

**Mentoring Preservice Teachers in Disciplinary Literacies:
A Model of Content Area Literacy Instruction**

BY

STEVEN KUSHNER

B.S., University of Illinois at Urbana-Champaign, 2006

M.A., National Louis University, 2008

M.A., National Louis University, 2010

THESIS

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Defense Committee:

Nathan Phillips, Chair and Advisor
James Gavelek, Curriculum and Instruction
Taffy Raphael, Curriculum and Instruction
Rebecca Woodard, Curriculum and Instruction
Cynthia Greenleaf, WestEd

To my wife, Allyson - my best friend and rock.

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SHK

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SUMMARY

Despite the growing body of literature emphasizing the unique literacies of history, mathematics, and science, teacher education programs in the U.S. seldom offer a content literacy course specific to each discipline. Rather, preservice teachers across the disciplines are often combined in a single course, requiring literacy educators to be knowledgeable in multiple fields of study. It is unrealistic, however, to assume that literacy educators possess the kind of disciplinary expertise that is required to adequately prepare preservice teachers for disciplinary literacy instruction in every content area. Consequently, the aim of this study was to provide a space for teacher candidates in history, math, and science enrolled in a content area literacy course to collaborate with university faculty – i.e., historians, mathematicians, and scientists – on disciplinary ways of thinking and practice.

Through an action research approach, I designed a semester-long mentorship framework pairing preservice teachers with university faculty to (1) support preservice teachers' disciplinary literacy development and (2) examine university faculty role in preparing preservice teachers for disciplinary literacy instruction. Thirteen university faculty were recruited from the College of Liberal Arts and Sciences to mentor fourteen preservice teachers during three scheduled meetings spread out over the entire 2014 fall semester. The mentorship meetings were purposefully developed and structured to make visible the implicit thoughts of experts as they read texts, solved problems, and discussed being a competent member of their communities of practice. Data sources include writing artifacts, pre and post surveys, interviews from each participant, researcher memos, and observational notes. Saldaña's first and second cycle coding method was used to organize and analyze the data.

Results revealed that embedding a mentorship within a content literacy course provided preservice teachers with an inside look into the role of literacy in specific disciplines (i.e., how

SUMMARY (continued)

meaning is made in different disciplines). The mentorship framework also created opportunities to expose the thinking processes and proficient reading skills of university faculty when approaching discipline-specific texts. Additionally, this experience allowed university faculty to reflect on their own literacy practices and reinforce the importance of literacy in their disciplines.

The findings from this dissertation underscore the need to build collaborative relationships across departments, colleges, and faculty in teacher education. Furthermore, preparing preservice teachers for literacy instruction demands shared learning experiences with people who have already mastered the discipline.

I. INTRODUCTION

Watching my guitar instructor in high school decipher every chord and faint sound of a song I aspired to learn was extraordinary. His fine-tuned ear was picking up musical notes that I could not even detect while, simultaneously, his fingers moved up and down the neck of the guitar with incredible precision. Sitting in his studio room, face-to-face, I listened to him talk out loud using specialized vocabulary, such as “D-minor” and “scales,” attempting to comprehend uncertain sounds. I also observed him writing music notes in his scratchpad in order for me to practice playing once he had finished interpreting every tempo and pitch. This was my first experience, of many, watching, modeling, receiving feedback, and performing with an experienced guitar player. During our many sessions together, I learned how a master musician makes sense of his discipline: how to listen intently to sounds, how to write music notes, how to read guitar tablature, and how to think about music as a second language. Gradually, through numerous observations of a professional musician, I was able to practice independently what I had learned and became increasingly confident in my own skills.

My own experience can shed light on the power of mentoring learners into disciplinary ways of thinking and practice. Learning through active participation, modeling, and guided scaffolding with expert members of a discipline connects with and grounds my understanding of teacher preparation at the middle and high school level. In support, Gee (1996) writes, “Discourses are not mastered by overt instruction, but by enculturation (apprenticeship) into social practices through scaffolded and supported interaction with people who have already mastered the Discourse” (p.139). In this learning framework, disciplinary professionals

(i.e., university faculty) mentor preservice teachers into modes of thinking, reading, communicating, and problem solving that are consistent with each discipline. Furthermore, preservice teachers are provided opportunities to develop a sense of belonging and competency in their disciplinary communities of practice (Lave & Wenger, 1991).

Using an action research approach (Sagor, 2000), I created a mentorship model pairing teacher candidates in history, math, and science with university faculty in their particular disciplines – i.e., historians, mathematicians, and scientists – to (1) support preservice teachers disciplinary literacy development and (2) examine the role of university faculty in preparing preservice teachers for literacy instruction. By making visible to teacher candidates the inherent ways university faculty in the arts and sciences conceptualize content knowledge, read texts, and solve problems, I aim to better prepare preservice teachers to advance their own students' literacy skills. As expressed by Heller & Greenleaf (2007), “the best teachers of discipline-based literacy practices are themselves able to read, write, and think like scientists, historians, and mathematicians...and they are well aware of the specific challenges that people tend to face when learning to read and write in these ways for the first time” (p.27). Additionally, I seek to examine how such a mentorship framework influences university faculty attitudes, beliefs, and practices regarding literacy, teaching, and student learning.

Statement of the Research Problem

The current call for reform in the field of teacher education reflects the increasing standards for learning, as citizens are now expected to enter the workforce with greater knowledge and a broad range of skills (Bransford, Darling-Hammond, & LePage, 2005). Moreover, the increasing diversity of the U.S. population places greater demands on teachers to

meet students' needs across school subject areas. In light of these mounting pressures on both students and teachers, new reforms are currently being studied and implemented to better prepare teacher candidates to meet these sociocultural and academic challenges (Futrell, 2010). Many of the efforts center on issues of local and national certification standards, coursework and curriculum development, and the organization of teacher education programs.

However, research about what constitutes appropriate coursework and an effective program design in the area of teacher education is still emerging (Cochran-Smith & Fries, 2005; Darling-Hammond, 2000; Grossman and McDonald, 2008; Zeichner, 2003, 2008). Questions continue to exist concerning how to better prepare teacher candidates for today's classroom with rigorous student learning outcomes and diverse learners with a broad array of needs. One the primary issues concerning teacher education is the lack of cohesiveness between courses, coursework, and university faculty (Darling-Hammond, 2006a; Goodlad, Soder, & Sirotnik, 1990; Howey & Zimpher, 1989; Tom, 1997). Bain and Moje (2012) underscore the "non-systemic" system of teacher education where prospective teachers learn content in one area, pedagogy in another, and learn how to apply their knowledge in a different space. Consequently, preservice teachers are left to make sense of, and connect, each disjointed experience. In agreement, Darling-Hammond et al. (2005) convey, "In recent past, many teacher education programs have been criticized for being overly theoretical, having little connection to practice, offering fragmented and incoherent courses, and lacking in a clear, shared conception of teaching among faculty" (p.391). One aim of this study is to unify these spaces (see Figure 1) to create a clear vision of literacy teacher preparation.

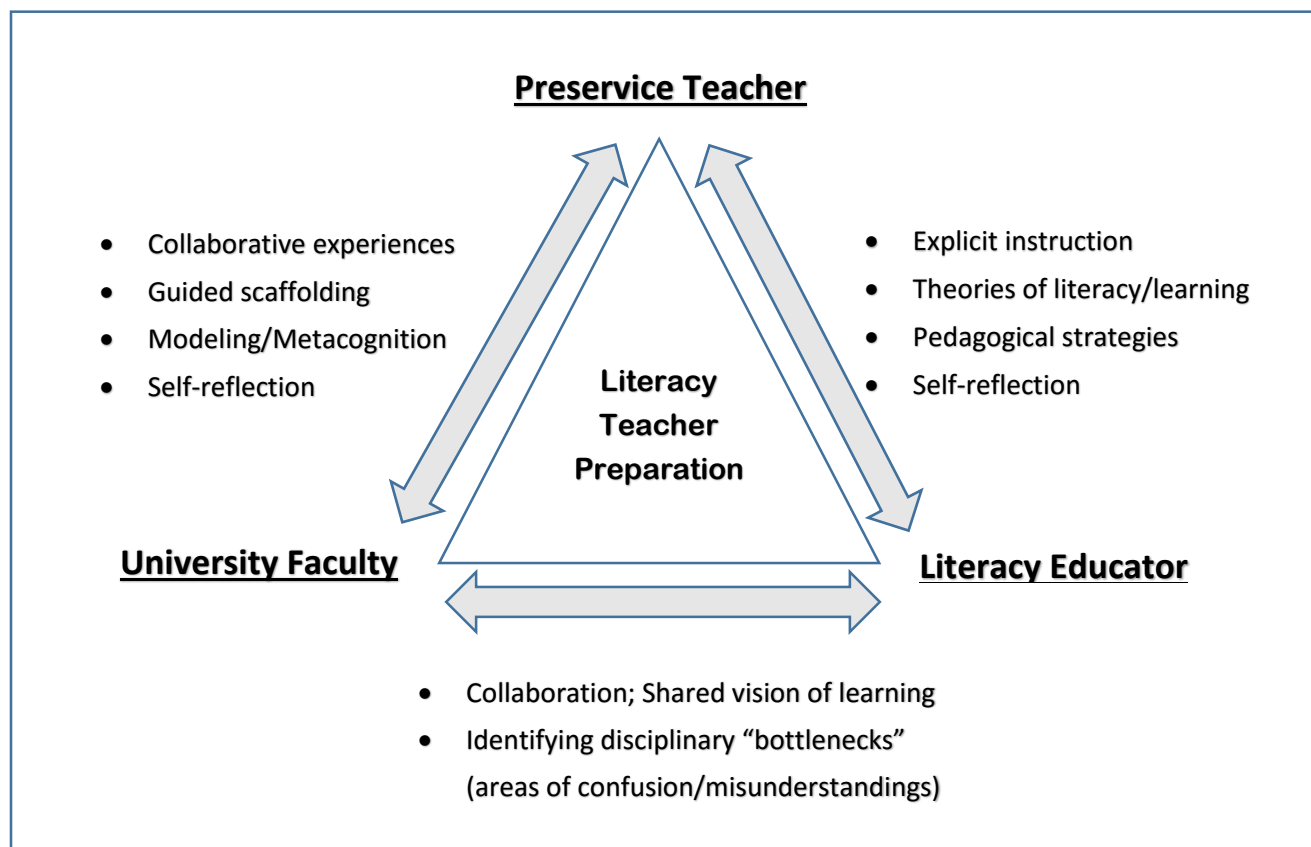


Figure 1: A collaborative model of literacy teacher preparation

Teacher education programs must provide opportunities for collaboration among literacy educators, university faculty in the arts and sciences, and teacher candidates themselves to build coherence.

Establishing collaborative spaces will also be imperative to address the growing need for adolescent literacy instruction (Draper, Nokes, & Siebert, 2010). At the middle and high school level, content area teachers are encouraged to teach the specialized reading, writing, listening, and speaking skills unique to their subject area. Although the concept is not new, disciplinary literacy stresses “advanced literacy instruction embedded within content-area classes such as math, science, and social studies” (Shanahan & Shanahan, 2008, p.40). As opposed to content

area literacy, which is perceived as generalizable reading and writing strategies adaptable across the subject areas, disciplinary literacy underscores the specific literacies used to create knowledge within each discipline. Each discipline has its own discourse community, with its knowledge, language, and sets of rules governing reading and writing norms (Moje, 2008). Ultimately, the emphasis is on approaching texts through the lens of disciplinary experts. In history, for example, historians analyze texts by means of sourcing, corroboration, and contextualization (Wineburg, 1991) while in science chemists create meaning through experimentation and statistical analysis (Shanahan & Shanahan, 2008). These skills are essential because they engender critical thinking and prompt students to deconstruct how knowledge is produced (Lee & Spratley, 2006). Developing collaborative spaces within teacher education programs allows preservice teachers to explore disciplinary ways of thinking and practice through the lens of multiple stakeholders, including peers, field supervisors, teacher educators, and university faculty in the arts and sciences.

In addition to collaborative learning spaces, researchers are urging teacher education programs to integrate specific courses and coursework to support preservice teacher literacy development (Birdyshaw & Swaggerty, 2015; Valdes, et al. 2005). However, with the growing emphasis on disciplinary literacy, questions concerning how instructors in these courses intend to meet the specialized literacy demands unique to each discipline are mounting. Specifically, how can one literacy educator meet the disciplinary literacy needs of students from multiple content areas? Moje (2008) underscores this issue in asking, “How many secondary literacy teacher educators have that knowledge for each of the different disciplinary majors they might meet in a typical secondary literacy course in teacher education programs (p.104)?” In my own experiences as a teaching assistant in the fall of 2013, I observed firsthand the struggles of

supporting students from content areas outside of my knowledge base. With my own educational background focused in the social sciences, supporting teacher candidates in mathematics or the “hard” sciences as they examine the particular language used to mediate learning in their specific fields was unrealistic. Looking back, I was unable to explain or model for her the specialized reading and writing skills unique to mathematics because I had no formal expertise training in this particular area. The rationale for implementing a mentorship framework within a content literacy course is to ensure that the disciplinary literacy needs of every learner are being met.

