her mentor reflection, Nora wrote about her process and the outcomes of this different approach:

I was unable to bring her to the point that her review was quite long and that the beginning of the main body of the lesson was 24 minutes into the period. I never got there and was not sure how to proceed since she was not putting that together. If she had concluded that the review is where she is losing instructional time and using too much entertainment to engage students, then we could have talked about restructuring her time more effectively.

This appears to represent a missed opportunity in the observation cycle, and it is clear that Nora wrestled with the implications.

Surprisingly, an important finding emerged from the interviews at the conclusion of the study. While it appears from the post-observation transcript that Keisha did not commit to an alternative strategy, this later conversation revealed that she had implemented changes following the observation cycle. When asked to summarize the important events from the second observation cycle, Keisha reiterated the focus for the

observation and shared that following the observation she changed the way she begins her lessons based on the data Nora collected:

I was like, “Hold on! This is supposed to last 10 minutes” and I’m taking away time from the lessons or from homework check. That was one thing I did take away. I have improved on that... I have a timer set now. You have so many minutes to complete it, and so many minutes to check.

What appeared to be a missed opportunity may represent an important caveat about the work of joint disciplined inquiry. Evidence for novice teachers’ development is not limited to what they discuss in the post-observation conversations. Rather, a broader field of vision may be necessary to identify the many ways novice teachers are impacted by joint disciplined inquiry.

#### Benefits for Using an Educative Mentoring Approach

Nora seemed to reflect on the relative benefits to conducting observations in the spirit of joint disciplined inquiry as compared to her former approach that was mentor-directed and offered evaluative feedback to the mentee. In her interview, she summarized her thoughts in this way:

Well, with our teachers today, it is very obvious that they have been trained in reflection... We need to feed on that because that’s what makes a stronger teacher... That’s the strength – they can reflect, they can take that reflection and analyze where they want to strengthen. They know where their weaknesses are coming from, and with our probing questions and our encouragement, they are going to be stronger teachers. They are going to soar and find different ways of doing things.

Nora sees educative mentoring as building on novice teachers’ strengths in reflection and supporting them to analyze changes in their teaching practice. It seems that Keisha holds

similar views about educative mentoring because she referred to webcam observations as “an awesome reflection tool” in her interview.

Later in the interview Nora referred to novice teachers’ reflection and change as “internalizing” teaching. It seems that, to Nora, learning to teach is not about collecting a set of procedures and techniques, but is rather an internal process of analyzing instructional decisions and continuously improving one’s practice. Keisha seems to hold complementary views, since she shared that “actually watching the video of myself was, I think, the best part of it.” Conducting the webcam observations with an educative mentoring stance seems to coincide well with Nora’s beliefs about the types of experiences that will best serve novice teachers and with Keisha’s enthusiasm for reflecting on her teaching practice.

### Closing

Nora seems to have embraced the educative mentoring framework for conducting webcam observation cycles. Her interactions with Keisha offer several lessons learned:

- Though mentors may be nervous to present data to their mentees, Keisha serves as an example of a mentee who thrived on the objective feedback she received from Nora. Keisha felt that Nora was “being way more honest” and Nora perceived that Keisha was “more receptive” when they engaged in joint disciplined inquiry in their second observation cycle.
- The outcomes from a disciplined inquiry approach may not be immediately apparent. Though Nora was somewhat discouraged that Keisha did not evidence

self-adjustment in their post-observation discussions, later conversations with Keisha revealed that she made substantial changes to her teaching practice based on the observation experience.

APPENDIX C

CASE STUDY – BECKY AND PAT

*It's like having an evaluation without the pressure. I like and also feel nervous to be evaluated, just like anyone would. But, when it's not your supervisor, who controls the fate of your job, it's just a lot easier to take. You're just getting feedback from someone who's more experienced than you... Becky just wanted me to improve my teaching the best I could, which is what it should all be about. – Pat*

### Background

Becky is a high school science teacher with more than twenty years of classroom experience. She has served as a department chair and mentor to pre-service teachers as well as her peers. Becky holds a Master's degree in science education and has earned awards for her teaching practice. Pat is one of Becky's mentees who agreed to participate in the webcam observation pilot project. Pat is in his second year of teaching high school science. He is currently teaching in a public high school in a suburban setting. In addition to earning a Master's degree, he reports taking two online courses, seminars, or discussion groups in science prior to his involvement with eMSS. In a survey administered prior to the commencement of eMSS mentoring, Pat indicated that he felt "fairly well prepared" to plan lessons and question students for understanding, and "somewhat prepared" to set and achieve professional goals.

### Development of Joint Disciplined Inquiry

From the beginning of the webcam observation pilot program, Becky appeared to embrace an educative mentoring stance and to seek ways to more fully implement joint disciplined inquiry with Pat. Becky was committed to collecting and using data to support Pat's inquiry into his teaching practice. Though Pat seemed reluctant to commit

to changes in his practice based on the outcomes of the inquiries, the experience was nevertheless valuable to both mentor and mentee. Their interactions offer insight into a mentoring relationship in which the mentor is skilled and committed to disciplined inquiry, but the mentee's analysis-of-practice skills are in development. In the following sections, their observation discussions will be analyzed in light of the research-based dimensions of educative mentoring using direct evidence from the discussion transcripts and reflections as to how Becky and Pat describe their experiences in interviews with the researcher.

#### Concrete Evidence to Inform Decisions about Teaching

Becky had a data-focused approach to both webcam observation cycles. She used the Selective Scripting Tool in both cases to collect data on Pat's area of focus for the lesson observation. Prior to each post-observation discussion, Becky sent Pat the completed Selective Scripting Tool so that they could review the data together.

It was interesting that in the first post-observation discussion, Becky and Pat spent little time discussing the data that Becky had collected. Perhaps because of this, Pat and Becky had somewhat competing memories of the conversation when they spoke about it in our interview at the conclusion of the project. When asked about the main points in the conversation about the first observation cycle, Pat responded:

I had asked her to look and see where I spend most of my time. She told me that I was up and moving around and it didn't seem like I went towards one group or another, which is what I was looking to see.

Becky's notes on the Selective Scripting Tool indicate that Pat was circulating around the classroom and indicated his multiple interactions with students. However, Becky recalls the debrief in a slightly different way in the interview:

One of the things he wanted me to look at was whether he was focusing in on all the kids or just on the few kids who were responding to him. He did do that a bit. He was not quite as good about getting around the whole room as maybe he wanted to be. I guess I sort of confirmed that for him.

Whereas Becky believed that the data she collected led Pat to see that he favored some groups over others, Pat did not seem to have a common understanding. Their limited interaction around the data in the first observation cycle seems to have contributed to divergent descriptions of the conversation and outcomes.

In the second observation cycle, Becky was notably more focused on discussing the data and elaborating on the trends. Whereas she and Pat described the conversation in a similar way in their interviews, it was clear that they differed in their interpretation of the information and its implications on Pat's practice. Becky had tallied the distribution of teacher-talk and student-talk in Pat's classroom and found that the teacher contributed 19 minutes whereas the students spoke for two minutes. Becky seemed to believe this was surprising because it was contrary to what Pat had expected to see. In the interview, she said about the data she collected, "Wow, this is so teacher-centric, when that was exactly what he didn't want to do." However, Pat seemed to attribute the heavy weighting of teacher-talk to the nature of his students:

I spend much, much more time talking than the students did. That was kind of a surprise to me because as I went through it, I didn't feel like that was the case. She wrote it down minute by minute. That's what happens sometimes. They were not very talkative that day, but it was kind of eye-opening to see that.

Despite Becky's best efforts to prompt Pat to think deeply about the data and its impact on his instructional decisions, Pat did not commit to identifying changes he might implement to better balance the student and teacher contributions to discussions.

It seems as though Pat's analysis-of-practice skills are still in development because he stops short of attributing the imbalance of teacher and student contributions to an aspect of his teaching over which he has control. Becky's attempts to scaffold and support Pat's review of the data seem to have not had an immediate impact on Pat's thinking. Perhaps future professional development or mentor tools can be developed to support mentors working with mentees who are developing their analysis-of-practice skills. It may be that a more direct approach is necessary to model for the mentee how to identify the implications of the data in light of the focus question.

#### Identification of Science Content Learning Goals

Becky and Pat teach similar content in their classes, and in both observation cycles they discussed biology content and science-specific instructional strategies. Their conversation about content seemed to provide context for the lesson and demonstrate the continuity between the observed lesson and the ones that came before and after it. However, since their post-observation conversations addressed multiple topics, there was little integration of the discussion of content with the focus of the lesson. Perhaps the absence of content in an integrated discussion of the lesson observation provides additional evidence that productive disciplined inquiry can occur without a discussion of the lesson content.

### Analysis of Student Learning Opportunities

Becky and Pat had only limited discussions of student opportunities for learning. Perhaps their diminished treatment of this dimension of disciplined inquiry contributed to some of the challenges Becky faced in prompting Pat to draw conclusions about the impact of his instructional decisions on his students. Like Becky and Pat's partial success in the dimension of data, their discussions around student learning opportunities may be constrained by Pat's developing analysis-of-practice skills.

In the first round of webcam observation cycles, Becky and Pat explored how well Pat moved between groups of students in the classroom. However, in their pre-observation discussion, they did not outline the implications of the information on Pat's practice. In other words, they did not articulate the outcomes for students if Pat spent more or less time responding to their questions or requests. It appeared that Becky may have assumed that Pat was able to independently identify how his unequal time with groups may impact his students. However, it is not clear whether Pat has fully developed these skills.

Likewise, in their second observation cycle, Becky and Pat selected an area of focus but did not hypothesize about the impact of that focus on Pat's students. Becky lamented in her mentor reflection following the post-observation discussion that she "was not terribly comfortable pushing" the conversation back to the data and its implications. Since she and Pat had not discussed student opportunities for learning in their pre-observation discussion, it may have made it harder for Becky to introduce the implications in the post-observation conference. After all, Becky shared in the interview

that she felt comfortable using the disciplined inquiry approach because “it’s all data-driven. It’s not me saying, ‘Oh, you did this.’” Becky seems to appreciate the objective approach and a degree of dispassionate distance from the evaluation. Indeed, identifying ahead of time the cause-effect relationship between the teacher actions on which mentor and mentee focus and the observable student outcomes may facilitate this conversation and maintain the mentor’s objectivity. This may be especially important with mentees who have less well developed analysis-of-practice skills.

### Critical Approach

In a similar way to the dimensions of data and student opportunities for learning, Pat demonstrated few instances in which he critically evaluated his teaching in both the first and second observation cycles. Indeed, more often he attributed difficulties to factors outside of his control, such as student profiles or the content he was teaching. This presented a challenge for Becky, who seemed to be committed to reserving her evaluative feedback and to supporting Pat to self-critique his practice.

In their second debrief conversation, Becky prompted Pat to consider the data that she collected and its implications for students. Becky persisted, but Pat seemed reluctant to identify an area that he could improve:

Becky – What did you think about the difference in time between how much you spoke versus the kids?

Pat – Oh, I didn’t really look at that... Oh, the student responses took about two minutes total. Wow.

Becky – Yeah.

Pat – Yeah, that’s not a whole lot. I remember that day. That class wasn’t very talkative...

Becky – So, you are still very much directing things...

Pat – The students I have want to give the shortest answer possible. They don't want to expound on something. If someone starts to do that, they start to zone out and no one listens and no one responds back. Sometimes they don't do that. Sometimes they're engaged in a good discussion, and sometimes not.

Becky – So on the days when they have been able to engage in a good discussion, what have you noticed that either you're doing or they're doing that allows that?

Pat – I think it's really just the topic. How into the topic they are.

Despite Becky's perseverance, Pat did not self-assess his approach or identify anything within his control that may have resulted in more consistent student engagement in class discussions. Even with Becky's prompt to examine what "you're doing or they're doing," Pat attributed the problem to sources outside of his control. Though this appears to be a missed opportunity for developing Pat's self-evaluation skills, it also illuminates the dynamic nature of the relationship between mentor and mentee. Both parties influence one another and contribute to how fully joint disciplined inquiry can be actualized.

### Alternative Teaching Strategies

Similar to their treatment of critical approach, Becky and Pat's conversations around alternative strategies are somewhat limited. Perhaps because Pat attributed issues to circumstances outside of his control, he does not appear to actively seek alternatives to the instructional methods he was currently using. What is notable is that Becky did not offer unsolicited recommendations in either observation cycle, though she attempted to cajole Pat into identifying potential self-adjustments.

Becky seemed to be committed to being an educative mentor, and understood that to mean that she would guide Pat to self-assess and self-adjust his practice. In the

interview she shared her interpretation of her role as an educative mentor, “I know the goal is to say, ‘Well, let’s work together, especially you. How can I help you come up with a plan?’” Becky seemed disheartened that Pat did not commit to changes right away, but remained hopeful that the experience would have an impact on Pat at some point in his career. When I asked her what impact she thought the webcam observations had on Pat’s ability to teach science, she said:

Hmm... That’s a great question! I don’t know. I mean, he seemed to reflect on my statements, but it’s hard to tell if he made changes in the classroom. I don’t know, actually. It could be something that hits him a year from now, too. I think there’s so much to being a new teacher, some things don’t hit you until later.

Ultimately, Becky understands the goal of the webcam observations to improve her mentees’ teaching practices, but it is clear in this case that this objective may not have been fully realized in the case of Pat.

It is interesting that Pat also seems to recognize his ambivalence towards changing his instructional practices. In the interview, he stated:

It’s just for me, it’s still... The whole thing kind of helped. I’m still trying to find my style as a young teacher. Getting further evaluations kind of helped me look at the areas I was kind of weak and the areas I was having trouble with.

It seems as though, despite not articulating them in the post-observation discussion, Pat recognized that there were areas where he was “kind of weak.” He also appears to view webcam observations as a forum for examining these trouble spots. Perhaps Becky is onto something as she looks for development of Pat’s instructional practice on a longer time range. Just as Keisha exhibited development weeks after her post-observation discussion with Nora, so too may Pat’s instructional change come at a later date. Again,

a broader field of vision may be necessary to identify the many ways novice teachers are impacted by joint disciplined inquiry.

### Benefits for Using an Educative Mentoring Approach

Despite some challenges to fully implementing joint disciplined inquiry, Becky seems to value the approach and the benefits to the mentoring relationship. During the interview, she spoke about how she took what she had learned in the professional development session and planned her second observation cycle:

Before I talked to Pat, I made notes to myself going back to the training. Pre-conference: this is the stuff I want to do. During the video cam: this is what I want to do. I had something to look at. Post-conference: This is what my role is.

Becky seemed committed to what she called “a whole new way of mentoring” and how it could help Pat to develop his instructional skills.

Surprisingly, despite Becky’s steadfastness to the process, there were struggles and missed opportunities. Compared to other mentees, Pat seemed to have less well developed analysis-of-practice skills. Perhaps because he was not as skilled in disciplined inquiry, even Becky’s best attempts fell short. Their case provides an interesting perspective into the dynamic interplay between mentor and mentee. It also prompts analysis of how the process can be better structured to support mentees, no matter how well developed their analysis-of-practice skills.

Closing

Becky seems to have embraced the educative mentoring framework for conducting webcam observation cycles. Her interactions with Pat offer several lessons learned:

- Structuring the pre-observation discussion around the focus area and a hypothesis about the impact of particular teacher actions on students' opportunities to learn may be a critical factor in the efficacy of joint disciplined inquiry. This is likely to most benefit mentees who are less skilled in analysis-of-practice, who may not be able to independently identify the implications of their actions on their students.
- The outcomes from a disciplined inquiry approach may not be immediately apparent. Though Becky was somewhat discouraged that Pat did not commit to self-adjustment in their post-observation discussion, the interview with Pat revealed that he was still considering Becky's observations and feedback. Even at the end of the interview, Pat said, "I went back and watched it myself. I was like, 'Oh, yeah. I'm talking a whole lot more than the students and I'm not giving them a lot of time to respond on a lot of questions.'" While the breakthrough has not yet been evidenced, it appears that Becky's attempts to push Pat toward self-assessment and self-adjustment are exhibiting incremental progress.

APPENDIX D

CASE STUDY – LYNN AND COLLETTE

*I think in general just to keep an open mind and try to look at your own teaching through a different point-of-view and be open to different possibilities [the webcam observations] can help you to do that more habitually. It's easy to close your door and do what you do, but I think the observations keep you on your toes a little bit. – Collette*

### Background

Lynn has been an eMSS mentor for three years and also serves mentoring roles in her local school district. Her content specialty is middle school science. She has several assigned eMSS mentees, and Collette is one of her mentees who has chosen to participate in the pilot program for implementing webcam observation cycles in the mentoring relationship. Collette is in her fifth year of teaching, which includes three years of teaching in a self-contained classroom and the two most recent years as a middle school science specialist in a suburban Catholic school. In a survey administered prior to the commencement of eMSS mentoring, Collette indicated that she felt “fairly well prepared” to plan lessons, question students for understanding, and set and achieve professional goals.

### Development of Joint Disciplined Inquiry

It was clear throughout the webcam observation cycles that Lynn and Collette were interested in engaging in joint disciplined inquiry. Lynn demonstrated educative mentoring skills in the first observation cycle and appeared to improve her practice following the professional development sequence. Collette appeared to be self-reflective about her practice and to have strong analysis-of-practice skills that were evidenced and improved through her interactions with Lynn. Both mentor and mentee spoke in their

interviews at the conclusion of the project about how they used the observation cycle experience to inquire into Collette's teaching and determine strategies that may better impact student outcomes. In the following sections, Lynn and Collette's observation discussions will be considered in terms of the research-based dimensions of joint disciplined inquiry.

### Concrete Evidence to Inform Decisions about Teaching

In both rounds of webcam observation cycles, Lynn and Collette used evidence from the observation to analyze an aspect of Collette's teaching. The first observation had a general focus – how well Collette was engaging her students in the instruction – and Lynn shared anecdotal data in their post-observation conversation. In the evaluation for the professional development session Lynn attended before the second observation, Lynn wrote that she would like to “start setting more measurable goals with my mentee.” Their conversation was noticeably more focused on concrete data in the second observation as compared to the first, and both Lynn and Collette commented on that in their interviews.

In the pre-observation discussion for the second observation, Lynn prompted Collette to select an area of focus that would yield quantitative data. Together, they decide to track Collette's frequency of interaction with each group of students during the class period. Collette seemed to appreciate the concrete data in the second observation when she noted in her interview:

I think maybe it made me take it more seriously, I guess. Not that I didn't take the first one seriously. It had evidence behind it. I could look and

say, “Yes, I really did talk to this group more.” Or the opposite. I’m a numbers person, too, so that tends to stick with me more than a descriptive comment might.

Collette commented several times about the differences she noticed in terms of the feedback being more specific in the second observation. She concluded, “I just feel like our conversation actually matched with what we wanted to talk about better.” With a measurable focus and concrete data, Collette seems to feel better equipped to analyze her teaching in light of her selected area of focus. Lynn seems to have a similar impression as she spoke about the second observation in the interview following the project:

We did focus more on one aspect. So, rather than skimming the top of the whole entire lesson, we could go deeper into that one aspect and focus more on why did she think she was at one location more than others.