At the secondary level, placing the responsibility for teaching literacy on one teacher, course, or department is ineffective. That is why the Common Core State Standards maintain literacy instruction will become a ‘shared responsibility’ for *all* teachers. English Language Arts teachers are no longer going to bear the heavy burden of having literacy expectations solely placed on them; history and science teachers will also be expected to introduce reading, writing, speaking, and listening standards in their classroom. However, research currently shows relatively little literacy instruction goes on in most content area courses (Hall, 2005; O’Brien & Stewart, 1990). Instead, the primary focus is on conveying content knowledge. The resistance and/or skepticism to teaching literacies in the content areas may stem from several reasons, including preconceptions teachers hold based upon their own experiences in the classroom (Lortie, 1975) and a lack of preparation in the literacy practices of their discipline (Valdes et al., 2005). Changing teachers’ attitudes and beliefs about literacy, in addition to adequately preparing teachers for literacy instruction, must occur *before* teachers enter the classroom.

Purpose of the Study

The purpose of this study was to develop and investigate a more collaborative model of teacher education to support preservice teachers as they transition into greater competency as disciplinary readers and thinkers. The rationale is that preservice teachers will then be able to mentor their own students into the specialized literacies in their fields. Buehl (2011) reinforces the importance of this kind of instruction: “Mentoring students as readers, writers, and thinkers is an integral and essential component of instruction within a discipline, enabling students to become increasingly more independent in accessing the communications of different academic disciplines (p. 30).

As the instructor of a preservice content literacy course at a large research-intensive university, I created a semester-long mentorship model (see Table 1) pairing teacher candidates in history, math, and science with university faculty in their particular disciplines to support preservice teachers’ disciplinary literacy development, to learn the implicit ways university faculty make meaning in their subject area, and to examine university faculty role in preparing preservice teachers for literacy instruction. Gee (1989) emphasizes that developing competency arises from a “master-apprentice relationship” by which experts demonstrate their “mastery” within that Discourse (p.11). For the current study, university faculty were recruited from the College of Liberal Arts and Sciences to mentor preservice secondary content area teachers during three scheduled meetings spread out over the entire 2014 fall semester. The meetings constituted a one-on-one gathering between a preservice content area teacher and a university faculty member in a similar field of study. Each meeting was scheduled to last approximately 45 minutes – 1 hour at a time and location convenient for both parties. The meetings were purposefully designed and structured to “peek inside” the mind of professionals as they (1)

discussed disciplinary discourse practices, (2) thought aloud while interpreting texts, and (3) offered feedback on literacy-focused teacher lesson plans.

Table 1
Content Literacy Course Mentorship Model

Mentorship Meeting	Assignment, per course curricula	Scheduled date/time (fall, 2014)	Assignment Description	Purpose
1	Disciplinary Expert Interview	September, 1 hour	Preservice teachers interviewed university faculty on what it means to be, become, a competent member of their disciplinary community of practice	To better understand disciplinary ways of thinking and practice
2	Think-Aloud/Modeling Using a Discipline-Specific Text	October, 1 hour	University faculty performed a think-aloud using a discipline-specific text (e.g. article, lab report, table/chart, book chapter)	To eavesdrop on the implicit reading skills and thinking processes of disciplinary professionals
3	Literacy-Focused Lesson Design Support	November, 1 hour	After designing a lesson plan, preservice teachers sought guidance from university faculty on ways to improve the learning goals, activities, assessments	To improve preservice teachers conceptual understanding of disciplinary topics

The first meeting comprised of a semi-structured interview to better understand how university faculty identified with their subject area, thought about and made meaning with texts, developed disciplinary knowledge, and collaborated with other members of their disciplinary community. The second meeting (see Figure 2) constituted a “think-aloud” activity to make visible university faculty’s implicit thoughts while reading a discipline-specific text; the text

could take the form of an article, academic journal, graphic, spreadsheet, chart, or any other text relevant to his or her discipline. At this meeting, university faculty were prompted to “think out loud” while reading their chosen text as their preservice teacher observed, took notes, and audio recorded the session. In the third and final meeting, university faculty were asked to offer feedback on a literacy-related lesson plan developed by the preservice teacher. As part of the course curricula, preservice teachers were asked to design a 20-25 minute mini-lesson that specifically aimed at disciplinary ways of thinking and meaning making. University faculty were instructed to provide guidance on the learning goals, activities, and assessments in relation to disciplinary thinking. Of course, I am not claiming that three one-hour meetings is the precise number to elicit significant changes in preservice teachers’ dispositions and teaching practices; rather, I am attempting to demonstrate a potential redesign of an effective teacher education program rooted in mentorships.



Figure 2: A university faculty member (mathematician) performing a think-aloud

As the instructor of the preservice content literacy course, I adopted the Reading Apprenticeship (RA) framework (Schoenbach, Greenleaf, & Murphy, 2012) to bridge the course curricula with students' one-on-one mentorship outside the classroom. Emerging from the belief that expert's implicit thoughts should be made visible to students, RA focuses on "apprenticing" students to become more confident and proficient readers and thinkers in their subject area. The Reading Apprenticeship framework is embedded within subject area teaching through metacognitive conversations – that is, conversations about the thinking processes both students and teachers engage in as they read. Although this kind of talk is rare at the secondary level, conversations about the specialized language and knowledge needed to comprehend disciplinary texts has proven a powerful instructional technique to improve reading skills. I engaged teacher candidates in various metacognitive activities within the content literacy course to better understand how to adopt this kind of instruction in their own classrooms. I adopted RA to frame the course curricula because (1) it created a space for students to reflect on their mentorship experiences and (2) it reinforced the fundamental principles of mentorship and disciplinary learning.

Research Questions

Through a collaborative model of literacy teacher preparation, I aimed to support both preservice teachers and university faculty's understanding, and appreciation of, literacy, teaching, and student learning. To that end, the following research questions guided my study:

RQ 1: What did preservice teachers learn about being a competent teacher of literacy through their mentorship experiences?

RQ 2: How does observing university faculty perform a think-aloud support preservice teachers' understanding of discipline-specific reading skills and reading instruction?

RQ 3: How does a teacher preparation mentorship influence university faculty attitudes, beliefs, and practices regarding literacy in their subject areas?

Significance of the Study

One of the salient issues and criticisms in teacher education is the “fragmentation” or disjointed components of the teacher learning process (Darling-Hammond, 2006b; Tom, 1997; Zeichner & Conklin, 2008). Darling-Hammond (2006b) explains,

Elements of teacher learning are disconnected from each other. Coursework is separate from practice teaching, professional skills are segmented into separate courses, and faculties in the arts and sciences are insulated from education professors. Would-be teachers are left on their own devices to put it all together (p.279).

She argues that students are left to assimilate “four alien worlds” on their own: (1) the liberal arts and sciences departments, (2) disciplinary pedagogy, (3) the learning environment where teachers work and practice, and (4) children's and families communities. In looking ahead at the future of teacher education, university faculty and prospective disciplinary teachers must be part of a collaborative community to meet the need for advanced literacy instruction in the secondary content areas. Schools of education cannot function in isolation, separate from the liberal arts and sciences to prepare teachers effectively. Accordingly, this study creates a pathway for university faculty to become more directly involved in the teacher learning process as it relates to supporting literacy development.

While researchers are currently exploring how to develop collaborative spaces between literacy educators and university faculty (Draper & Siebert, 2010; Draper, Broomhead, Jensen, & Nokes, 2012), this qualitative case study intends to advance this model by constructing a space for prospective teachers to also join this learning community. In an effective content literacy course, preservice teachers engage with university faculty who understand the meaning-making practices inherent to the discipline. An integrated model of teacher education requires teacher candidates to actively engage with, and become members of, disciplinary communities of practice (Lave & Wenger, 1991).

Theoretical Framework

In recent decades, discussions of literacy have been grounded in sociocultural theory, emphasizing the role of literacies as social practices embedded in larger social and cultural relationships (Barton, 1994; Gee, 1996; Scribner & Cole, 1981). This view challenges our previous understanding of literacy as simply reading and writing; rather, it focuses on *how* reading and writing are used to participate in various Discourse communities. Across the disciplines of mathematics, history, and science, for example, experts use and apply different cognitive reading strategies dependent on what they are trying to making sense of in their particular discipline.

In contrast to the traditionalist view or autonomous model (Street, 1997) of literacy, suggesting that literacy is best understood as a technical skill “irrespective of, or autonomous of, context” (p.47), researchers now see literacy as a set of social practices that vary from situation to situation (Barton, 1994). Gee (1996) argues that “literacy has no effects—indeed, no meaning—apart from particular cultural contexts in which it is used, and it has different effects in different

contexts” (p. 59). In connection to this study, the space and setting in which preservice teachers learn the implicit practices of their discipline is just as important as what they learn. An impetus for designing this study was the realization that the classroom might not be the best place or “context” to learn discipline-specific literacy skills; rather, working alongside a university faculty member in their own learning environment may lead to a deeper understanding, and appreciation of, disciplinary literacy.

In support of a mentorship framework in teacher education, it is important to recognize the social nature of cognition (Resnick, 1987). Bandura (1977) proposed that learning occurs, not through cognitive or informational processing, but through observation and modeling. His theory of social learning underscores the learning process as a socially mediated activity; that is to say, a reciprocal relationship occurs between the learner and the social and material environment. Bandura stressed the phenomena of *vicarious learning*, whereby learners acquire knowledge through observation. By making their hidden cognitive reading strategies visible, university faculty allow preservice to eavesdrop on their thinking. Thus learning becomes a process whereby knowledge is co-constructed in a “community of practice” (Lave & Wenger, 1991).

From the social constructivist paradigm, learning occurs as a result of social interactions with others. Vygotsky focused on the social and cultural experiences of children in shaping their cognitive processes. Woolfolk (1998) writes,

Whereas Piaget described the child as a little scientist, constructing an understanding of the world largely alone, Vygotsky (1978, 1986, 1987, 1993) suggested that cognitive development depends much more on interactions with the people in the child’s world and the tools that the culture provides to support thinking (p.44)

One of Vygotsky's salient ideas that plays a crucial role in supporting a mentorship framework of literacy teacher preparation is the "zone of proximal development," commonly referred to as ZPD (see Figure 3). The zone of proximal development refers to the difference between what a learner can do independently, and what they can potentially do with the guidance and support from a knowledgeable teacher. Such support, often termed "scaffolding," allows a learner to recognize their own limitations and then gradually advance their understanding through collaboration. Each mentorship meeting, and interaction with university faculty, is designed to move preservice teachers progressively toward disciplinary competency.

Becoming part of, or gaining access to, a specific community to master specific literacy practices has been studied extensively by Gee (1990, 1996). Gee (1990) defines literacy *within* the boundaries of Discourse, or the ways of reading, writing, speaking, thinking, and 'ways of being' in the world. Similar to Lave and Wenger (1991), Gee argues that in order to master a Discourse, individuals must immerse themselves in specific social or cultural groups through enculturation or apprenticeship. In an effective content literacy course, preservice teachers must not only interact with their peers but also engage with university faculty to gain access to expert knowledge. Research shows that experts use and apply different thinking and problem-solving strategies than novices (Bransford, Brown, & Cocking, 2000), suggesting the importance of providing preservice teachers with learning experiences to observe and connect with experts in their subject area. Accordingly, this study is grounded in the philosophy that in order to develop competency in particular subject areas, learners must immerse themselves in the language, texts, and ways of thinking that are consistent with each discipline.

II. LITERATURE REVIEW

Overview of Review of Literature

In the previous chapter I outlined the issues surrounding teacher preparation and adolescent literacy instruction. Additionally, I described the purpose and significance of this study, theoretical framework, and research questions that ultimately guided my data collection process. In this chapter I provide a comprehensive review of the literature to identify studies that support my research topic, give context for developing a mentorship framework, and show where my research fits into the existing body of knowledge.

Teacher Education Programs

For several decades, researchers have inquired about the organizational structures, curricula, and program design of teacher education programs (Cochran-Smith & Zeichner, 2005; Darling-Hammond, 2000, 2006a; Holmes Group, 1986; Zeichner & Conklin, 2008; Zeichner & Gore, 1990). The design of programs can be diverse, varying in coursework, learning standards, licensure, clinical experiences, and overall philosophy and vision of teaching and learning. In recent years, educational reformers and policy makers have explored the multiple pathways into teaching (Boyd, Grossman, Langford, Loeb, Michelli, & Wyckoff, 2005; Feinman-Nemser, 1990); more specifically, the “traditional” or “alternative” routes to certification. While all teacher education programs are designed to develop “highly-qualified” teachers for classroom instruction, certain features of programs appear to be more instrumental than others in supporting teacher development. Most notably, effective teacher preparation programs are designed around a clear, shared vision of good teaching among all faculty (Darling-Hammond, 2006b; Goodlad, Soder, & Sirotnik, 1990; Hammerness & Darling-Hammond, 2002; Howey & Zimpher, 1989; Whitford, Ruscoe, & Fickel, 2000).