Using concrete data and a concentrated focus framed Lynn and Collette’s observation discussion as an analysis-of-practice exercise.

Together, Lynn and Collette engaged in joint disciplined inquiry. Collette’s impression that she took the second observation “more seriously” may indicate that she felt more engaged in the process of evaluating her teaching. Rather than simply receiving feedback on her overall process, Collette and Lynn collaboratively examined data and addressed “why did [Collette] think” she behaved particular ways in the instructional episode.

#### Identification of Science Content Learning Goals

Lynn and Collette engaged in few discussions about science content in either of their webcam observation cycles. Their focus during these conversations was notably more focused on instructional practice than on content. In some ways, it seemed as

though Lynn and Collette regarded the science content as arbitrary and instead placed a greater focus on the nature of teacher-student interactions in general.

Interestingly, both Lynn and Collette spoke about the importance of having a science-minded professional provide feedback for science teaching. In her interview, Collette mentioned, “science is its own animal, so even an administrator who’s sitting in on your classroom may not have the insights that another experienced science teacher would.” Lynn seems to have a similar impression when she said:

Science is kind of its own beast. It’s hard for people to understand some of the dynamics of a science classroom because you have so much of that inquiry going on and so much of that hands-on stuff that they may not have in a language arts class.

Lynn’s comments seem to suggest that science teachers have a unique perspective and are able to filter what they see in another science classroom through this lens. Though she and Collette do not speak explicitly about science content or science-specific instructional approaches, it appears that she and Collette appreciate sharing a common theoretical perspective. It seemed as though Lynn and Collette sensed common ground, and while there was little direct discussion of instructional content, it did not appear to adversely affect the observation cycle process.

### Analysis of Student Learning Opportunities

Lynn and Collette also engage in few conversations about evidence of student learning. It appears that there may be a missing piece in their definition of the area of focus. In other words, although Lynn and Collette adeptly selected a specific aspect of Collette’s teaching on which to focus, they missed an opportunity to define its impact on

student learning. A greater focus on the opportunities for learning may have made clearer the cause-effect relationship that Collette's instructional decisions had on students' learning.

There was evidence of this missed opportunity for a fully realized inquiry into the student learning impacts of Collette's instructional decisions in the second observation cycle. Though Lynn and Collette selected an important focus for the observation – the frequency with which Collette interacted with groups of students – the implications of the data were not fully articulated. As a result, Lynn and Collette seemed to struggle to find unifying patterns or themes and instead examined distinct data points in isolation of one another. This is evident toward the end of the conversation as Lynn and Collette summarized and wrapped up their discussion:

Lynn – This might help you to see. You'll know better because you know the kids. Were these behavior issues? Were these kids who were trying to dominate your time as the teacher and share all of their wonderful knowledge? What was the reason? And the zeroes. Was it that those kids are just your kids that are always fine and that are always doing what they're supposed to? Or is it, maybe, that they're just totally lost and they're getting lost in the shuffle?

Collette – I think the zeroes are both the kids who are very independent and then there are a few on there that may not necessarily be completely lost, but definitely quiet and reserved.

While it was likely worthwhile for Collette to consider individuals and the reasons for differences in the frequency of interaction, the experience may not have provided the information that Collette would need to better understand how her interactions impact students in general. Had Collette and Lynn more fully fleshed out the relationship between teacher interaction and the student learning outcomes under investigation, their

inquiry into Collette's teaching may have illuminated trends instead of discrete and highly contextualized events.

### Critical Approach

There was evidence of some difference in Lynn and Collette's discussions between the first and second observation with regard to evaluative judgments. In the first observation cycle, Lynn offered judgments of Collette's teaching, mostly positive and some critical. Collette seemed to notice this because in her interview she said, "She mainly pointed out positive things about my lesson, which was helpful because I was feeling frustrated with how things were going with that class in general." In other mentoring models, evaluative feedback is an expected part of the discourse during post-observation discussions. Since this observation cycle occurred before the professional development sequence about educative mentoring, Lynn may have relied on her previous experience with a different mentoring model. Indeed, in her reflection at the conclusion of the professional development session, Lynn stated that she would like to cut back on "offering automatic 'fixes' to problems that arise." It is clear that her thinking about her role with regard to evaluative feedback shifted during the professional development session.

In the second observation cycle, Lynn's approach to the post-observation discussion seemed to foster more collaboration and joint deliberation about instructional strategies and techniques. Together, Lynn and Collette examined data about Collette's interactions with students and the distribution of her time amongst the student groups. Their joint disciplined inquiry provided the opportunity for Collette to reflect critically on

her instructional decisions. In her interview, Collette said that their conversation “was kind of eye-opening because you think you may be visiting groups the same amount, but that may not necessarily be the case, so I found that helpful.” It seems as though Lynn structured the conversation to support Collette to engage in analysis-of-practice. While Collette appreciated the positive feedback she received from Lynn in the first round of observation cycles, it appears that she found this approach to be “helpful” and beneficial as well.

#### Alternative Teaching Strategies

Lynn and Collette both appear to regard observation cycles as a forum for considering alternative teaching strategies. In the first cycle, Lynn had a much more direct approach to offering suggestions as compared to the second observation. In their second debrief conversation, Lynn’s approach to alternatives was more collaborative and less direct than their first debrief. Following the professional development sequence, Lynn committed to supporting Collette to self-adjust. In her interview, Lynn shared:

I’m really bad sometimes about trying to offer a quick solution to something. I have to work on myself. How am I going to word this or question this to get her to think more deeply about it rather than just say, “Maybe you want to do this? Maybe you want to try that?” To get her to develop a solution, because she knows what’s going to work for her and her students.

Lynn seemed to appreciate the value of supporting Collette to self-identify alternative strategies.

In the second observation cycle, Lynn guided the discussion towards alternative grouping strategies that Collette might try to better respond to the needs of her students.

Lynn questioned Collette about several grouping techniques, and their conversation shifted to a discussion of ability grouping. In reflecting on this second observation discussion in her interview, Collette shared:

In school I was always taught to do multi-level grouping and take kids of different abilities. I had just been at the NSTA conference where I heard someone talking about doing more ability level grouping. That was something that my mentor challenged me to think about, too. I think there are a lot of good reasons to do that. That has caused me to think about how I'm going to do my groups... I'm actually trying it this week with a project with my eighth graders.

Collette seemed to have been grappling with the idea of ability grouping and its potential impacts on students, given that the conference occurred several weeks before their conversation. Her interaction with Lynn appeared to provide her with the opportunity to fully consider an idea that was contrary to the philosophical approach of her pre-service training. As Lynn related in her interview, "You just have to adjust and it's OK to try new things. I feel like she was open to that." It seems as though Lynn's commitment to supporting Collette to self-adjust her practice was realized. In the end, Collette demonstrated that she was able to analyze her practice with Lynn and commit to trying an alternative teaching strategy. Lynn's educative mentoring approach to this second webcam observation process seemed to empower Collette to implement a strategy she may not have considered in the past.

#### Benefits for Using an Educative Mentoring Approach

Lynn seemed to value the role of webcam observations to further develop Collette's confidence in experimenting with her teaching practice. In her interview, Lynn

shared, “We all want reassurance that it’s OK if you mess up, you learn from that, too. This didn’t work, how can you change that? It’s OK to think outside of the box in terms of your own teaching.” Lynn seemed to embrace the opportunity to engage in joint disciplined inquiry with Collette and to build in her the skills and self-assurance to undertake this work on her own.

Collette also seemed to appreciate the joint inquiry in which she and Lynn engaged. In her interview, she noted, “I tend to be fairly reflective about my teaching. It’s helpful to have somebody go through that process with you... It encourages me that much more because somebody will take the time to do that.” It appears that Collette is confident in her ability to self-reflect on her practice, but that she also finds value in having Lynn by her side. For both parties, educative mentoring appears to have been highly regarded and well-received.

### Closing

Lynn appears to have committed herself to engaging in disciplined inquiry in the context of the webcam observation cycles. Her interactions with Collette offer several lessons learned:

- While it may appear to be more time-intensive to collect data during the observation, a concentrated focus on data facilitates the post-observation discussion. For mentor and mentee alike, it makes the “goal seem more achievable” and the conversations “align more clearly” with the mentee’s focus for the lesson.

- Though mentor and mentee may not tangibly address science content and science-specific pedagogy, their shared identity as science teachers seems to contribute to their analysis. Since science teachers perceive that it is difficult for teachers outside of their field to “understand some of the dynamics of the science classroom,” there may be a benefit to content-specific pairing for observation cycles in science and other content areas as well.

APPENDIX E

CASE STUDY – DAWN AND ARMAND

*For one thing, because it's been such a tough year this year, [one benefit] was getting that positive reinforcement that I really wasn't getting here at the school. I'm kind of debating the whole teaching thing. So I think with the webcam observations, and the whole mentee process, the whole focus was that there is hope, that there are things that I do need to work on, but they're workable. It was very nice to get an objective, outside opinion. It was critical, but in a positive way. Positive criticism, not just criticisms. – Armand*

### Background

Dawn is an experienced middle school science teacher and science professional development provider who holds a Master's degree. She has served on the district curriculum committee and supports the instructional practices of the other science teachers in her school. Armand is one of Dawn's mentees who agreed to participate in the webcam observation pilot project. Armand is in his second year of teaching middle school science. He is currently teaching at a private Catholic school in a suburban setting. In addition to earning a Bachelor's degree, he reports taking two online courses, seminars, or discussion groups in science prior to his involvement with eMSS. In a survey administered prior to the commencement of eMSS mentoring, Armand indicated that he felt "somewhat prepared" to plan lessons, question students for understanding, and set and achieve professional goals.

### Development of Joint Disciplined Inquiry

Dawn seemed to approach the webcam observation cycles with an educative mentoring stance from the beginning of the pilot program. Dawn's role as professional developer in her district seemed to have impacted her beliefs about the most effective methods for advancing instructional practices. In her interview at the conclusion of the

project she said about traditional, evaluative approaches to observations, “I think mentors tend to want to do that anyway. We’re teachers – we want to find a quick fix. I know in the long run that doesn’t change behavior, when we just tell people what to do.” Dawn’s previous experience seemed to have developed in her an entrenched educative mentoring stance that was well aligned to the disciplined inquiry approach that we were hoping to implement in the webcam observation cycles.

It was interesting that Dawn, the mentor in the project with the greatest prior development of educative mentoring skills, was paired with the mentee in the project who had the most fundamental instructional challenges with classroom procedures and management. Several of the other mentors reflected on their work with their mentees who had fairly well developed instructional skills and questioned whether this approach would be successful with teachers who had more basic challenges. For instance, in her interview with me, Nora said:

There are some teachers that you need to have the wisdom to say, “I need to step in because they’re going to drown here.” I have to step in and take a little authority and say, “I need to help you with this,” and throw out some ideas, especially with classroom management.

Dawn’s prior experiences provided her with the insight into how to frame her role to best support Armand. What was most notable about her approach was that it was mentor-directed, yet still reflective of the dimensions of disciplined inquiry. In both post-observation discussions, the proportion of Dawn’s utterances heavily outnumbered Armand’s (83% and 80%). Just as Nora had anticipated, joint disciplined inquiry can be supported, but it requires a mentor who is willing to “step in” and guide the conversation.

In the following sections, their observation discussions will be analyzed in light of

the research-based dimensions of educative mentoring using direct evidence from the discussion transcripts and indirect evidence about how Dawn and Armand describe their experiences in interviews with the researcher.

### Concrete Evidence to Inform Decisions about Teaching

From the beginning of the project, Dawn placed a central focus on data in her conversations with Armand. She described webcam observations in terms of how they benefit mentees in her interview at the conclusion of the project in this way:

I think when people really reflect, they do know where their weaknesses are. For them to say, “Here’s where I’m weak. This is where I need help. Look at me. How can you help me with this issue?” It’s easier for us to help them, but it also empowers them to say, “OK, there’s an area where I’m weak, and this process is going to help me see myself more objectively... You can’t see that while you’re teaching, especially when you’re a new teacher.

Dawn seems to value the disciplined inquiry approach because it allows mentees to identify an area of focus and then look at data to see a perspective they may not have while they are engaged in the act of teaching.

Armand seems to have developed a similar appreciation for the webcam observation cycles. He described the webcam observations as a way for his mentor to see his teaching from a different perspective. He said, “If there’s something that I’m not aware that I’m doing that isn’t benefitting the kids, she can see it and can tweak what I’m doing to help improve the teaching, the instruction, or the management.” It seems as though the data-focused approach to webcam observations helps even struggling teachers to identify how their actions impact their students. Dawn’s educative mentoring

approach helped Armand to gain an objective perspective on his teaching and identify areas that he could improve.

Dawn seemed to take a direct approach to selecting the data that she would collect. While she prompted Armand to identify the area of focus for the observation, Dawn solicited little input from Armand as she planned for data collection. However, it appeared that Armand may have struggled to think about his teaching in this way. It may have been necessary for Dawn to scaffold the process to such an extent in order to engage in any joint disciplined inquiry at all. In the post-observation discussion for the second observation cycle, Dawn said to Armand, “I think it’s really important to have that pre-conference where *you* decide what it is we need to look at, and that’s what we look at. That’s how we improve as teachers, really.” Dawn appears to be trying to drive home to Armand that these observations present the opportunity to inquire into his own teaching. It seems as though Armand benefitted from the structured and supportive environment in which he and Dawn examined his teaching.

#### Identification of Science Content Learning Goals

In both observation cycles, Armand and Dawn discussed the science content of the video recorded lessons. While these discussions were not fully integrated with the inquiry process, it is interesting to note that in at least one case Dawn was able to correct a misconception that Armand appeared to have. While discussions of content were not critical to all mentor-mentee pairs’ discussions, the webcam observation cycles provided an opportunity for Armand to receive content support from Dawn. However, Armand and Dawn’s brief discussions about content seemed ancillary to the joint disciplined

inquiry in which they engaged. Perhaps this is additional evidence that a productive observation cycle can occur in the absence of a conversation about content or content-specific instructional approaches.

### Analysis of Student Learning Opportunities

It was interesting that Dawn noticed a difference in the approach Armand and she took in the second observation cycle with regard to the analysis of student learning opportunities. In the first webcam observation cycle, Dawn and Armand's focus was on how well he was implementing particular attention-getting strategies in the classroom. In their pre-observation discussion, while they determined that Armand's use of the techniques was important in some way, they did not articulate the outcomes in terms of students' opportunities for learning. Dawn identified that their second observation cycle was different from the first in this regard. She said, "The first time, I think he was just interested to know, 'This is what I'm doing. Tell me how I look when I do it.' [The second time], he wanted more information about what was happening with the students." Dawn attributed the difference to the trust that she was able to establish with Armand by completing an observation cycle. Perhaps analyzing student learning opportunities is more likely to occur in subsequent observation cycles, or maybe it can be supported with mentor professional development and tools aligned with disciplined inquiry.

### Critical Approach

As stated earlier, Dawn took the lead in both observation cycles, and this is particularly evident in her treatment of critical approach and alternative strategies. Dawn was quite direct in her assessment of Armand's teaching. Though she solicited his input on how he thought the lesson progressed during each post-observation discussion, the majority of the time in these conversations was devoted to her data-supported assessment of the lesson in light of the area of focus. While this approach is useful in that it provides concrete feedback and supports disciplined inquiry, a more collaborative approach may have more fully engaged Armand in the process and supported the development of his analysis-of-practice skills.

What seems unique to Armand is that he appears to be able to recognize that there are aspects of his teaching that need improvement, but may not be able to identify what, in particular, should be adjusted. For instance, in his first post-observation discussion, Dawn asked Armand to give his impression of the lesson:

Dawn – I know it has been a while, but in your best summary, as far as your discipline program and that particular day with these sixth graders, what was your overall impression with that day and how well they listened?

Armand – I didn't like it. I didn't feel like they were really settling down. I think there was some distraction. I don't think it was working too well. In terms of 1-10, it was probably a 5.

It seems as though Armand was self-reflective about the overall assessment of the lesson and the outcomes of the behavior management techniques he used. However, he did not appear to independently recognize the pitfalls of his techniques.

On the other hand, Dawn provided many appraisals of Armand's teaching. She offered evaluative feedback intermixed with the data she collected. Armand did not contribute much to the discussions, which may have been due to Dawn's management of the conversation or due to Armand's seeming inexperience with analyzing his own practice. What is interesting is that Armand's reflection at the end of their second post-observation conversation may indicate that his analysis-of-practice skills are not developed to the point where he can undertake this disciplined inquiry independently. He said:

I think this is very valuable. You have experienced eyes looking at somebody who's teaching. They have so many other things on their minds at the moment, they're probably working on habit, so they're not necessarily paying attention to what's working and what's not working. They're just trying to do this, trying to do that. Those objective eyes, that's really nice.

It seems as though Armand is so consumed with the act of teaching while he is in front of his class that he is unable to simultaneously assess and evaluate his instructional decisions. Perhaps Dawn had also noticed this, which prompted her to take a direct approach to offering feedback and evaluative comments. It seems as though Armand was receptive of the critique and suggestions. For teachers with less developed analysis-of-practice skills, the more effective approach to classroom inquiry may be mentor-directed in order to scaffold the process until the mentee has the skills to undertake certain aspects of it independently.

### Alternative Teaching Strategies

Armand and Dawn's approach to alternative teaching strategies was also mentor-directed. For Armand, the stakes for improving his teaching were high – both he and Dawn shared that his principal was monitoring his progress through the year. Dawn mentioned in the interview that she had this in mind during the second observation cycle:

Knowing that [behavior management] was something that his superior spoke to him about, I wanted to be his coach and his cheerleader. “OK, we can do this, Armand! Let me help you. Let me see where it's lacking and give you the information to improve this.”

Just as Armand seems to have struggled to evaluate which particular aspects of his teaching could be improved, he appears to also need support to identify adjustments that will improve these pitfalls. Dawn seems to sense this as well, and given the evaluative pressures outside of the mentoring relationship, took a direct approach. While this may not be fully aligned to the educative mentoring stance, what is notable is that there is evidence that Armand committed to and implemented alternatives following each of the observation cycles.

In the first observation cycle, Dawn offered several suggestions for alternatives that Armand may implement to provide more structure in the classroom and enhance student engagement. For instance, Dawn proposed that Armand implement a bell-ringer activity at the beginning of each class session:

It seems to me, in the beginning, when your kids walk in the class, they would do really well with some kind of structured activity. What works well for many newer teachers is what they call Bell Work, where there is something up on the board that they need to write down and answer every day when they walk in the door. And, I think that would be a good way to get them in their seats.

Though Armand did not solicit Dawn's feedback, her advice for an alternative strategy seems to be well aligned with his goal of improving students' behavior in the classroom. It was clear that Armand implemented Dawn's suggestion following the first observation cycle and was continuing to use Bell Work at the end of the pilot project when I interviewed him. He said:

One of the things she advised me to do was to put something up to warm up the kids and get them into the lesson as soon as they come into the classroom. Now I do that on a regular basis. I trained the kids to see it as a learning environment. I started to do that, and I'm still getting on the kids that as soon as they come in, they sit down and they need to take their paper out and start heading it and everything.