A Shared Vision of Teacher Preparation

Reform efforts in the 1980s began to develop integrated teacher preparation programs, designed around a uniform vision of good teaching (Hammond et al., 2005). These institutions were initially criticized for being overly fragmented, containing a collection of unrelated courses, coursework, and conflicting ideologies of quality teaching (Howey & Zimpher, 1989; Zeicher & Gore, 1990). My course redesign manifested from the inconsistent vision of effective literacy instruction across the university¹. Restructuring teacher education programs around a shared conception of teaching suggests a stronger link between courses and faculty in the teacher learning process. In this learning framework, faculty in the arts and sciences and education collaborate on ways to improve teacher education and bridge course curricula; thus, reinforcing specific skills and strengthening preservice teachers' understanding of effective teaching practices. Research suggests that repeated exposure and opportunities to practice skills aids in deeper learning and competency (Giovannisson, Krampe, & Tesch-Romer, 1993).

Redesigning teacher education programs around a shared vision of teaching reinforces the importance of collaborative learning communities (Au, 2002; Cochran-Smith & Lytle, 1999; Murphy, 1990). In these spaces, preservice teachers, literacy educators, and university faculty in the liberal arts and sciences work together to support disciplinary learning. In support, Darling-Hammond (2006b) examined seven “exemplary” teacher preparation programs and found they all shared common features, including a clear vision of good teaching and strong relationships and shared beliefs across the program and among all faculty members. I too intended to establish “strong relationships” and cultivate “shared beliefs” among university faculty through a

¹ I discuss in greater depth the motivations behind redesigning the content literacy course in Methodology

mentorship model of teacher education. Encouraging preservice teachers and university faculty to join a collaborative learning community reflects an understanding that effective teacher preparation is a social and dialogic activity.

Goodlad (1994) argues that the responsibility for preparing new teachers resides with the entire university. However, university faculty outside of education seldom assume this role.

Darling-Hammond, et al., (2005) convey,

The faculty in the arts and sciences most often carry out the preparation for future teachers in undergraduate programs, but this function is rarely acknowledged and developed. These faculty introduce teachers to critical content, they demonstrate what it means to participate in a discipline, and they model teaching techniques that teachers emulate... Yet, it is not uncommon to find that most arts and sciences faculty feel little responsibility for the preparation of teachers through the courses they teach. (p. 456 – 457)

I uncovered similar attitudes in my findings. In a pre-survey, university faculty were asked, *“What responsibility do you feel, if any, for preparing the next generation of teachers to read texts/documents using methods that disciplinary insiders (e.g. historians, scientists, and mathematicians) use?”* One professor of science responded quite bluntly, “I don’t know that I do feel a responsibility to do so.” It is important, however, to consider the reasons behind these sentiments.

Obstacles to Establishing Collaborative Communities

As I discussed in Chapter 1, one of the critical issues in teacher education is the “fragmentation” of the teacher learning process (Darling-Hammond, 2006b; Zeichner & Conklin,

2008). Tom (1997) contends that this fragmented system, of which students have to endure, is a result of staff organization within the university. Conflicting ideologies, goals for learning, and approaches to teaching among faculty members, may generate tensions and disrupt any attempt to establish social communities. One of my observations in speaking to university faculty across colleges and departments was the varied teaching styles and visions for student learning. Additionally, I noticed that some colleges and departments were more interconnected than others².

In large research-based universities, teacher education is also not a high priority (Goodlad, 1994). Many of the faculty members within the disciplines have few opportunities for collaboration, as their time is often allocated towards grant proposals, conducting their own research, and other conflicting interests. These same universities also adhere to the state board of education's changing requirements that affect what objectives and learning standards must be met in teacher preparation courses. Additionally, research intensive universities often hire adjunct faculty members to teach teacher education courses, and there is significant turnover in these adjunct faculty members from semester to semester. The revolving door of teacher educators at these institutions makes it quite difficult to embrace a clear and consistent vision of *how* to prepare teachers (Zeichner & Conklin, 2008). It is also important to recognize the amount of time, work and human resources that are required to restructure a teacher education program (Draper et. al., 2012; Zeichner, 1993).

I would be naïve to assume that every faculty member within the disciplines desires to collaborate with other teachers and/or students. In his book, *Among School Teachers*,

² In the Department of History, faculty held weekly "brown bag" lunch meetings to discuss issues and share ideas

Westheimer (1998) recalls his own experiences working with and observing teachers: while some teachers saw learning communities as valuable resources, others preferred “individual professional autonomy” (p. 10). Teachers often want to be left alone, far removed from the bureaucracy and politics of a large institution. Consequently, pursuing meaningful reform within institutions will presumably elicit skepticism and/or disdain with some faculty members.

To address these challenges, partnerships between colleges, faculty, and teacher candidates must be developed. In the next section I discuss various approaches to building collaborative communities within teacher education programs and provide specific examples of integrated institutions.

How to Establish Collaborative Communities

Taking steps to bridge faculty in education and the arts and sciences begins with establishing a university culture that embraces the teaching profession. Compared to other disciplines, teaching is not always deemed a high priority (Goodlad, 1994). This is evident in the growing number of part-time faculty responsible for teaching undergraduate courses, rendering a cohesive vision of teaching quite difficult. Creating collaborative communities also demands leadership and commitment from department chairs and administration (Darling-Hammond, et al., 2005). In my recruitment efforts of university faculty for this study, I was initially advised by peers and mentors to reach out to department chairs because their commitment to and passion of teaching and literacy would motivate other staff to participate. Several universities have tried implementing “jointly taught or parallel content and content pedagogical courses” to create a space for preservice teachers to immediately reflect on both subject-matter knowledge and teaching practices (p. 457).

Several organizations and universities around the country serve as prominent examples of how to bridge faculty in the arts and sciences and education to share the responsibility of preparing new teachers. In 2001, the *Carnegie Corporation*, with the support of the *Annenberg* and *Ford Foundations*, launched the *Teachers for A New Era* initiative. The purpose was to reward institutions – affording grants up to \$5 million for a period of five years - that developed new reforms in current education models. The authors of the national initiative desired greater active engagement of arts and science faculty in the preparation of students, recommending mentorship in the teaching techniques for the academic discipline. Boston College, for example, developed the *Collaborative Mentoring Program*, fostering a community of teacher candidates and arts and sciences faculty around the content areas. Stanford University redesigned the *Stanford Teacher Education Program* to foster school-university partnerships that involve placement for student teachers and joint research in the university’s partner secondary school.

Separate from the *Teachers for A New Era* initiative, researchers are exploring how to develop collaborative communities among literacy educators and content area educators (Draper & Siebert, 2004; Draper, Broomhead, Jensen, and Nokes, 2012). Reporting on findings from a three year study of an ongoing participatory action research (PAR) project at Brigham Young University, Draper et. al., (2012) brought together literacy and content area teacher educators. The purpose of the study was to (1) develop a shared understanding of literacy instruction in content area classrooms and (2) improve practices with teacher candidates to support adolescents’ discipline-specific literacy development. The University of Michigan also restructured their teacher education program to support disciplinary literacy development. Also known as The Rounds Project, since 2005, University of Michigan’s school of education has sought to “close gaps” between schools of education, liberal arts, and classrooms (Bain & Moje,

2012). Modeled after the rounds and rotations of medical training, their program aims to deepen prospective teachers' knowledge of disciplinary literacy by forging greater connections among semesters, teachers, and courses.

Similar to the programs mentioned above, I purposely developed a shared space for preservice teachers to learn the unique literacies of their particular disciplines. However, the aim of my course redesign was to provide a more direct and active role for university faculty to support disciplinary literacy development through a one-on-one mentorship. This model of learning creates a more personalized and intimate learning experience to help prepare preservice teachers for literacy instruction.

Preparing Preservice Teachers for Literacy Instruction

When national policy briefs and educational reports underscore the literacy struggles of adolescent learners (Moje, Young, Readence, & Moore, 2000; Moore, Bean, Birdyshaw, & Rycik, 1999; The National Council of Teachers of English, 2007), a spotlight also shines on teacher preparation. Currently, schools of education are placing emphasis on literacy teacher preparation to address the stagnant reading scores of middle and high school students (Grigg, Donahue, & Dion, 2007; National Assessment of Educational Progress, 2013) and the complex literacy demands outlined by the Common Core State Standards.

In 2015, the International Literacy Association (ILA) issued a preliminary report by its Literacy Teacher Preparation Task Force to spark “conversations” about the current state of U.S. preservice teacher preparation in literacy (Birdyshaw & Swaggerty, 2015). The committee uncovered a lack of standards for how to teach literacy and inconsistent certification requirements for licensure in literacy instruction. The authors elaborate, “The preliminary

findings of our investigation make apparent the need for increased attention to how preservice educators are prepared for teaching literacy, with particular attention to potential relationships between program design and teacher effectiveness” (p.8). The intent of this study was to further call “attention” to how preservice teachers are prepared for literacy instruction and, more specifically, develop into effective teachers of reading.

Preparing Secondary Teachers to Teach Reading

In the past few decades, there has been an increase in studies on teacher education, but little research on how to prepare teachers to teach reading (Anders, Hoffman, & Duffy, 2000). This is especially apparent in secondary teacher preparation programs where prospective teachers are typically considered more content-focused. The authors attribute the scarcity of research to several causes: “either preservice teacher education is lacking compelling questions, or it is such a difficult and undersupported area of study that researchers have shield away from systematic inquiry” (p.724). Other researchers cast blame on the common misconception that basic reading skills at the elementary level will automatically evolve into more advanced skills in the upper grades (Buehl, 2011; Shanahan & Shanahan, 2008; The National Council of Teachers of English, 2007). As a result, over the past century, research initiatives and policy briefs have primarily focused on how to teach reading at the elementary and primary school level (Hiebert & Taylor, 2000; Shannon, Edmondson, Ortega, Pitcher, and Robbins, 2009), minimizing secondary reading preparation.

The lack of support and urgency in secondary reading preparation is problematic because, with the newly adopted Common Core State Standards (CCSS), all secondary teachers are expected to be knowledgeable in supporting students’ reading skills for college and career

readiness. While middle and high school teachers are not expected to become reading specialists, they are encouraged to emphasize reading practices that are specific to their subjects (Biancarosa & Snow, 2004; Heller & Greenleaf, 2007). The standards outlined by CCSS act as a blueprint for secondary content area teachers to imbed disciplinary reading into their instruction and support adolescent literacy development.

Stressing the need for effective secondary reading preparation is also imperative because of assessment data showing that adolescents today read no better than a decade ago. According to the most recent National Assessment of Education Progress (NAEP), in 2013 only 38 percent of 12th grade students read at or above the proficient level, and approximately one-quarter of high school seniors read below grade level. Breaking down reading scores by race and ethnicity, the statistics present an even more vivid and grim picture: only 23 percent of Hispanic and 16 percent of African American 12th graders are reading at proficiency levels.

Fostering meaningful changes in the ways secondary preservice teachers are prepared to teach reading will not be an easy task; there are a number of obstacles that must be overcome, both within the classroom and in the larger institution. One of the salient issues is the lack of training and coursework in reading and language instruction (Alvermann & Moore, 1991; Braunger, Donahue, Evans, & Galguera, 2005; Campbell & Kmiecik, 2004; International Literacy Association [Task Force], 2015). Secondary educators have sufficient coursework in content knowledge, but “little formal training in the reading and writing demands of their disciplines, and even less formal training in the systematic ways that acquiring such reading and writing skills are intimately linked to issues of language acquisition and language socialization” (Valdes et al., 2005, p.154). Having a separate course in reading or content literacy is relatively new in most states; reading instruction is most commonly embedded into secondary methods

courses (Braunger, Donahue, Evans, & Galguera, 2005). Valdes et al., (2005) contend that language education should not be an “add on” in teacher preparation institutions, but rather it should be integrated throughout the teacher learning process (p.161).

Other researchers underscore the lack of standards and guidelines for literacy teacher preparation (Birdyshaw & Swaggerty, 2015; Campbell & Kmiecik, 2004; Moats, 1999). In 2015, the International Literacy Association (ILA) commissioned a Teacher Preparation Task Force to review the preparation U.S. teachers to teach literacy. The 13-member task force found inconsistent standards for preparing teachers on how to teach literacy. The committee recommends clearer, research-based state guidelines and standards for what preservice teachers should know and be able to do once they enter the classroom. The purpose of establishing specific standards is to assure that secondary teachers are qualified and prepared to teach reading.