Later in the interview, he referred to Bell Work again and described it as a "big change" in his practice. Armand seemed to embrace some of Dawn's suggestions and was committed to implementing them consistently.

It appears that Armand is receptive of feedback and committed to changing his practice to be more effective. In many ways, it seems as though Armand thrives on getting direct advice and may not have strong enough analysis-of-practice skills to identify self-adjustments independently. In this case, Dawn's direct approach appears to be well matched to Armand's needs.

### Benefits for Using an Educative Mentoring Approach

Dawn appears to be a skilled educative mentor who believes in the power of disciplined inquiry to improve her mentees' practice. In her professional development evaluation she wrote, "The webcam observation provides many opportunities to help with the mentee's growth. The final step of this process is to help them through the post-

conference to self-adjust and to LEARN FROM THEIR PRACTICE!” Though Dawn’s approach was direct, it seems as though Armand achieved Dawn’s goal. There was evidence of several self-adjustments in his second video recorded class session and he spoke about others in the interview. Since Armand appeared to be struggling, and because the stakes were higher in that his principal was critically evaluating his progress, Dawn’s approach seems apt.

Dawn seems to recognize the danger of being too direct. She said, “I know in the long run [giving quick fixes] doesn’t change behavior, when we just tell people what to do.” Dawn avoided those dangers by structuring the conversation around disciplined inquiry. She and Armand were examining his focus question together, looking at the available data, and considering strategies that an experienced teacher might try in Armand’s position. She was not simply noticing issues and listing off quick fixes. Armand seems to have recognized the importance of monitoring his behaviors and their impacts on students. In the interview, he said, “I am watching the firmness of my voice that I have with the kids.” It appears that experiencing joint disciplined inquiry with Dawn has supported Armand’s development of analysis-of-practice skills.

### Closing

Dawn seems to be an experienced educative mentor and implemented the disciplined inquiry approach conducting webcam observation cycles. Her interactions with Armand offer several lessons learned:

- A disciplined inquiry approach to classroom observations can be effective with teachers who are developing more fundamental skills, including classroom management and behavioral interventions. Not all dimensions of disciplined inquiry apply in these cases, particularly the identification of science content goals. Tools specific to observations with a classroom management focus may support mentors as they work with teachers whose skills are less well developed.
- For mentees who struggle to analyze their practice, a more mentor-directed approach to the observation cycles may be beneficial. In these cases, mentors would implement the dimensions of joint disciplined inquiry but would scaffold and direct the conversation. After all, as Armand stated, “there’s things that I’m doing that I’m not aware that I’m doing.”

APPENDIX F

CASE STUDY – ALISSA AND SHARON

*It is an extremely useful process... to see ourselves as others see us, mainly my students. Am I effectively teaching them? Am I doing all these things that I think I'm doing, and to me I think they ought to work? Do they actually work when somebody else sees me trying to do them? The difference in viewpoint is pretty amazing. – Sharon*

### Background

Alissa is a high school science teacher and instructional coach. Sharon is one of Alissa's assigned eMSS mentees who has agreed to participate in the webcam observation cycles in the e-mentoring relationship. Sharon was an industrial chemist who changed careers and is now in her first year of teaching high school science. In addition to earning a Bachelor's degree, she reports taking five or more online courses, seminars, or discussion groups in science prior to her involvement in eMSS. In a survey administered prior to the commencement of eMSS mentoring, Sharon indicated that she felt "very well prepared" to plan lessons and set and achieve professional goals, and "'fairly well prepared" to question students for understanding. Sharon had fairly good command over the classroom environment and seemed to plan and sequence lessons appropriately, as observed in the video recorded lessons.

### Development of Joint Disciplined Inquiry

Alissa seemed to have many of the skills of educative mentoring from the onset of the pilot program, and her development over the course of the two observation cycles was in the direction of provisioning for joint disciplined inquiry. What is most notable is that both Alissa and Sharon noticed that Sharon's analysis-of-practice skills developed over the course of the pilot program. They independently shared with me in interviews that

Sharon had become more confident in inquiring into her classroom practice, and Alissa stated that Sharon, “really took control of [the second post-observation] conversation. She wanted to hear what I had to say and really directed that conversation to the points that we were looking at.” It appears that when a mentee is paired with a supportive and skilled mentor and engages in webcam observations over time, there is a better chance for noticing changes in their analysis-of-practice skills. Like Diana and Karen, Alissa and Sharon’s progress through the pilot program may indicate several outcomes that can be anticipated in a larger scale implementation of webcam observations with mentors who embrace a disciplined inquiry stance. In the following sections, their observation discussions will be analyzed in light of the research-based dimensions of educative mentoring using direct evidence from the discussion transcripts and evidence about how Alissa and Sharon describe their experiences in interviews with me.

#### Concrete Evidence to Inform Decisions about Teaching

In both observation cycles, Alissa collected concrete data about Sharon’s classroom practice. It was interesting that there was continuity between the two observation cycles, in that they both focused on a common area of Sharon’s concern. Alissa structured both observations to respond to Sharon’s inquiry into the impact of her ability to stay on-track with her instructional plan on her students’ ability to follow the flow of the lesson. This allowed Alissa to observe Sharon’s development over the course of two observed lessons. Alissa described the joint inquiry into Sharon’s teaching in which they engaged over two cycles of webcam observations:

Sharon identified the problem in the beginning. We worked through that, we talked about that. I observed her, then I set up a second time to see if things had gotten better. Had she used the strategies, or how had she changed the strategies to suit the way she teaches?

Alissa appears to value Sharon's input and contributions throughout the process. It seems that she is not interested in seeing her suggestions play out just as she has proposed them, but is keen to see Sharon modify what was recommended to best meet her needs.

What is interesting is that the area of focus that Sharon selected for the first observation – the pacing of instruction – was tangentially related to the elaborated conversation in which Alissa and Sharon engaged during their post-observation discussion. Alissa scripted what Sharon had said and how her students responded while she observed the recorded lesson. When Alissa reviewed the data, she was able to hone the focus and identify a potential source of the difficulty Sharon sensed in the flow of her lesson. Alissa recalled in the interview:

Before [the first] observation, I remember we talked about transitioning from one activity to the next and getting things going in class, as what we were going to focus on. Then, the conversation after that observation, the thing that stuck out to me from what I had written, because I was trying to script what she was saying, was that she seemed very scattered when she was teaching. She would say one thing and then say, "Oh, yeah" and go into another thing. For me, that was what leapt out to me. Her timing was OK, but I felt like she should do one thing and do it completely and then do the next thing and do it completely, instead of skipping around.

This can serve as a reminder that, by nature of their inexperience, mentees may not accurately identify the source of the difficulty they may sense in the classroom. The role of the educative mentor is to scaffold the experience for the mentee in order to advance joint disciplined inquiry.

Both Alissa and Sharon spoke about how teachers may mislabel the problems they face in the classroom, and how observations such as this can help to resolve them. Alissa said, “Sometimes I think we can get a warped idea as to what’s happening in our classroom. Just to have a different set of eyes, I think, can be helpful.” Likewise, Sharon shared, “I was able to extract information just from looking at the videos. Knowing what the problem is, is different than knowing a solution to it. In that respect, my mentor was very useful.” It seems as though Sharon values both the reflective experience of viewing her own video recorded lesson as well as receiving feedback from Alissa. In this way, webcam observations can support the development of mentees’ analysis-of-practice skills and the shared process of joint disciplined inquiry in the mentoring relationship.

#### Identification of Science Content Learning Goals

Alissa and Sharon did not have elaborated discussions on the science content in the lessons that Sharon recorded. Their discussions of content seemed separate from their conversations about Sharon’s instructional practices. While it was not a showpiece of their interactions, it is clear that Sharon was thinking deeply about the content of the lesson and how she could present it most effectively to her students. In the interview at the conclusion of the project, Sharon spoke about the content of the second observation lesson in this way:

I prepared really meticulously a worksheet with problems of graduating difficulty. They were to complete these in the process of practicing these concepts. They had had two-stage conversions previously, so they were not learning it for the first time. I don’t know if I’d recommend doing it this way the first time through, but I might try it next year. It makes an excellent review. You start with the little problems and remind them of

what they need to do and then you scale up the problems and you whip right through it. We spent most of a week working on that worksheet.

Sharon described the way she considered scaling the complexity of the tasks for two-stage chemical conversions as a review activity for her students. Though this occurred separately from her discussions with Alissa, it is clear from this elaborated description of her lesson that Sharon thought carefully about how to structure a review of two-stage conversions to best meet her students' needs. This provides evidence that, even though there may be limited discussion of content in the mentoring conversation, there may be deep reflection and consideration of content on the part of the mentee. Similar to other mentor-mentee pairs, Alissa and Sharon seem to focus their attention on instructional practices without discussing content to a deep extent. This does not preclude the mentee from independently considering the instructional content before or after her conversations with her mentor.

To Alissa, discussions of content may not be fully integrated with her understanding of how to engage in joint disciplined inquiry through lesson observation. Perhaps deep discussions of content related to the lesson are contingent on selecting a content-centered area of focus for the observation. Since in both observations Sharon selected a focus that was instructional in nature, this dimension of disciplined inquiry was less critical than in other cases. Similar to Karen and Diana, Alissa and Sharon spend a greater portion of their time discussing topics other than the content of the observed lessons.