Despite the myriad challenges in secondary reading preparation, from insufficient training to institutional roadblocks, teachers, researchers, and educational reformers are seeking solutions. At the 2015 International Literacy Association (ILA) Conference, a special session titled, “Cultivating Literacy Achievement Through Quality Teacher Preparation,” brought together a panel of leading experts across the U.S. to examine how to better prepare teachers at the elementary and secondary level to advance student literacy achievement. The panel of scholars called attention to the role of literacy educators, content literacy courses, and the organization of institutions. In other words, preparing teachers for literacy instruction requires direct participation and collaboration between all stakeholders during the teacher learning process (Draper, Broomhead, Jensen, Bakeron, & Nokes, 2012; Frazier, Mencer, & Duchein, 1997; Le Cornu & Ewing, 2008). Too often, university faculty in the liberal arts and sciences and

university faculty in the college of education prepare preservice teachers separately without establishing cohesive goals, standards, or expectations. In this study, I aim to address the “fragmentation” that is typically seen at large teacher preparation institutions (Darling-Hammond, 2006; NCTAF, 1996).

Within the classroom, researchers are rethinking the ways in which secondary preservice teachers are prepared to teach reading. Campbell & Kmieciak (2004), for example, believe that preservice teachers should be exposed to more authentic, real-world literacy challenges that secondary teachers are likely to experience in the classroom. Other researchers are looking at how literacy educators balance theory and practice in their instruction (Levine, 2006). In my own personal experiences teaching a content literacy course, I frequently ask myself, how much instructional time should I devote to discussing the theoretical underpinning of literacy and adolescent development and how much instructional time should I devote to demonstrating the use of literacy strategies? Farnan, Grisham, & Lenski (2008) proclaim that finding a balance between the two is key: “Quality teacher preparation requires the development of a strong knowledge base coupled with practical literacy teaching opportunities” (p.14).

Improving the specific course and institutional conditions in which secondary preservice teachers learn how to teach reading is essential because of the effects on their prospective students. In support, Campbell & Kmieciak (2004) express, “Improving literacy levels for secondary students is too complex for simplistic explanations, yet one thing seems clear: faculties in schools of education need to attend to the voices of secondary teachers. When we fail to do so, we do this at the peril of the students they teach” (p.17). The author’s point is that all stakeholders in the teacher learning process, including university faculty, should support the literacy development of secondary teachers because of the impact on our youth. Ultimately, a

poorly trained teacher will not be able to address the complex literacy demands of a diverse student population. Additionally, they will not be able to support the disciplinary reading and thinking skills that are required to make meaning in each subject area (Moje, 2008).

The primary role of university faculty in this study was to mentor or “apprentice” preservice teachers into the ways of thinking, reading, communicating, and problem solving in their fields. Through discussions and metacognitive tasks (e.g., think-aloud exercise in the second mentorship meeting), preservice teachers gained insight into university faculty cognitive processes. In the next section I examine the body of literature of supporting learners through this kind of apprenticeship learning.

Apprenticeship Learning

Supporting students as they develop as academic thinkers and readers is not going to be an easy task. As stated previously, basic skills learned in the primary grades do not necessarily translate to advanced literacy skills required to be successful readers and writers in the secondary content area classrooms. From the perspective of content area teachers, teaching discipline-specific literacy skills demands more than explicit instruction; it requires apprenticing students to become aware of the tacit meaning-making practices used by experts. Two of the prominent methods content area teachers can use to make visible experts’ tacit knowledge is the think-aloud protocol (Giovannisson & Simpson, 1993; Pressley & Afflerbach, 1995) and metacognitive conversations (Schoenbach, Greenleaf, & Murphy, 2012). That is to say, supporting students as they transition into academic thinkers and readers will require explicit teacher modeling and discussion of how to interpret discipline-specific texts. In this study, preservice teachers observed firsthand how university faculty made sense of texts and solved novel problems though talking out loud.

The thought of ‘apprenticeship’ in the realm of teacher education is most commonly associated with the work of Dan Lortie (1975), who coined the phrase “apprenticeship of observation.” The concept signifies the years we spend in the classroom observing teachers, often eliciting narrowed preconceptions about what it means to teach. Furthermore, it was presumed that these biases were so deeply rooted that teacher education programs could not overcome and ultimately advance preservice teachers’ beliefs.

However, traditional apprenticeship is the process whereby a novice learner acquires knowledge and skills from an experienced practitioner. Apprenticeship typically involves learning by doing; that is, an apprentice observes and works side-by-side with an expert as he or she engages in the task being acquired. In this process, the expert demonstrates how to do a task, observes as the apprentice preforms small steps of the task, and then once the apprentice is capable, he or she takes on full responsibility to complete the task independently (Collins, Brown, & Holum, 1991). For prospective content area teachers, apprenticeship learning would entail working alongside university faculty as they engaged in close reading, makes connections between concepts, and thinks out loud to solve problems. As the student learner continually observes the expert model meaning-making strategies within their particular discipline, he or she practices similar strategies, collaborating and receiving feedback on the task. Gradually, the student learner becomes confident in their own skill-set to work independently. Through purposeful modeling and scaffolding, the aim of apprenticeship is for prospective teachers to not only think like disciplinary experts, but construct an identity and work collaboratively with other members in that particular community of practice (Wenger, 1998)

In modern times, apprenticeship learning has largely been replaced by formal schooling (Larabee, 2004). In secondary content areas classrooms, the *transmission model of learning* often

directs classroom discourse. From this approach, learning is dependent on the teacher and *telling* students what to think and know dominates pedagogical practices. Although students are able to store a vast amount of information through rote learning, they receive little instruction in the implicit ways experts analyze and comprehend academic texts. The assumption that basic reading and writing skills learned at early grades automatically evolve into advanced academic literacy skills at the secondary level is misleading. Even for students who master basic decoding and comprehension skills, many adolescents struggle making sense of the specialized language and academic discourse typically seen in the upper grades (Shanahan & Shanahan, 2008). Consequently, disciplinary experts need to make visible the implicit strategies and comprehension and composition techniques that produce successful readers and writers (Collins, Brown, & Holum, 1991; Delpit, 1988; Gee, 1996). In other words, teachers must not only *tell* students what to do, but explicitly *show* them how to construct and create meaning from complex, academic texts (Greenleaf, Schoenbach, Cziko, & Mueller, 2001).

Over the last two decades, developing an apprenticeship framework of learning between expert and novice has sparked several reform efforts (Collins, Brown, & Newman, 1989; Greenleaf et. al., 2001; Schoenback, Braunger, Greenleaf, & Litman, 2003). A focus on cognitive apprenticeship, for instance, aims to teach novices the metacognitive processes experts use while performing a task (Barab & Duffy, 2000; Collins, Brown, & Newman, 1989; Collins, Brown, & Holum, 1999). This type of teaching approach allows students to “eavesdrop” on experts’ thinking (Bronzo & Simpson, 2007, p.50). The thought being, as experts solve problems by making their tacit thoughts explicit, students will develop thinking strategies they can use independently.

Developing Metacognitive Learners

Research suggests that stronger readers monitor their own reading and actively consider how they are making sense of texts (Schoenbach, Greenleaf, & Murphy, 2012). Compared to struggling readers, proficient readers make connections to prior knowledge, generate questions, make predictions and inferences, and consciously adjust their reader strategies to assure a better understanding of a text (Buehl, 2007). Bransford, Brown, and Cocking (2000) express, “the ability to monitor one’s approach to problem-solving – to be metacognitive – is an important aspect of the expert’s competence” (p. 78). Ultimately, students who read with a critical eye evolve into strategic and metacognitive readers.

Students’ abilities to monitor and control their own mental processes is often referred to as metacognition (Baker & Brown, 1984; Flavell, 1976; Fogarty, 1994). Coined by developmental psychologist Giovanni Flavell, metacognition refers to “one's knowledge concerning one's own cognitive processes” (p.232). Simply defined, metacognition is “thinking about thinking.” In regards to its impact on student learning, Vargas (2006) remarks, “the discovery and theoretical elaboration of metacognition constitute a major breakthrough in recent decades on cognitive research (p.696). Vargas, however, perceives metacognition as much more nuanced and complex than commonly defined. In his mind, metacognition is the “monitoring and control of thought” (p. 696). Through this lens, metacognition evolves from a passive process to an active, reflective practice.

Fogarty (1994) suggests that metacognition is a three-step process, and that to become successful thinkers, students must follow each step. First, readers develop a plan before reading. In the history classroom, for example, students are encouraged to source primary documents

prior to reading to examine author bias, credibility, and when the text was written and for what purpose (Wineburg, 1991). Developing a plan before reading also concerns reading with purpose and setting clear goals (Duke & Pearson, 2002). That is, how a reader approaches a text can significantly impact his or her understanding. Schoenbach, Greenleaf, and Murphy (2012) assert, “Purposes drive reading processes” (p.35). Secondly, metacognition entails a reader monitoring his or her understanding of the text during reading. Readers who monitor their understanding often apply “fix-up” strategies when they get stuck or when their comprehension breaks down. These strategies may include going back and rereading a section, adjusting their reading rate, referring to visual aids, visualizing concepts, or checking alternative sources. Proficient readers also monitor their comprehension by questioning texts (Beck, McKeown, Hamilton, & Kucan, 1997; Raphael, 1982). Buehl (2011) contends that teachers need to “empower students as active questioners” to support reading development (p.173). Lastly, metacognition involves students evaluating their thinking after completing a task. For example, after reading a text, students should ask themselves, “What did I learn?”; “What did I not understand?”; and “What can I do differently next time?”

Vacca and Vacca (2005) proclaim that it is the responsibility of teachers to show students how to engage in metacognition and to think deeply about texts. In their words, “Translating our metacognition into lessons that students understand is the hallmark of effective content area teaching” (p.76). Through the Gradual Release of Responsibility Model (Pearson & Gallagher, 1983), learning is steadily transferred from the teacher to the student through scaffolding and teacher modeling. The purpose of modeling is to make visible teachers implicit thoughts so that students “build their own mental modes of disciplinary thinking” (Buehl, 2011, p.26). Central to this study is how teachers learn and acquire the skills to effectively model for their own students

how to read and make sense of disciplinary texts. Examined in the next section is a framework of teaching that allows for this kind of instruction.

Reading Apprenticeship framework

Using an apprenticeship approach to support academic literacy development, Greenleaf et. al. (2001) designed an instructional framework, Reading Apprenticeship (RA), for 9th graders at Thurgood Marshall Academic High School. The Reading Apprenticeship framework is embedded within subject area teaching through metacognitive conversations – that is, conversations about the thinking processes both students and teachers engage in as they read. Although this kind of talk is rare, conversations about the specialized language and knowledge needed to comprehend disciplinary texts has proven a powerful instructional technique to improve reading skills. Working with subject area teachers to practice metacognitive reading strategies, the researchers designed three units in an original course, *Academic Literacy*. The purpose of the study was to “help students become better readers of a variety of texts by making the teacher’s discipline-based reading processes and knowledge visible to students” (p.89). Embracing literacy practices through a sociocultural lens, RA integrates four dimensions of classroom life to support adolescents’ literacy knowledge and development:

1. *Personal dimension* focuses on developing students’ identities and self-awareness as readers
2. *Cognitive dimension* focuses on developing readers’ mental processes, including their problem-solving strategies

3. *Knowledge-building dimension* focuses on identifying and expanding the kinds of knowledge that readers bring to a text and further develop through interaction with that text
4. *Social dimension* focuses on community building in the classroom

The researchers collected quantitative data to assess student learning and found significant reading growth within one academic school year. In light of these findings, the researchers call for greater collaborative inquiry between students and teachers to support adolescent academic literacy development.

For the purpose of this study, I adopted the RA approach to guide my own disciplinary teaching practices within a secondary preservice content literacy course. It is critical prospective teachers gain insight into the challenges adolescents will face when approached with specialized, academic texts. While professional development will continue to be a prominent element of teacher development, teacher educators have a responsibility to address and challenge prospective teachers' attitudes and beliefs of disciplinary literacy instruction prior to entering the classroom. Bransford, Darling-Hammond, and LePage (2005) claim, the goal for preservice teachers is to "give them traction on their later development" (p.3).

A Focus on Adolescent Literacy

Almost three decades after President Reagan's administration released the landmark publication, *A Nation at Risk* (1983), a compilation of educational research reports and policy briefs have brought to light the need for adolescent literacy reform: *Adolescent literacy: A position statement* (Moore, Bean, Birdshaw, & Rycik, 1999), *Reading Next* (Biancarosa & Snow, 2006), and *Principles of Adolescent Literacy Reform* (NCTE, 2006). These reports underscore the complexity and urgency of addressing adolescents' literacy needs. For instance, according to

the National Assessment of Educational Progress (NAEP) (Donahue, Daane, & Grigg, 2003), more than two-thirds of middle and high school students score below the proficient level in reading achievement. For minority students the statistics are even grimmer, showing, on average, African American and Hispanic twelfth-grade students read at approximately the same level as white eighth graders (OVAE, 2002). Moreover, only half of graduating high school students read well enough to succeed in college (ACT, 2006). A position statement developed by the International Reading Association Commission on Adolescent Literacy expresses why adolescent literacy reform should take effect immediately:

Adolescents entering the adult world in the 21st century will read and write more than at any other time in human history. They will need advanced levels of literacy to perform their jobs, run their households, act as citizens, and conduct their personal lives....Continual instruction beyond the early grades is needed (Moore, Bean, Birdshaw, & Rycik, 1999, p. 3)

In recent years, the Common Core State Standards outlined a comprehensive agenda recognizing the advanced literacy skills (reading, writing, speaking, and listening) adolescents will need for college and career readiness in a global economy. Secondary teachers are now expected to support and explicitly teach discipline-specific reading skills.