### Analysis of Student Learning Opportunities

In a similar way, there is only limited evidence of Sharon and Alissa discussing student opportunities for learning in the conversations they have with one another. In the dialogue where it is present, it seems as though Sharon is the one who initiates the discussion and does the majority of the talking. For instance, in the first post-observation discussion, Alissa suggested that Sharon jot notes to herself so that she did not interrupt the flow of the lesson with extraneous information. Sharon restated Alissa's recommendation in terms of how it may impact students when she said, "so, I need to give my thoughts a place to go so I don't derail the students." Sharon seems to have thought about the implications of reducing interruptions on her students' ability to follow her instruction.

This is also evident in the second observation discussion. Sharon started to discuss with Alissa the way she had structured the problems to scaffold students towards two-stage conversions. Sharon shared that, "it worked! Afterwards [the students] went 'Oh, hey'" when they realized that they had successfully solved a two-stage conversion when it had been broken into discrete steps. Though Alissa did not appear to play a role in Sharon's discussion of this cause-effect relationship of Sharon's planning on students' opportunities for learning, the context of the webcam observation cycle provided Sharon an audience in Alissa to expound on the impact of her decisions on students.

It was interesting that Sharon also raised student opportunities for learning in her interview with me at the conclusion of the project. In this conversation, she seemed to

expand her thinking about the discrete classroom episode to address her approach to teaching more globally. She said:

When they have something specific to work on and the rules are made very clear, they do very well. I've come to realize that the more clear you are with the students about what you want, the likelier you are to get it.

Sharon seems to be developing her analysis-of-practice skills and becoming more independent in their use. Even in the relative absence of Alissa's contribution to this dimension of joint disciplined inquiry, Sharon appears to be well versed in examining how her teaching impacts student opportunities for learning. As with other mentor-mentee pairs, it seems that a more structured planning tool that outlines how the area of focus impacts student opportunities for learning and what to look for relative to that in the observation may have benefitted Alissa and Sharon. Together, they may have been able to build on Sharon's budding analysis-of-practice skills and more fully engage in joint disciplined inquiry.

### Critical Approach

Sharon seems willing to make critical evaluations of her teaching practice and to receive them from Alissa. In both observation cycles, Sharon offered critical appraisals and solicited them from Alissa. In the first post-observation discussion, Sharon started by offering two judgments of the webcam lesson: "so you watched my very embarrassing tape," and "the class was a wreck." Alissa reassured Sharon and offered some concrete evidence about what she observed, "it's probably been a while since you've seen it so I was thinking first I would kind of remind you about what you did." From there, Alissa structured the debrief conversation and the data and she and Sharon took an objective

look at it. Though Sharon's self-deprecating remarks could have drawn Alissa to offer saccharine feedback, she instead stayed the course and drove the conversation toward a healthy examination of the data and potential issues.

The two observation cycles provided Sharon a supportive environment in which she could examine her teaching and identify areas for improvement. Sharon seems to have developed a calmer and more reasoned approach to her self-evaluation by the second observation. In the interview, she said:

The nature of the first observation was, "Oh my God! What do I do about this? I had no idea that it was this bad a problem." I kind of did, but I didn't really... The second one was, "OK, I've been doing this, my perception is that things are much better. What does it look like to you?"

It is clear that Sharon has grown more confident and seemingly more able to take a balanced assessment of her practice by the second observation.

It was interesting that Sharon spoke at length about how the nature of the conversations with Alissa provided a safe environment in which she could inquire into her own teaching. Sharon seems to attribute her ability to reflect on her own teaching and garner advice from her mentor on the fact that these webcam observations were conducted by somebody unrelated to her school environment. She spoke about how these webcam observations provided her a venue to teach authentically:

She hasn't got a stake. She's just there to help. If I had one of my colleagues in, there would definitely be a performance for them. I wouldn't want to do a bad job, so I would really be on edge. I wouldn't be relaxed and just doing what I do... It's a very nice thing to have that chance. It's not something that normally one gets. Under ordinary circumstances, anybody observing you has a stake in the outcome, which changes everything.

Webcam observations with a distant mentor seem to provide a unique opportunity for mentees to receive feedback on their practice from an experienced mentor in a low-risk environment. Alissa seemed to notice a change in Sharon between the first and second observations when she said in the interview, “I think she’s becoming more and more reflective as a teacher. To do that in your first few years of teaching is pretty phenomenal.” In this environment, Sharon seems to thrive and to develop her ability to self-assess her teaching practice.

#### Alternative Teaching Strategies

The identification of an alternative teaching strategy started in Alissa and Sharon’s first observation cycle and continued to the second. Alissa suggested to Sharon that she keep a post-it note handy to jot down information she would like to share with the class so that she shares it at the end of class rather than interrupting the flow of the lesson. Though there is limited evidence of additional alternative teaching strategies proposed their treatment of this post-it recommendation over the course of two classroom observations is unique to this mentor-mentee pair.

Alissa had a direct approach to offering the strategy, but both Sharon and she agreed that her directness was appropriate. As Sharon said, Alissa “was able to offer a few suggestions that really had a disproportionate impact... A simple fix that I might never have thought of that works!” Alissa seemed to agree when she said, “I do not think she would have picked up on that.” Like several other mentor-mentee pairs, Sharon seemed to benefit from Alissa’s spontaneous advice, even though an educative mentoring stance would suggest a more subtle approach is superior. What seems to be more

important, however, is that the mentee commits to implementing an alternative strategy and examining its impact. It is clear that Sharon has done just that.

### Benefits for Using an Educative Mentoring Approach

Alissa seems to be committed to transitioning to an educative mentoring stance, but believes she would benefit from additional practice to hone her skills. In her interview, she said:

I think something where I could practice more would be good. I get the general idea, but just to sit down with another mentor and just practice doing it and saying, "This is how I felt when you said this." That way, I could see what I'm saying... I think that begin able to practice with somebody who's going through the same thing would be very helpful.

While there is some evidence of changes in Alissa's practice, there are also areas that could be developed more fully. It is likely to take time, additional experiences, and more targeted professional development to realize the true potential of educative mentoring to advance novice teachers' analysis-of-practice skills.

### Closing

Alissa seems to be developing an educative mentoring stance in her webcam observation experiences with Sharon. Her interactions with Sharon underscore the benefits of educative mentoring for developing mentees' analysis-of-practice skills. The areas where Alissa and Sharon's conversations were relatively less well developed provide insight into potential changes to the professional development sequence and mentoring tools that would better support joint disciplined inquiry. Overall, the

dimensions of joint disciplined inquiry seem to be an apt match to webcam observations, but Alissa and Sharon's interactions may indicate additional considerations:

- Joint disciplined inquiry seems to be best supported by safe, low-risk observations. Sharon is not alone in valuing the fact that her mentor is “somebody I can afford to be candid with.” The careful pairing of mentors and mentees along with shared norms for confidentiality and no recourse is an important consideration when beginning an observation program to support joint disciplined inquiry.
- Discussions of content may not emerge in the conversations between mentors and mentees. However, content's absence from the discussion does not indicate the absence of either party considering it. The remaining four dimensions of classroom inquiry seem to have emerged as strongest and most critical to successful observation cycles.

APPENDIX G

CASE STUDY – TOM AND EMILY

*It was definitely nice. I did like the lessons that I did. Going through the whole process really forces you to plan it all out more and really analyze it. If I did it myself, if I ran out of time or something, or if I was really rushed that week, I wouldn't necessarily reflect on it. But, because I was doing the observation, I really had to reflect on it and plan it out. – Emily*

### Background

Tom has been an eMSS mentor for eight years and also supervises pre-service student teachers in their practicum placements. As a veteran high school physics teacher, Tom has a wealth of experience and depth of content knowledge. Tom has several assigned eMSS mentees, and Emily and Chloe are two of his mentees who have chosen to participate in the pilot program for implementing webcam observation cycles in the mentoring relationship. Emily holds a Master's degree and is in her second year of teaching science at the high school level. In a survey administered prior to the commencement of eMSS mentoring, Emily indicated that she felt "very well prepared" to plan lessons, set and achieve professional goals, and question students for understanding. The observation lessons that Emily conducted revealed that her lessons were well-planned and that she was striving to implement inquiry-based principles in her instructional practice.

### Development of Joint Disciplined Inquiry

Though there was some progress towards joint disciplined inquiry in Tom and Emily's observation conversations, the development of Emily's analysis-of-practice skills seemed to compete with other goals Tom had for the webcam observations. Tom and

Emily both perceived some subtle changes in the discussions during the second observation as compared to the first, and Tom attributed these changes to what he learned in the professional development session. In the following sections, their observation discussions will be analyzed in light of the research-based dimensions of educative mentoring using direct evidence from the discussion transcripts and indirect evidence about how Tom and Emily describe their experiences in interviews with the researcher.

#### Concrete Evidence to Inform Decisions about Teaching

In neither observation cycle was it evident that Tom collected objective data about Emily's lesson while he observed it. Rather, Tom and Emily's discussions resembled observations that may be typical of a supervisor guiding a pre-service teacher in lesson planning and the analysis of its execution. Tom describes his didactic focus in an interview:

I believe I gave a lot more attention to the theory and tried to help them understand what was happening so that when they're having conversations with their classes that they're more likely to say things that are not correct... I have to admit that it's hard to give that up.

Emily seems to have the same perception of the conversations. She describes the observation cycles in this way, "It's somebody being able to watch a lesson, help you out on techniques." It appears that Tom is finding it difficult to change the mentoring stance that he has developed through previous experiences working with pre-service and early career teachers.

Tom indicated that he did not believe there was enough time to collect and analyze data about teaching in an observation cycle. In his interview, he discussed the dimension of concrete evidence for disciplined inquiry:

Concentrating on data, that's easier said than done... Looking at data requires, in my opinion, more than a half-hour or 45 minutes with the video. It requires you to view it again and maybe even more than two times and really, really listen very carefully. I have to admit that I didn't do that.