Secondary Reading Instruction

Because students' reading skills in the elementary grades do not automatically evolve into more advanced skills in the upper grades (The National Council of Teachers of English, 2007), secondary teachers play a critical role in helping students develop into proficient readers (Buehl, 2011; Lee & Spratley, 2010; Vacca & Vacca, 2005). As discussed in previous sections of

this paper, secondary teachers do always see themselves as the most qualified or knowledgeable in supporting students reading skills (Alvermann & Moore, 1991; O'Brien, Stewart, & Moje, 1995), but due to the changing literacy demands of the 21st century, assessment data showing that one-quarter of 12th graders read below proficiency levels (Nation Assessment of Educational Progress, 2013), and the new reading requirements outlined by the Common Core State Standards, secondary teachers can no longer take a back seat to reading instruction – all teachers must be held accountable.

One of the main issues concerning secondary reading instruction is how to prepare teachers to teach reading (Anders, Hoffman, & Duffy, 2000) and providing them with the knowledge and tools to feel confident in their abilities to support adolescent learners. For the purpose of this section, I aim to examine various reading strategies, techniques, and approaches to promote adolescent reading development across the disciplines. In her influential paper, *Effective Literacy Instruction for Adolescents*, Alvermann (2001) highlights several practices to support the reading development of middle and high school students. Foremost, teachers must address students' self-efficacy and confidence in their abilities to read complex texts. The Gradual Release of Responsibility (GRR) Model, developed by Pearson & Gallagher (1983), provides a structured framework that allows students to build confidence and develop into independent thinkers and readers through explicit instruction and modeling (see Figure 3). For example, a teacher may demonstrate in front of their students how they make inferences, generate questions, and organize their thoughts while reading a text, and then provide students opportunities to practice similar cognitive reading strategies independently.

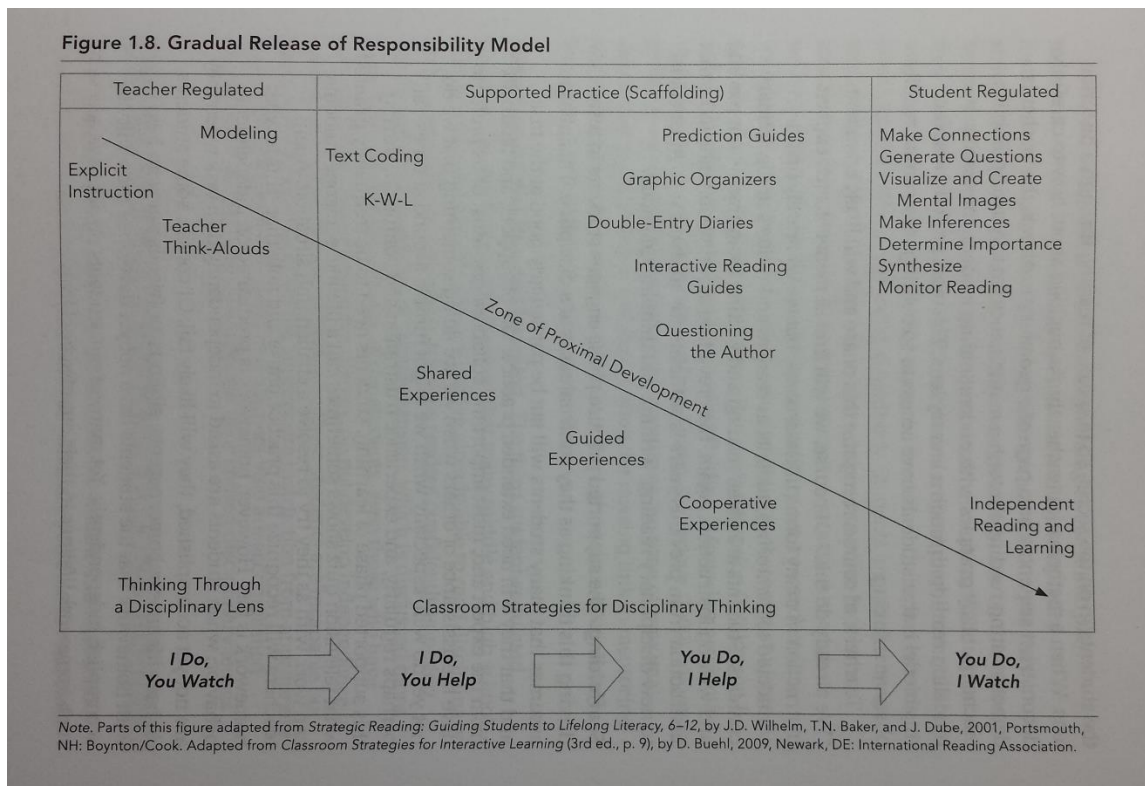


Figure 3. Gradual Release of Responsibility (GRR) Model. Adopted from Buhel (2011, p.27)

Changing students' beliefs about reading also entails motivating students to want to read. Research suggests that one of the primary factors influencing the growth of reading proficiency in adolescents is the level of interest and motivation (Brozo & Simpson, 2007; Bakeron, Caverly, Nicholson, O'Neal, & Cusenbary, 2000; Torgesen, Houston, & Rissman, 2007; Vacca & Vacca, 2005). Offering students choices in what they read is one way to foster engagement. Another example of sparking student interest is creating culturally responsive pedagogy. Moll, Amanti, Neff, and Gonzalez (1992) argue that teachers must tap into the hidden home and community literacy practices, or Funds of Knowledge, that are essential to families. From this lens, household literacy practices become rich cultural and cognitive resources that can be used in the classroom in order to provide culturally responsive lessons.

Through guided scaffolding, and in support of the GRR Model of instruction, secondary teachers are encouraged to mentor or apprentice students into becoming metacognitive readers (Schoenbach, Greenleaf, & Murphy, 2012). Metacognitive readers are able to monitor and control their thinking as they read to inquire about the author’s intent, make connections to prior knowledge, and use fix-up strategies when comprehension breaks down. Fogarty (1994) insists that metacognition is a three-step process – that is, to be successful thinkers, students must (1) develop a plan before reading, (2) monitor their understanding during reading, and (3) evaluate their thinking after reading. In table 2 below is a list of metacognitive strategies that secondary teachers can use to support reading comprehension:

Table 2
Metacognitive Reading Strategies Before, During, and After Reading

Before reading	During reading	After reading
<ul style="list-style-type: none"> • Examine the title • Skim for boldfaced headings and words • Read ahead to mark areas of confusion • Study illustrations and graphics • Look at text organization • Ask questions about the author and source • Set a purpose for reading 	<ul style="list-style-type: none"> • Make connections to prior knowledge • Make connections to other texts • Visualize • Make inferences • Make predictions • Paraphrase/summarize the text • Ask questions • Use “fix-up” strategies • Annotate in the margins • Reread the text 	<p>A reader asks themselves:</p> <ul style="list-style-type: none"> • How well did I understand the text? • What did I learn? • What reading strategies worked for me? • Where did I struggle?

Note: Strategies compiled from multiple sources: Vacca & Vacca, 2005; Lee & Spratley, 2010; Buehl, 2011; Schoenbach, Greenleaf, & Murphy, 2012.

Teaching students metacognitive reading skills is often performed through the think-aloud method. In this approach, teachers make visible their implicit thoughts using similar strategies outlined in Table 2. Through numerous observations, the aim is to have students

internalize these proficient reading processes and then use them independently when reading a text. In this study, I adopted the Reading Apprenticeship (RA) framework (Schoenbach, Greenleaf, & Murphy, 2012) which utilizes think-alouds as a primary instructional technique.

Effective secondary reading instruction also entails activating prior knowledge (Alvermann, 2001; Lee & Spratley, 2010). Simply stated, prior knowledge aids in reading comprehension. Buehl (2011) explains,

Prior knowledge (schema) is portrayed as the bedrock for comprehension. The questions we generate as we think about a text, the visual and sensory scenarios we create in our mind's eye through our imaginations, our ability to infer implicit layers of understanding, and our perceptions of the essence of a text – all involve a back and forth mental, and social, interaction with the knowledge we bring to a text as readers. (p.78)

Buehl's point is that a reader's ability to understand a text is rooted in their capacity to access prior knowledge. Teachers can help students activate their prior knowledge through brainstorming activities, KWL charts, concept maps, story impressions, and prediction guides. Students are also encouraged to think of real-life examples to make personal and emotional connections to a reading. Often called "text-to-self knowledge" (Harvey & Goudvis, 2007), readers are asked to think of personal, real-life experiences to make an emotional connection to the subject matter. For example, in my own teaching of Ivan Pavlov's theory of classical conditioning, I often have my students think of a specific time that they got food poisoning and now avoid the establishment or location where they got sick.

As students transition from the elementary and primary grades into middle and high school, several changes emerge: larger facilities, increase in student-teacher ratio, greater

responsibilities and academic expectations, and students have separate teachers for each subject (Manning & Bucher, 2011). Most importantly, learning becomes much more sophisticated and students are exposed to a variety of academic texts, language, and norms distinct to each discipline. The generalizable literacy and comprehension skills that once dominated the early grades are suddenly replaced by the specialization of reading skills (Shanahan & Shanahan, 2008). This implies that making sense of primary documents in history, lab reports in science, and equations in mathematics, require a set of reading and thinking skills specific to each discipline. That being said, secondary teachers can no longer pass the responsibility of teaching reading to English Language Arts. Smagorinsky (2014) writes,

While English teachers might be able to provide a basic understanding of how sentences and paragraphs are constructed, they are less able to teach their students how to think and represent knowledge in math or history, especially when the value systems that govern expression in those other disciplines are different. (p. xiv)

Historically, English teachers have been the scapegoat for improving adolescent reading skills – they have assumed most, if not all, of the responsibility. Smagorinsky’s point is that English teachers are not prepared to support this kind of work across the disciplines. Furthermore, the most qualified teachers are in fact disciplinary teachers themselves because they possess the kind of disciplinary thinking required to advance students’ reading skills. However, possessing a deep knowledge of one’s discipline does not always translate into effective literacy instruction.

Secondary Literacy Challenges

It is not a surprise why little attention has been placed on secondary literacy skills; historically, most literacy policies and federal money have targeted younger readers (Teale et.

al., 2009). The common assumption being: children learn to read in K-5 and, subsequently, apply those same skills at the high school level. Additionally, the resistance of inservice and preservice secondary teachers to teaching reading and writing in the content area has been well documented (Bintz, 1997; Donahue, 2000; Hall, 2005; Moje, 2008; O'Brien & Stewart, 1990). Hall (2005), for example, examined current and past research of content area teachers' beliefs and attitudes about the teaching of reading within subject areas. In addition, she addressed the various reasons that motivate secondary preservice teachers to either teach or not teach reading. Her results revealed that many preservice and inservice teachers do not see themselves as reading teachers, do not feel qualified in this area, and often believe literacy instruction is the responsibility of others.

The results are not surprising. At the secondary level, content area teachers have little preparation in the literacy practices of their discipline (Valdes et al., 2005). And for preservice teachers who do enroll in content area reading courses, many still resist content area reading instruction when they enter the classroom (O'Brien & Stewart, 1990). Another reason many secondary content area teachers may not be enthusiastic about reading instruction is because it does not mesh with their existing schemas. Moje, Young, Readence, & Moore (2000) refer to terms like *secondary reading* and *content reading* as carrying "baggage" or connotations which limit how we think about literacy. For example, to many secondary teachers the word "literacy" brings forth memories of elementary school, English teachers, and alphabetic text.

Accordingly, changing secondary teachers' attitudes regarding literacy instruction will not be easy; many of their fixed beliefs about teaching originate from personal experiences as students (Lortie, 1975). As teacher educators, we must exhaustively underscore, and directly demonstrate, that teaching reading and writing in their disciplines *is* teaching their disciplines. In

the words of Braugner et al., (2005), “As teacher educators, we want to challenge the notions that teaching reading is incompatible with teaching content; that reading instruction is specialized beyond the average teacher’s capabilities, that improving students’ reading is someone else’s jobs” (p.47).

The focus on adolescent literacy has placed a spotlight on the unique literacies middle and high school students must acquire to meet the learning demands in the content areas. In the next section I discuss the emergence of content area and disciplinary literacy instruction.