Tom's perception that collecting data would require more time than he could offer resulted in little change between the first and second observations with regard to the centrality of data in the mentoring conversations.

Though Tom seemed to resist making some changes relative to this dimension, there is nevertheless some evidence of an increased focus on analyzing cause-effect relationships in the second observation as compared to the first. For instance, the post-observation discussion included a greater emphasis on the particular focus for the observation, Emily's role as facilitator of an inquiry activity. In the second webcam observation cycle, Emily perceived that her post-observation conversation with Tom "had more to do with my approach to [the lesson]." She indicated that she appreciated examining something that she could change in future lessons. The difference between the first and second cycles was subtle; Emily attributed it to the different type of lesson she selected. She explained, "It wasn't necessarily because of the questions or anything. It was just that the type of lesson I did was more open for these suggestions and comments." Regardless of the reason, the nature of Tom and Emily's second observation

discussion supported an analysis of a cause-effect relationship between Emily's instructional decisions and the opportunities for her students to learn.

### Identification of Science Content Learning Goals

In both observation cycles, Tom and Emily engaged in elaborated discussions about the physics content that Emily teaches and discipline-specific approaches to teaching the content. Though a discussion of science learning goals can support joint disciplined inquiry if it sheds light on teachers' instructional decisions, in Tom and Emily's case it served Tom's more traditional mentoring stance. As his statements from the interview indicate, Tom places a high value on teachers' conceptual understanding:

If you have conceptual understanding, you will eventually be a great teacher. If you keep plugging away, you'll find better ways of doing things. On the other hand, if you don't have the conceptual background, then no matter how much you struggle, you're always going to miss the mark.

However, because Tom regards conceptual understanding as paramount, disciplined inquiry seems to play second fiddle.

Tom defines his role, first and foremost, in terms of building his mentees' conceptual understanding. Indeed, Tom endeavored to integrate the dimensions of disciplined inquiry into his practice with the goal to serve conceptual development:

My role prior to the [professional development] was to help them so that they had a much better conceptual understanding of what they were teaching. After the [professional development], I did not lose that, but I also started focusing on these other ideas so that perhaps I can get that first goal of mine done in a more effective or stronger way.

It seems as though Tom did not buy in to the educative mentoring stance as a method to advance novice teachers' practice, but instead sought to use it to support his deeply held approach. As a result, there were few changes in terms of disciplined inquiry in

### Analysis of Student Learning Opportunities

A dimension in which Tom's approach to observation cycles coincides well with the educative mentoring approach is the analysis of student learning opportunities. It is not surprising that it was evident in both cycles of the webcam observations. Originally, Tom's mentoring stance uses the analysis of student learning opportunities to gauge students' developing conceptual base. In the interview at the conclusion of the project, Tom shared that he shifted his thinking about student opportunities for learning based on the professional development:

Prior to then, I was thinking in terms of the concept, but now I am thinking in terms of what this activity is all about and what kind of student outcomes do you expect. That was very enlightening to me because she had some difficulties with that.

An analysis of student learning opportunities can serve disciplined inquiry if students' development is considered in light of the teachers' instructional decisions. It appears that Tom shifted his thinking at least slightly to better address the bridge from conceptual development of the part of teacher and students to instructional practice as a whole.

Without much prompting, Emily demonstrated the ability to identify what students had learned in the post-observation discussion:

I'm glad we waited to do our post-observation conference until today because I gave a quiz on that topic, on the period of a pendulum, today. Throughout this week we were reviewing and then I gave the quiz. All the conceptual questions, like "If you change the length, what's going to

happen to the period?” That kind of stuff, they did so well on. I kept hearing them, if we were asking questions or talking to each other, they were referring back to the activity. They were picturing it in their heads. “Oh, when I had the extra mass, it didn’t do anything.” They were thinking back to it.

In her discussion, Emily seems to use the evidence of student learning to validate her instructional practice. She reflected back on this again in the interview at the conclusion of the study when she said, “The kids got a lot out of it. The whole rest of the chapter they were able to go back to that introduction where they could picture the pendulum.” It is not clear whether a change in Tom’s behavior prompted the connection between students’ learning and Emily’s approach or whether it emerged independently. In any case, the second post-observation discussion provided evidence of Emily’s developing analysis-of-practice skills.

### Critical Approach

In both observation cycles, Tom seemed more inclined to offer evaluative feedback than to support Emily to self-assess, though both individuals did critically evaluate the execution of the lesson. Emily seems to have perceived this approach as well, since in the interview she described the webcam observations in this way, “I’d give him my opinion of it and he would give me some suggestions or if there were things that were good or bad about the lesson.” Emily noted that some of the recommendations that Tom offered were ones that she would not have identified on her own.

Tom seemed more comfortable with a direct approach to offering feedback, most likely due to his prior experience with traditional, evaluative observation protocols. Indeed, though he shared that “I tried to avoid judgments and I think I achieved that” in

his mentor reflection following the second observation cycle, there were several instances in that post-observation discussion that he offered direct advice. For instance, after addressing Emily's selected focus for the observation in the debrief Tom stated, "I do see a related issue, though. If you want me to, I could discuss that with you." Had he adopted a disciplined inquiry stance, Tom may have guided the discussion towards the feedback he was prepared to offer. However, Tom takes a more direct approach, which seems consistent with his evaluative observation approach. Tom discussed his perceived need for directness in the interview at the conclusion of the study. He stated, "I also think maybe at some point, you have to say, 'Listen, so-and-so, please, do you think that you've done the best job, or do you want to hear about other things?'" It is clear that Tom is wrestling with some deeply held beliefs about his role in observation discussions with novice teachers. In only two observation cycles, it is difficult to discern the trajectory of change. However, the experience may have been helpful for Tom to bring to the surface his mentoring stance and identify what he is willing and unwilling to change.

#### Alternative Teaching Strategies

Closely related to critical approach is the identification of alternative teaching strategies. It is not surprising, then, that Tom demonstrated little change between the first and second webcam observation cycles in this dimension as well. Tom shared in the interview, "I was trying to avoid giving suggestions unsolicited. I think I did, at best, an OK job of that." Tom seems to be aware that his approach to the observation discussions

did not fully reflect the educative mentoring stance advocated in the professional development session.

### Benefits for Using an Educative Mentoring Approach

Tom seemed to be somewhat ambivalent about adopting a joint disciplined inquiry stance toward the classroom observations. He reflected on the experience as beneficial for his own professional development in his interview when he said, “I realize that no matter how great a job I do or not do, I can always do something better.” However, there were few noticeable changes in the fundamental aspects of educative mentoring between his first and second webcam observation cycles.

Emily did not seem to perceive the webcam observation cycles as a vehicle to advance her analysis-of-practice skills. Rather, she described the webcam observations as if they were no different than other, evaluative observations that she had in the past. As such, each observation represented an isolated experience to hone a particular skill. For instance, in her interview Emily stated that the observations “helped with the inquiry and realizing that I could do it and that it’s easier than I thought it would be, too.” It seems that Emily benefitted from the lesson planning and analysis of the execution in which she and Tom engaged, but that focus seemed to do little to impact her disciplined inquiry stance.

Closing

Tom seems to have grappled with competing rationales for conducting observations with novice teachers. While he attempted to institute changes in his approach, he did not fully adopt the educative mentoring stance. As a result, his observations provided lesson planning and conceptual development guidance for his mentees, but did not seem to advance their analysis-of-practice skills. Tom's reluctance to implement a disciplined inquiry stance raises several questions:

- Is a teacher's conceptual understanding paramount to his/her development of instructional practice and disciplined inquiry? What milestones must novice teachers reach before they can effectively engage in joint disciplined inquiry with their mentors?
- What types of professional development experiences can best support mentors' paradigm shift toward educative mentoring?

APPENDIX H

CASE STUDY – DIANA AND KAREN

*It changed the way I teach. It changed how I teach for the better. I would say there's probably not a week that goes by that I don't think about something I've learned in the past year and how I can take that and make that the best class I can. – Karen*

### Background

Diana is an experienced eMSS mentor and has served as science specialist in her district. She supervises student teachers and has provided instructional coaching to her peers in the elementary school in which she teaches. Diana has several assigned eMSS mentees, and Karen is one who chose to participate in the pilot program for implementing webcam observation cycles in the mentoring relationship. Karen holds a Bachelor's degree and is in her first year of teaching science at the middle school level. In a survey administered prior to the commencement of eMSS mentoring, Karen indicated that she felt "fairly well prepared" to plan lessons, set and achieve professional goals, and question students for understanding. The observation lessons that Karen conducted revealed that she managed students well during hands-on and interactive lessons.

### Development of Joint Disciplined Inquiry

Diana appeared to have a mentoring stance that was well-aligned with educative mentoring, so few changes to the mentoring relationship between Karen and her were necessary to support joint disciplined inquiry. When speaking to the researcher in interviews following the conclusion of the project, Diana and Karen mentioned some changes that they noticed between the first and second rounds of observation cycles. While they did not attribute these differences to any modification of their roles or

behaviors, the changes are notable because they may reveal the development of Karen's analysis-of-practice skills. Their progress through the pilot program may indicate several outcomes that can be anticipated in a larger scale implementation of webcam observations with mentors who embrace a disciplined inquiry stance. In the following sections, their observation discussions will be analyzed in light of the research-based dimensions of educative mentoring using direct evidence from the discussion transcripts and evidence about how Diana and Karen describe their experiences in interviews with the researcher.

#### Concrete Evidence to Inform Decisions about Teaching

Both observation cycles revealed Diana's data-centered focus and structure for joint disciplined inquiry. Diana guided Karen in the pre-observation conference to isolate an instructional need and identify evidence that she could collect during the observation that would illuminate the question at hand. In their discussions, Diana provided scaffolding and modeling to support Karen to examine her own teaching with that focus in mind. It was clear that Karen was receptive to identifying a focus and exploring her teaching. She recalled in the interview:

The goal is always to make sure that you're using best practices and doing things that are going to be beneficial to your kids. Is your structure adequate? Is your flow good? All of those things that it's hard to assess from a first-person view when you're in the middle of it.

Karen seemed to take advantage of the opportunity to examine her teaching from the point-of-view of the camera angle alongside her mentor. She questioned her strategy for

instruction-giving and asked Diana to help her identify what she could do to improve the way she gave directions.

Karen revealed that she intentionally selected a lesson that would involve action and movement on the part of her students, because “I feel like that’s where a lot of instructional struggle comes in.” In the supportive atmosphere that Diana established, Karen was able to investigate a cause-effect relationship to improve the way that she delivered instructions.

It was interesting that there was continuity between the first and second observation cycles. Karen selected a complementary area of focus for her second webcam observation based on what she and Diana discussed during her first observation. Karen revealed in the interview that even as she was teaching the second lesson, “I was much more aware when I was giving instructions. Were kids writing and cutting things out? ... It made me much more aware of their inability to do multiple things at once.” Since Karen was thinking about her focus question as she was delivering instruction, it appears that she has strong analysis-of-practice skills. Diana’s educative mentoring was well aligned to Karen’s development and provided a ripe proving ground for joint disciplined inquiry.

#### Identification of Science Content Learning Goals

The conversations Diana and Karen had about science content were only tangentially related to the observed lessons. In both cases, Karen selected an instructional focus that was not dependent on particular lesson content. Perhaps due to

this, Diana and Karen's discussions about content related more to overall unit planning than they did to the lesson at hand.

To Karen and Diana, discussions of content may not be fully integrated with their understanding of how to engage in joint disciplined inquiry through lesson observation. Perhaps deep discussions of content related to the lesson are contingent on selecting a content-centered area of focus for the observation. Since in both observations Karen selected a focus that was instructional in nature, this dimension of disciplined inquiry was less critical than in other cases. While other mentor-mentee pairs consider science content to be the central focus for observations, Karen and Diana are not alone in their diminished treatment of this dimension.

#### Analysis of Student Learning Opportunities

There was some evidence of Diana and Karen discussing student opportunities for learning in both webcam observation cycles. Similar to the science content dimension, student opportunities for learning represented a small portion of the discussion between Diana and Karen. However, unlike science content, there was some evidence that Karen was analyzing student opportunities for learning in light of her focus for the observation.

When Karen initially selected the area of focus for her first observation, it appeared to emerge from a problem she sensed in her classroom. She noticed that students were repeatedly asking for the directions to be clarified, "I consistently get questions, 'What's next?'" By the time she and Diana discussed their plan for the second observation, Karen seemed to be aware of what behaviors students could exhibit that would indicate that students were attending to her directions. She said, "I'm

definitely more mindful that when I am giving an instruction they're not writing, but they're looking at me. I'll have them put their pencils down and that kind of stuff."

Karen seems to have developed the analysis-of-practice skill of identifying what behaviors would be associated with the desired outcomes of her changes to practice.

Diana needed to provide little support to advance the discussion in that regard.

Joint disciplined inquiry seems to come naturally to Diana. This may be due to her previous experience as a science specialist and instructional coach. She noted in the interview that these observations were similar to her work as specialist:

I mentored teachers and made it better for them in the classroom. I would go in and observe them teaching – exactly what I did with Karen. I would say, "What do you see as your problem?" Then I would go in and look at it... I think it makes you have a better understanding. I can guess at what the problem is, but actually seeing it makes it a whole lot easier.

Her stance towards observations – that she can serve as a resource to identify the impacts of teacher behavior on student outcomes – is well-aligned to the educative mentoring approach. That Karen and Diana do not engage in elaborated conversations about student opportunities for learning is not alarming because both seem to regard student outcomes as an integral part of their collaborative work to improve Karen's instructional practice.

### Critical Approach

Karen seems reflective about her practice and willing to take a critical stance to identify potential changes that would improve subsequent lessons. In her interview, she said about her first observation lesson, "in watching it, I never realized how active [the students] were to an observer because I have so many other things to look at that I don't notice." She spoke about how viewing the video allowed her to reflect on her teaching

practice and see herself from a different perspective. Diana seems to have noticed that Karen benefitted from watching and reflecting on her first lesson. Diana said about Karen's second lesson, which Karen did not view in advance of their post-observation discussion, "I think if she had re-watched her lesson, it would have been a more rich conversation." There seems to be a benefit to mentees viewing their video recorded lesson in advance of the post-observation conversations. This factor may contribute to mentees' development of analysis-of-practice skills and the ease with which mentors can facilitate joint disciplined inquiry.

In both observations, Diana offers positive and critical evaluations of Karen's practice. Though an educative mentoring stance would suggest that mentors guide mentees to self-evaluate their practice, Diana seems unapologetic about providing direct feedback. In her mentor reflection she wrote:

I think because she wanted to improve how she gave directions, I needed to give her feedback on what an outsider observes. It has been my experience that some of the miscues that new teachers make they have no idea that they are even doing it.

Karen appears to be receptive to Diana's feedback. In her interview, she spoke about the type of feedback from which she benefitted:

Of course you don't want to listen to negative things about everything that you're doing for like an hour. Not that Diana did that at all. But I could totally foresee that if somebody said, "You can do this better. You can do that better." I would not want to do it if that was the type of feedback I was getting.

Karen seems to appreciate the joint disciplined inquiry in which she and Diana are engaged. Though Diana's feedback is somewhat critical, Karen differentiates it from wholly evaluative feedback from which she says she would not benefit. Karen seems to

find Diana's approach to be supportive of her plan to improve her instruction. As such, the feedback she and Diana both provide serves to advance her goal.

Though joint disciplined inquiry would promote more self-evaluation on the part of the mentee, it is important to remember that mentors have a greater depth of experience on which to draw. While over time mentees may assume greater responsibility for self-critique, a more direct approach on the part of the mentor may be necessary in the initial observation cycles.

#### Alternative Teaching Strategies

In both webcam observation cycles, Diana offered alternative teaching strategies that Karen may wish to try. Karen appears to be receptive of these alternatives, since she focused the second observation cycle on her use of a strategy that Diana recommended in the first. Though it is not Karen who identified the strategies with Diana's support, Karen's willingness to adopt new strategies and evaluate their merits is well-aligned to the goals of joint disciplined inquiry.

Diana reiterated that novice teachers are sometimes unaware of the root cause of problems and may mislabel the sources of difficulty in their instruction. In her interview, she said, "I think Karen would still have been banging her head against a wall trying to figure out why her directions were wrong if she hadn't [focused instead on attention-getting techniques]." Diana found that offering alternatives was necessary in order to refocus their attention on strategies Karen could try that may impact student outcomes.

Indeed, mentor suggestions about alternative strategies may promote mentees' professional growth. It was surprising in the interview with Karen that she had picked up

on a tangential recommendation that Diana had made in their first observation cycle and executed an elaborate plan to grow professionally. Karen said:

After the first time Diana watched me, I thought about the tips that she gave. She had said, “Do you use exit tickets?” That was something I had never heard of. That was never something I was introduced to. She told me a little more about it. That determine what I chose for my next inquiry, so I chose “Formative Assessment” so I could learn more about it. I actually use formative assessment fairly regularly, and I have also encouraged my colleagues to do it. I feel like, because of that conversation, it has not only changed my practice, but it changed my colleagues’ practice, too.

Karen’s actions highlight the importance of provisioning for the sharing of information between mentor and mentee. Restricting the identification of alternative teaching strategies to the mentee alone may unintentionally limit the professional growth that can occur in the mentoring relationship. While mentee input into the selection of alternative teaching strategies is important, there is much to be learned from their more experienced mentors as well.

#### Benefits for Using an Educative Mentoring Approach

Diana seemed to have embraced an educative mentoring stance from the beginning of the webcam observation pilot project. Though there was little change evident between the first and second observation cycles, it may have more to do with Diana’s initial practices being well-aligned to the spirit of joint disciplined inquiry. While their conversations are not archetypical of what research suggests is important in discussions that support joint disciplined inquiry, the areas at which they diverge offer

important insights into how to best position educative mentoring to support new teachers' development of analysis-of-practice skills.

Karen appeared to have benefitted from the joint disciplined inquiry in which she and Diana engaged. She found the observation cycles to provide an opportunity for self-reflection and for Diana to provide feedback, strategies, and information about how to improve. Karen seemed to gain from the scaffolding that Diana provided as they inquired into her teaching and she demonstrated analysis-of-practice skills in both cycles.

### Closing

Diana appears to have maintained an educative mentoring stance throughout the webcam observation pilot program. Her interactions with Karen highlight some important considerations for structuring webcam observations in the future. Though the dimensions of joint disciplined inquiry seem to provide an overall framework for webcam observations, a few caveats have emerged:

- Webcam observations are useful to help mentors identify areas of improvement along with mentees. While mentees may correctly identify the source of the problem, sometimes this is not the case. Mentors also need to balance their support of mentees' self-evaluation and their own direct provision of feedback.
- Likewise, while input on alternative teaching strategies from the mentee is an important element of self-adjustment and empowerment, restricting suggestions to only the mentee may limit the mentees' professional growth.

- Discussion of discipline-specific content and strategies may not be critical to successfully implementing joint disciplined inquiry. Other components of eMSS provide curriculum-focused support, so perhaps webcam observations can achieve a more concentrated focus if the number of dimensions is pared down to four.