Disciplinary Literacies

Content area literacy focuses on the generalizable reading comprehension strategies that can be applied across disciplines (Shanahan & Shanahan, 2012). It is grounded in the presupposition that students must learn a “core” set of literacy strategies in all secondary education courses. These may include pre-reading strategies, such as predicting, summarizing, questioning, and visualizing, or activities, such word walls, KWL charts, SQ3R, anticipations guides, semantic maps, and various graphic organizers (Vacca & Vacca, 2005; Brozo & Simpson, 2007). From this perspective, the same reading and writing instructional strategies used to make sense of primary source documents in history can be used to understand scientific lab reports in chemistry and read complex maps in geography. This view is perpetuated by demands to teach “reading across the content areas.” In theory, this is a reasonable requirement but it leads high school teachers to believe that the same meaning-making strategies can be applied in every subject area. Of course, generalizable literacy strategies should not be viewed as less practical or meaningful in the disciplines. Proficient readers frequently employ generalizable reading

strategies such as questioning, predicting, and summarizing, as they read both discipline and non-discipline-specific texts.

In contrast to the generalizable literacy skills and practices across the disciplines, scholars in recent decades have examined the specialized literacy practices within the disciplines (Zachander, 1998; Chi, Feltovich, & Glaser, 1981; Fang & Schleppegrell, 2010; Lee & Spratley, 2010; Moje, 2008; Shanahan & Shanahan, 2012; Wineburg, 1991). As adolescents transition into the upper grades texts become increasingly sophisticated and students are expected to engage in academic discourse distinctive to each domain or discipline (Shanahan & Shanahan, 2008). Disciplinary literacy underscores the reading, writing, speaking, and reasoning skills particular to each discipline (McConachie & Petrosky, 2010). Moje (2008) asserts that each discipline possesses its own terminology and norms of practice, underscoring particular ways of communicating and representing knowledge.

To lay emphasis on Moje's claim, consider the differences in how texts are structured in science compared with history. Research indicates that academic texts vary from subject to subject in regards to functional linguistics (Fang & Schleppegrell, 2008; Schleppegrell, 2004), terminology and academic language (Lee & Spratley, 2010), and visual information (Buehl, 2011). Compared to historical texts, scientific texts contain much more sophisticated vocabulary and language (Lee & Spratley, 2010). Science vocabulary terms are often derived from Latin and Greek roots, such as *poly* (polymer, polypeptide, or polymorphism) and *sub* (subatomic, suboxide, or subacetate), eliciting decoding problems in struggling readers. Additionally, many scientific words are used differently in everyday discourse, such as energy, law, error, and theory. Fang & Schleppegrell (2008) call attention to the use of "nominalization" within science – that is, the conversion of verbs and adjectives into nouns. For example, the ground may

“saturate” (verb) with water, but scientists study the process of “saturation” (noun). In contrast, historical texts contain many more “concept-laden terms like industrialization, urbanization, immigration, Progressivism” etc. (Buehl, 2011, p.58). Historical texts also contain widespread concepts that require deep prior knowledge, such as justice and power. Buehl also emphasizes the unique nature of historical texts because they require the reader to make connections to the present day and draw comparisons.

Because of the past failures and/or resistance of content area literacy instruction, disciplinary literacy is being considered as an alternative to generalizable approaches. According to Shanahan & Shanahan (2012),

disciplinary reading approaches hold the promise of being more appealing than traditional content area reading approaches to content area teachers. Because the insights and strategies of disciplinary literacy are drawn from the disciplines themselves, a focus on this information does not pose the same challenges to teachers whose self-actualization is tied to their identities as mathematics, science, English, or history educators. (p.15)

Disciplinary literacy also provides insight into how knowledge is constructed and produced, as opposed to just a barrage of facts to memorize (Moje, 2008). Learning the reading and writing skills particular to each discipline gives students an “insider look” into the meaning-making practices. Moje uses the phrase “metadiscursive” to signify the self-awareness students obtain when approaching texts through a disciplinary lens. Moreover, disciplinary literacy provides students an opportunity to become part of a discourse community – that is, by thinking like historians, for example, students are enacting the identities and Discourse practices of historians.

Immersing oneself in the meaning-making practices of a discipline is interconnected to issues of power, agency, status, and identity.

The significance of teaching discipline-specific literacy skills at the secondary level has been recognized by the Common Core State Standards, developed in 2010 by the Council of Chief State School Officers and the National Governors Association. The national mandate encourages content area teachers to support students' reading, writing, speaking, and listening skills across the subject areas. As expressed by the International Reading Association (2012), "The Common Core State Standards emphasize disciplinary literacy; that is, the teaching of reading and writing in social studies, history, science, and the technical subjects" (p.3).

Summary of Reviewed Research

The reviewed literature in this chapter provided context to support the design and implementation of this study. I began with examining the body of literature on the "fragmented" state of teacher education and the importance of establishing collaborative learning communities among faculty and students. I also focused on studies that emphasized the importance of apprenticeship learning and how modeling and metacognitive teaching strategies can help students internalize the implicit ways experts make sense of texts and solve problems. Lastly, I analyzed studies that reinforced preparing preservice teachers for disciplinary literacy instruction, albeit there are several challenges. In the next chapter I outline the methodology that provided a pathway to collect, organize, and make meaning from the data.

III. METHODOLOGY

I used an action research design (Sagor, 2000) to examine preservice teachers' and university faculty mentorship experiences in a redesigned literacy course. Action research is commonly employed by teachers who identify an immediate problem within school-based settings and work in collaboration with others to solve those problems (Picciano, 2004). Ferrance (2000) defines action research as a "disciplined inquiry done by a teacher with the intent that the research will inform and change his or her practices in the future" (p. 1). Through this lens, action research is a cyclical process of planning, acting, observing, and reflecting. While there are various, and often conflicting, terminology for describing action research, including *participatory action research (PAR)*, *action science*, *self-study*, *educative research*, and *teacher researcher* (Herr & Anderson, 2014), it remains a method of reflective inquiry to solve on-the-ground challenges. My dissertation did not arise from a single experience but rather emerged from a set of experiences over the duration of three years of reflection and collaborative inquiry about literacy teacher preparation. Each experience, which I will discuss later in this chapter, informed my decisions on how to design a more effective content literacy course.

There were several persuasive reasons to use an action research design for this study. Foremost, action research positions the teacher as researcher (Elliott, 1991). In this process the teacher supports student learning while simultaneously reflecting on their own practices to improve instruction. For the present study, my role as instructor of the content literacy course allowed me to engage with students on a weekly basis. I continuously collaborated with students about their mentorship experiences and the course itself. Through this lens, I became a principal instrument in data collection and analysis. Action research also allows teachers to learn from their experiences to improve instruction (Nugent, Malik, & Hollinsworth, 2012). In the years

preceding my dissertation, I observed the content literacy course, interacted with instructors, and modified the curriculum; in addition, I co-taught the course and conducted a pilot study in the spring of 2014. The decisions I made in this study, such as how and when to plan the meetings between preservice teachers and university faculty, were informed by the data I collected and examined over the years. Lastly, action research allows teachers to adopt new instructional techniques and strategies and then examine the effectiveness of those changes (Picciano, 2004). I adopted action research for this study because I could assess the effectiveness of redesigning a content literacy course rooted in disciplinary mentorships.

Sagor (2000) describes seven basic steps or phases in action research: (1) select a focus, (2) clarify theories, (3) identify research questions, (4) collect data, (5) analyze data, (6) report results, and (7) take informed action. In my study the focus was on improving the way preservice teachers are prepared for disciplinary literacy instruction. I wished to investigate the use of mentorship experiences between preservice teachers and university faculty within a content literacy course. This focus prompted three research questions:

RQ 1: What did preservice teachers learn about being a competent teacher of literacy through their mentorship experiences?

RQ 2: How does observing university faculty perform a think-aloud support preservice teachers' understanding of discipline-specific reading skills and reading instruction?

RQ 3: How does a teacher preparation mentorship influence university faculty attitudes, beliefs, and practices regarding literacy in their subject areas?

What differentiates action research from other methodologies used in educational research is the last step: taking informed action. Researchers are encouraged to collect and interpret the data to “act” on the evidence (Ferrance, 2000). This allows the researcher to continuously evaluate their

performance to make informed changes and then study those changes. Action research becomes a cyclical process of identifying a problem, designing a plan of action, and participating in ongoing reflection and assessment. In the sections below, I describe in detail my observations and actions within the content literacy course that led to my current study.

Research Design

Literacy Course Redesign

The impetus for this study was not a single event, but rather a series of occurrences that I directly experienced in the classroom as both a student and teacher. Many of these experiences can be expressed as a set of “gaps” in the way content area teachers are prepared for secondary literacy instruction. Represented in Table 3 is a chronological summary of these gaps and personal experiences that led me to redesign the course curricula and develop a new model of literacy teacher preparation.

One of the salient issues that emerged early in my career was the reluctance and/or skepticism of secondary teachers to teach literacy in their classrooms. For the past nine years, I have been teaching high school social studies in the south suburbs of Chicago. I pride myself on creating engaging and meaningful lessons that incorporate reading and writing practices. Additionally, I value the role of modeling to students the implicit ways teachers make sense of texts. I frequently share my thoughts with students as I encounter difficult words or complex sentences. Many of my colleagues, however, are reluctant to the notion of teaching literacy and even express angst when our supervisor addresses the Common Core State Standards. Implementing literacy and literacy strategies are not seen as a means to improve instruction, but rather they are perceived as a hindrance to current instructional practices. I do not believe these

attitudes and beliefs are rooted in ignorance or stubbornness; instead, I believe they are a consequence of poor preparation, or no preparation at all, in how to teach literacy in the disciplines. This belief stems from my first experience observing preservice teachers learn about literacy as a Teaching Assistant (TA) in a content literacy course.

Beginning in the fall of 2012 I served as a TA, providing me direct access to how the primary instructors approached literacy instruction and the structuring of the course curricula. In designing this current study, many of these observations helped shape my thinking about how to improve the course as a literacy educator and for student learning. While several issues surfaced from these observations, most notable were a lack of emphasis on disciplinary literacy in the curricula and the inability for the primary instructor to meet the needs of students from multiple content areas. The course curricula covered numerous topics, including reading fluency, comprehension skills, standards, and vocabulary instruction, but the primary instructor did not address how these areas differ, or are perceived, through a disciplinary lens. Several preservice teachers, particularly in mathematics, expressed to me their inability to relate to the course because the primary instructor did not connect the content to their discipline. It occurred to me that the primary instructor, even if he had wanted to, could not adequately prepare preservice teachers across the disciplines because his background was in English Language Arts. Consequently, this experience inspired me to design a content literacy course where preservice teachers were provided opportunities to meet and interact with professionals in their field of study who understood their unique literacy needs.

Table 3

Chronological Summary of Personal Experiences and Recognized Gaps

Chronology	Experiences	Result/Impact on Literacy Course redesign
2007-present	I observed secondary teachers in my own high school lacking the confidence, and knowledge, to teach literacy in their classrooms	I developed course assignments that were authentic, practical, and specific to each discipline/Preservice teachers collaborated with professionals (i.e., university faculty) to expand their knowledge of disciplinary discourse practices
Fall, 2012	As a TA, I observed the course curricula focused around generalizable literacy skills and strategies	I designed a course curricula that addressed the unique literacies of each discipline
Fall, 2012	As a TA, I observed a literacy educator lacking the disciplinary expertise required to meet the needs of students from multiple disciplines	I created opportunities for preservice teachers to collaborate with professionals (i.e., university faculty) on disciplinary ways of thinking and practice
Fall, 2013	I enrolled in a 6-week online course to study the Reading Apprenticeship framework	I adopted the Reading Apprenticeship framework in the course curricula/University faculty performed a think-aloud in front of their mentee as they make sense of a discipline-specific text
Spring, 2014	My co-instruction and I conducted a pilot study on the use of 'Expert Interviews' to support preservice teachers' understanding of disciplinary discourse practices	I modified the interview questions based on student and faculty feedback/This experience created a sense of comfort and familiarity with the course assignments

I began researching content literacy course curricula and syllabi to see if the use of “mentorships” and/or “disciplinary experts” were a part of teacher education. Though I could not find specific teacher preparation programs that paired preservice teachers with university faculty, in my search I stumbled upon the Reading Apprenticeship (RA) framework (Schoenbach, Greenleaf, & Murphy, 2012). The RA framework is a specific approach to instruction that

focuses on apprenticing students to become more confident and proficient readers and thinkers in their subject area. The RA framework is embedded within subject area teaching through metacognitive conversations – that is, conversations about the thinking processes both students and teachers engage in as they read. Despite the importance of metacognitive conversations, teacher modeling is seldom used in secondary classrooms (citations). This “gap” sparked the need to make visible the implicit thoughts of disciplinary professionals. To gain a deeper understanding of the RA framework, which I used to frame the course curricula in this study, I enrolled in an online 6-week course in the fall of 2013 through WestEd. The course was aimed at community college instructors from across the disciplines. The course description as stated on their homepage:

Reading Apprenticeship professional development helps instructors to understand the ways in which they, as disciplinary experts, can “apprentice” students into proficient academic reading in their subject area. This course will teach instructors: (1) how to think beyond their “expert blind spot” to uncover the strategies they bring to disciplinary reading tasks in order to scaffold these strategies for students, (2) how to introduce and sustain metacognitive conversation in their classes, (3) how to recognize and work with students’ strengths as readers, and (4) how to bring an inquiry lens to their own instructional practices.

Personally, the course served to demystify the RA approach. In addition, I was able to observe and practice many of the metacognitive and think-aloud activities I ultimately used in this study.

In the spring of 2014, I served as a co-instructor of CI-414. This was my first opportunity to create lessons, implement the RA framework, and pilot many of the activities used in this

study. According to Yin (2009), conducting pilot cases helps “refine your data collection plans with respect to both the content of the data and the procedures to be followed” (p.92). Picciano (2004) states that pilot studies are “especially popular for action research” (p. 87). Teaching this course prior to my dissertation study was instrumental to generating a sense of comfort and familiarity with the activities and procedures I intended to use. Foremost, my co-instructor and I piloted one of the primary activities students were instructed to complete when meeting with their assigned university faculty member³. As part of the mentorship framework, students were asked to conduct an interview to better understand what it means to be, or become, a competent member of their disciplinary “community of practice” (Lave & Wenger, 1991). The findings from the pilot study revealed preservice teachers gained insight into how professionals make meaning from and with texts and identify within their disciplines or fields. The feedback I received, both written and oral, helped me refine specific interview questions and reexamine how data should be collected and assessed.

In light of these observations and personal experiences, I aimed to redesign a content literacy course to better prepare preservice teachers for literacy instruction. I developed my dissertation to address, and ultimately improve, the “gaps” within literacy teacher preparation. In the fall of 2014 I expanded on the pilot study to create several meaningful experiences between preservice teachers and university faculty. These experiences will be discussed in-depth later in this chapter.

³ Later in this chapter I discuss in detail how this activity was implemented in my dissertation

Literacy Course Curricula Redesign

In light of my personal experiences and gaps discussed in the section above, I redesigned the literacy course curricula to create a more authentic and meaningful experience for preservice teachers. With the guidance of my co-instructor, I developed a curricula that focused on disciplinary literacy instruction through a mentorship framework. This involved (1) selecting an appropriate textbook, (2) choosing topics for each class, and (3) creating mentorship assignments during the semester.

Textbook

The textbook for the course (CI-414) had to reflect the specialized meaning-making practices for each discipline and the understanding that learning is a collaborative experience. I browsed the internet for literacy textbooks highlighting specific key words, such as “disciplines”, “experts”, “reading”, and “apprenticeship,” I eventually came across, *Developing readers in the academic disciplines* by David Buehl (2011). The book perfectly connected to the main ideas and framework that I had intended to use for the course. The summary of the book on Amazon.com (<http://www.amazon.com/Developing-Readers-Academic-Disciplines-Buehl/dp/0872078450>) states:

What does it mean to read, write, and think through a disciplinary lens? How do you develop students as readers, writers, and thinkers in the different academic disciplines? Doug Buehl, author of the perennial bestseller *Classroom Strategies for Interactive Learning*, shows you how to: (1) teach to the match of literacy and disciplinary understanding to bridge academic knowledge gaps, (2) frontload instruction that activates and builds academic knowledge and (3) build inquiring minds through questioning.

Buehl (2011) organizes his book based on disciplines (history, mathematics, and science) and readers are exposed to the kinds of knowledge, reading strategies, and thinking skills necessary to be successful in each discipline. Additionally, Buehl argues that teacher modeling and metacognitive conversations are essential to student learning. In the syllabus (see Appendix A) I created reading assignments based on the discipline of preservice teachers. For example, in Chapter 2: Reading Comprehension, preservice science teachers were only required to read sections from the chapter that focused on scientific reading (pp. 54-57), while preservice mathematics teachers were only required to read sections from the chapter on mathematical reading (pp. 61-66).

Topics

I developed a total of 14 topics to teach during the semester (see Table 7). Many of the topics were not unusual to include a content area literacy course, such as reading comprehension, oral language, student diversity, and writing, etc., but I purposeful designed several classes to reflect and reinforce preservice teachers' mentorship experiences rooted in the RA framework (Schoenbach, Greenleaf, & Murphy, 2012). Some of these topics included Metacognitive Conversations, Disciplinary Literacy, Disciplinary Knowledge and Vocabulary, and Digital Literacies. In this section I describe and outline in detail one of these classes.

The main topic of the third class of the semester (9.8.2014) was *Metacognitive Conversations*. Three guiding questions framed my teaching: (1) "What is Reading Apprenticeship?", (2) "What is metacognition?", and (3) "How can teacher modeling support student learning of content material?" I taught students the importance of metacognition and the think-aloud method by reviewing current research (Vargas, 2006) and actually having students

practice thinking out loud using a discipline-specific text. We discussed sub-topics, such as the Gradual Release of Responsibility Model (Pearson & Gallagher, 1983). I also included an activity from the RA framework, called Talking-To-The-text, and distributed the Metacognitive Bookmark (see Appendix B) to practice metacognition. To reinforce the importance of these concepts, students were assigned to read three different texts prior to the class: *What is Metacognition?* (Vargas, 2006), *Apprenticing Adolescents to Reading in Subject-Area Classrooms* (Schoenbach, Braunger, Greenleaf, & Litman, 2003), and Buehl (2011, p. 188-208). I assigned students to read Vargas (2006) because I had to read this text as part of my 6-week RA training course through WestEd.

The rationale for teaching this topic at the beginning of the semester was to highlight the importance of the RA framework, teacher modeling, and learning as a shared experience. These concepts were embedded in the mentorship experiences between preservice teachers and university faculty.

Mentorship Assignments

Designing specific tasks between preservice teachers and university faculty was not easy. I had to take into account a limited time frame (i.e., 15-week semester), the amount of time university faculty were willing to give up to take on the role of a mentor, and how the assignments would fit into my curricula. The first major step in this process was deciding how many meetings to design. Taking into account university faculty additional responsibilities and research duties within the university, I did not want to come across as overwhelming and require too much of their time during the recruitment process. The fear being, university faculty would

opt out of the study, not because of their disinterest in the topic, but because of time constraints. Consequently, three meetings (assignments) were deemed appropriate.

I had already conducted a pilot study in the spring of 2014 on interviewing university faculty to better understand disciplinary ways of thinking and practice. The interview questions were designed around four domains of expertise, and modeling after the RA framework: personal, cognitive, knowledge, and social. While Schoenbach, Greenleaf, & Murphy (2012) created these domains of “classroom life” to support reading development, they also exemplify the multidimensional nature of acquiring expertise status. The rationale for choosing the ‘Disciplinary Expert Interview’ assignment as the first meeting was because preservice teachers and university were collaborating for the first time and it created a relaxed environment to get to know one another. I provide a detailed outline of this assignment, and the subsequent two assignments, later in this chapter.

In addition to learning about the role of literacy in each discipline, I wanted preservice teachers to actually observe professionals use these literacies firsthand. Research suggests that experts approach texts quite differently than novices (Bransford, Brown, & Cocking, 2000), so I aimed to design a second assignment that made visible professionals’ implicit thinking processes. The think-aloud method (Pressley & Afferbach, 1995) appeared to be the most fitting task for this idea. For this assignment university faculty would be instructed to choose a discipline-specific text (e.g. article, magazine, spreadsheet, chart, etc.) and think out loud as they made sense of it. Wyatt et al. (1993) contend that permitting professors to pick an article of his or her own choosing fosters more authentic reading because of their interest. Preservice teachers would then observe, take notes, and audio record university faculty perform a think-aloud to examine disciplinary professionals’ reading skills.

For the third, and final mentorship assignment, I felt that it was important for preservice teachers to practice both lesson planning and the art of teaching. The rationale being, understanding the unique literacy practices of a discipline is important, but unless you can implement those practices in front of students that knowledge is meaningless. In previous years, my co-instructor and I had students teach a 20-25 minute “mini-lesson” on a topic, using various literacy strategies and texts. To adapt this assignment for a mentorship, I thought it would be reasonable to have university faculty offer guidance and support the design of the lesson. During this meeting, preservice teachers would bring with them a completed lesson plan, sharing step-by-step the objectives, learning goals, activities, and assessments. University faculty would then be instructed to use their rich knowledge to anticipate areas of confusion and broaden preservice teachers’ conceptual understanding of the topic.

Participants

Student Participants

Fourteen secondary preservice teachers from a large research-intensive university participated in the study (see Table 4). Students were drawn from a preservice content literacy course (CI-414: Middle and High School Literacy) I co-taught in the fall of 2014. While the university offers several secondary teacher preparation programs (e.g. Teaching of Spanish, Teaching of English, Teaching of Chemistry, Teaching of History), students who enroll in CI-414 are drawn from the disciplines of history, mathematics, chemistry, and physics. As incoming freshman, these students first major in one of these subject areas, primarily within the College of Liberal Arts and Sciences. Before being admitted into the College of Education (“Pre-Candidacy” phase), they must meet several requirements: complete 45-60 credit hours, take and

pass an Initial Licensure Exam⁴, enroll in two education courses⁵, and declare a “Teaching of...” major. Admission to the “Candidacy” phase is determined by The Council on Teacher Education (CTE), the professional education unit for the university. The CTE oversees 21 programs that prepare teachers, school leaders, and school service personnel for licensure by the state. Once admitted, candidates must complete all coursework, including CI-414, maintain a 3.0 GPA, complete Early Field Experiences, register and pass the ILTS Content Test, and apply for student teaching. Students who enrolled in my course were in the “Candidacy” phase of the program.

Final enrollment numbers for the course included 6 preservice history teachers, 6 preservice mathematics teachers, and 2 preservice chemistry teachers. All participants were in junior standing or above.

⁴ ACT or SAT

⁵ Foundations of Education courses

Table 4
Student Participants

Name*	Discipline	Year	Gender**	Race/Ethnicity**	Teaching aspirations
Kim	History	Senior	Female	White	High school
Jessica	History	Senior	Female	African-American	High school
Porter	History	Senior	Male	White	High school and/or middle school
John	History	Senior	Male	White	High school
Zach	History	Senior	Male	White	High school
Giovanni	Chemistry	Senior	Male	Iranian	High school
Luis	Chemistry	Senior	Male	Hispanic	High school
Lois	Mathematics	Junior	Female	Indian	High school and/or middle school
Rose	Mathematics	Junior	Female	White	High school
Rick	Mathematics	Junior	Male	White	High school
Ari	Mathematics	Senior	Female	White	Middle school
Alexandra	Mathematics	Junior	Female	Croatian/White	High school
Sarah	Mathematics	Senior	Female	White	High school

* Pseudonyms self-identified by the participant

**Gender and Race/ethnicity self-identified by the participant

University Faculty

Within the same university, 23 faculty members from the Department of History (N = 10); Department of Mathematics, Statistics, and Computer Science (N = 7); Department of Chemistry (N = 5); and Department of Physics (N = 1) were originally recruited to mentor secondary preservice teachers. University faculty were recruited to participate as mentors during the fall semester to support preservice teachers' understanding of disciplinary ways of thinking

and practice. They would subsequently be paired with a preservice teacher within his or her discipline. The number of university faculty recruited from each discipline was based on evaluating past enrollment numbers in CI-414. However, due to lower than expected enrollment numbers in the fall of 2014, only 13 faculty members ultimately participated (see Table 5).

Using convenience sampling (Patton, 1990), participants were recruited based on their willingness to participate in the present study. However, I purposely identified university faculty who either taught methods courses or undergraduate courses because of their greater familiarity with secondary literacy. Emails were sent out to the department heads of each discipline in the spring and summer of 2013 asking to be put in contact with university faculty who either worked with preservice teachers or have a strong passion for education. I subsequently reached out to these university faculty members via email and solicited their participation in this study. I requested a face-to-face meeting, and eventually met with each university faculty member, where I explicitly stated and outlined their role: to support preservice teachers' disciplinary literacy development.

University faculty areas of expertise were wide-ranging. Of the 6 historians, areas of expertise included U.S. history, Gender and Women's Studies, Russian history, German history, and the teaching of history; of the two chemists, areas of expertise included organic chemistry and neurochemical signaling in the central nervous system; and of the six mathematicians, areas of expertise included geometric group theory, cryptography, mathematical argumentation, and mathematics education.

Table 5
University Faculty Participants

Name*	Discipline	Research Interests**	Gender	Race/Ethnicity
Johnny Morgan	History	Progressive Era; Post-1970 U.S.; History of Medicine; Teaching of History	Male	White
Thaddeus Jones	History	Russian History	Male	White
Jane Baker	History	Teaching of History	Female	White
Meredith Hindman	History	Gender and Women's Studies	Female	White
Elvis Rabinowitz	History	German History; Anti-Semitism	Male	White
Giovanni Ward	Chemistry	Organic Chemistry	Male	White
Derrick Kent	Chemistry	Neurochemical Signaling in the Tissues of the Central Nervous System	Male	White
Lauren Miller	Mathematics	Teaching of Mathematics; Mathematical Argumentation	Female	White
Brian Simon***	Mathematics	Low-dimensional Topology; 3-Manifolds	Male	White
Erin Davidson***	Mathematics	Mathematics Education	Female	White
B. Stellar	Mathematics	Cryptography; Mathematics Education	Female	White
Mary Jones	Mathematics	Mathematics Education	Female	White
Jillian Vargas***	Mathematics	Mathematics Education	Female	Hispanic

* Pseudonyms self-identified by the participants

** Research interests is based on information provided on the university faculty homepages

*** I created pseudonyms for these participants because they were unreachable

Research Sites

This study took place at a large four-year public research university in the Midwest. With a population of approximately 28,000 students, it is the largest university in the Chicagoland area. The reason for choosing this university as the primary research site is because I am currently enrolled as a doctoral candidate in the Literacy, Language, and Culture (LLC) program within the Department of Curriculum and Instruction. Over the past five years, I have established meaningful relationships with students and university faculty across many departments, making this site an ideal location to pursue my research interests. I am also in close proximity to university faculty members, allowing for easier communication and prompt feedback. Most importantly, I chose this university as the primary research site because I was one of the primary instructors of the course I intended to redesign.

University Course

Within the College of Education, the prominent site for data collection occurred in a preservice content literacy course (Curriculum and Instruction 414: Middle and High School Literacy). Teacher preparation programs often require preservice teachers to enroll in a content literacy or reading course, similar to CI-414, to further develop their understanding of secondary literacy instruction. For students enrolled in the Secondary Education program at this university, CI-414 is a course requirement prior to graduation.

Stated in the universities undergraduate course catalog, CI-414 “focuses on the teaching of reading and writing strategies appropriate for disciplinary learning and expression.” The spring 2014 syllabus (see Appendix A), which I developed in collaboration with my co-instructor, describes a much more detailed purpose of the course:

The goal of this course is to support your efforts and mine to integrate the teaching and learning of literacy practices in subject-area instruction. In doing so we will learn about the complex, rich, literate lives of young people – the ways that they are connected and often navigate expertly across multiple media as they read, write, and produce texts of all kinds...And we will work to learn ways to support our students in becoming readers, writers, and producers across the disciplinary domains that we teach. In this way, teaching disciplinary literacies is teaching for social justice, connecting students' lives, communities, and cultures to ways of knowing and being across their lives in a way that empowers their participation in society.

The curriculum covered many of the same topics that were used in years past, such as reading comprehension, writing, assessments, and cultural responsive pedagogy, but I redesigned the course to emphasize the specialized language and literacy practices that mediate learning in each discipline. I developed a new syllabus for the course rooted in the RA framework and situated around the mentorship experiences between preservice teachers and university faculty.

Faculty Offices

The second major research site took place outside the classroom on the university campus. Preservice teachers were required to meet with their assigned university faculty member three times over the duration of the semester at a location convenient for both parties. The teaching candidates were responsible for making contact (via email) and establishing a time to meet. All of the meetings took place in the offices of each university faculty member.

Data Collection Methods

I used multiple qualitative tools to examine my participant experiences within the action research design. Using multiple sources of evidence over an extended time period fosters a persuasive argument that the researchers' findings are predictable patterns and themes, not sporadic. Collecting and analyzing multiple sources of evidence together is also a critical step to achieving triangulation (Creswell, 2003). Data collection methods in this study included: (a) participant-observation, (b) writing artifacts, (c) surveys, (d) interviews, (e) video recordings, and (f) memo writing. Below I describe each of these.

Participant-observation

Participant-observation allows researchers to gain access to the participants' natural worlds to attain a more comprehensive understanding of their experiences. Ultimately, taking on the role of participant-observer allows a researcher to become an "insider" during the data collection process. However, one of the major issues with this source of evidence is the potential for bias. Having an awareness of one's own biases and preconceptions of a certain phenomenon is important when collecting and analyzing data.

In the content literacy course, I observed and interacted with preservice teachers on a weekly basis; I participated in large and small group discussions, modeled instructional strategies, shared personal stories of classroom teaching, and provided feedback on mini-teaching lessons, just to list a few examples. My personal thoughts and interpretations of the events in the course were recorded through memo writing. I wrote a total of 15 memos to help make sense of the findings during the data collection and analysis phase of the study.

Writing Artifacts

Documentation comes in many forms: letters, emails, notes, agendas, and other personal documents. For case studies, writing artifacts serve to corroborate information from other sources, such as interviews and observations. Researchers can also make inferences from these documents to pose new questions during the study. From an analytical perspective, documents can be reviewed repeatedly so that a researcher can return to these documents for further examination.

The primary writing artifacts in this study came from preservice teacher's reflection papers. After each mentorship meeting, students were assigned to write a 3-5 page reflection paper both summarizing and analyzing their experiences. Detailed instructions and a rubric for each paper were distributed to students prior to each meeting (All assignments and rubrics are included in the Appendix section). Once complete, all papers were then emailed to me and uploaded to NVivo qualitative data software program for analysis. A total of 42 reflection papers were collected. The rationale for using reflection papers to collect data was that it allotted time for preservice teachers to reflect on their experiences and describe in detail how it impacted their thinking.

The first reflection paper was in response to the "Disciplinary Expert Interview" assignment (see Appendix C) where preservice teachers interviewed their mentor on what it means to be, or become, a competent member within a discourse community. Preservice teachers were first asked to provide background information regarding who they interviewed, where the interview took place, and the overall receptiveness of their university faculty member. They were then instructed to summarize each of the four components of expertise (i.e., cognitive, person,

social, and knowledge-building), which I adopted from the RA framework, using quotations and other observations to support their findings. Lastly, preservice teachers answered the central question, *“Did the expert’s responses change the way you think about reading, writing, thinking, and meaning making in your discipline?”*

The second reflection paper was in response to the think-aloud activity performed by each university faculty member. For this assignment (see Appendix D), university faculty chose a discipline-specific text that they had not yet read, but were intending to do so in the near future, and performed a think aloud as their preservice teacher observed and took notes. Similar to the first reflection paper, preservice teachers were prompted to provide background information on the experience, such as what particular text was used (e.g. journal article, spreadsheet, book chapter) and specific details about the text, like language, format, and publisher. In the next section of the rubric, preservice teachers were asked to compare and contrast how they read and made sense of the text with that of their university faculty member. The rubric stated, *“What were the similarities and differences between your text interpretation and your professor’s?”* To gain further insight into preservice teachers’ observations, they were asked to consider, *“How did the think-aloud interview, if at all, change the way you think about reading discipline-specific texts like disciplinary experts?”*

The third and final reflection paper summarized the meeting between preservice teachers and university faculty regarding the literacy-focused lesson plan. As part of the course curricula, preservice teachers were asked to design a 20-25 minute mini-lesson (see Appendix E) that specifically aimed at disciplinary thinking and meaning making. University faculty were instructed to provide guidance on the learning goals, activities, and assessments in relation to disciplinary thinking. Preservice teachers reflected on three specific parts of the lesson (e.g.

transitions, clarity, time management) that could be improved based upon on feedback from their peers. Additionally, they discussed the feedback provided by their university faculty member on ways to improve the overall lesson design.

Other writing artifacts collected included weekly blog postings and responses. A total of 32 blog posts and responses were collected and analyzed. Preservice teachers were assigned to write three blog posts throughout the semester about a specific topic or reading discussed that week. I created a webpage that allowed students to upload each blog post, and respond to their peers writing as well. Only blog posting and responses that explicitly referenced the mentorship experiences of preservice teachers and university faculty were used for data collection. In the Data Analysis and Interpretation section of this chapter I describe in detail how I determined which artifacts to use and which to exclude.

Survey Method

The survey method was used to gather data from the experiences of both preservice teachers and university faculty. For preservice teachers, the purpose of using a survey was to (1) address the body of research showing preservice content area teachers are often resistant, or feel ill-prepared, to teach reading and writing at the secondary level (Hall, 2005; Moje, 2008; O'Brien & Stewart, 1990) and (2) assess preservice teachers' understanding of disciplinary discourse practices and teacher modeling. In relation to my research questions, the survey method was one source of evidence to identify changes in preservice teachers' attitudes and understanding of literacy and disciplinary competency. A pre-post survey design was used for data collection.

The pre-survey used in this study was divided into two sections. First, *A Scale to Measure Attitudes Toward Teaching Reading in Content Classrooms*, developed by Vaughn (1977), was used to assess preservice teachers' beliefs about, and confidence in, secondary literacy instruction (see Appendix F). Vaughn formulated a seven point Likert scale (1=strongly disagree, 7=strongly agree), consisting of 15 questions to measure the attitudes of teachers towards teaching reading. In the past three decades, his questionnaire has been adopted in several research studies examining secondary literacy instruction (Lloyd, 1990; McCoss-Yergian & Krepps, 2010). Vaughn created a scale that was both reliable and valid which was missing from previously designed instruments. Using the RA framework as a guide, I added 5 Likert scale questions to the reading survey developed by Vaughn to evaluate preservice teachers' thoughts about teacher modeling and metacognition. (e.g. *"Accessing and thinking about one's thinking processes facilitates learning"*; *"Solving problems collaboratively usually results in a deeper understanding for all students"*).

The second section of the pre-survey consisted of open-ended questions inquiring about preservice teachers' expectations of the course mentorship framework. I developed questions that would reveal preservice teachers' attitudes and beliefs about collaborating with university faculty. I hoped to capture their initial feelings (e.g. excitement, intimidation, indifference) and see if and how they changed once the semester ended. Specifically, they were asked about what they hoped to "gain" from these experiences:

Knowing that you will be guided through this course by both the course instructors and disciplinary insiders, what do you hope to gain from this apprenticeship experience?

What questions do you have? Briefly list and/or discuss your goals, thoughts, questions, expectations, and/or concerns in the space below:

Students were subsequently asked to reflect on their initial attitudes and beliefs towards the end of the semester.

In the last week of the course (week 15), a post-survey (see Appendix G) was emailed to each preservice teacher to reflect on their mentorship experiences. All of the surveys were returned back to me. Vaughn's (1977) seven point Likert scale on secondary literacy instruction was used again to compare preservice teachers' attitudes before and after the study. Additionally, students answered three open-ended discussion questions to reflect on their experiences:

1. *How did the apprenticeship meet your expectations? Did your UIC professor meet your goals?*
2. *Did you take away something (e.g. idea, learning strategy, or teaching method) that you didn't expect? If so, what?*
3. *Any recommendations/suggestions about having a student-professor apprenticeship for future literacy classes? For example, would you change any of the meetings? Would you have students and professors work on different tasks? Etc. Your opinion is important.*

To gather data on university faculty attitudes, beliefs, and practices surrounding literacy, they completed a pre-survey (see Appendix H) prior to participating in the study. University faculty were asked about their role or responsibility to teach literacy in the classroom, strategies for teaching literacy, their understanding of the think aloud method, and what they hoped to gain from this experience. The surveys were then emailed back to me for coding and analysis. University faculty reflected on their initial responses in the post-interview.

Interviews

Interviews can take several forms, including open-ended, focused, or semi-structured. For example, in a *focused interview* a participant may be interviewed in a single setting for a short period of time, while an *in-depth interview* may occur over the entire duration of the study. Conducting effective interviews requires the researcher to not only ask questions and investigate the given phenomenon, but perform it in a manner that is pleasant and non-confrontational to the interviewee.

The purpose of using interviews in the present study was to assess (1) how effective the content literacy course was in shaping preservice teachers attitudes about, and confidence in, secondary literacy instruction and (2) how the course mentorship shaped preservice teachers understanding of disciplinary discourse practices. For university faculty, the interview was used to reflect on their role as a course mentor. Interview questions were open-ended to give participants an opportunity to elaborate on their experiences.

Using a semi-structured interview prompt (see Appendix I), preservice teachers were asked to discuss their experiences and overall perceptions of the course and mentorship. The interview occurred in week 8 because this was considered the “halfway” point during the semester. The interview questions were categorized under specific topics covered in the course, such as secondary reading instruction (e.g. “*how has your opinion changed, if at all, about teaching reading in your discipline?*”), metacognition (e.g., “*how can you get students to start self-questioning and assessing their own thoughts while reading?*”), and the course mentorship (e.g. “*what has your experience been like, thus far, mentoring with your assigned expert?*”). The interview questions were developed with the guidance of a professor of education in the

department of literacy, language, and culture who had experience teaching the content literacy course. An audio recording device was used to document their responses.

To gain further insight into the course and mentorship framework, preservice teachers from each discipline (mathematics, chemistry, history) were interviewed together. By structuring interviews around each discipline, students were more likely to disclose information because they were surrounded by like-minded people. On this specific day our class was in the computer lab working on a digital storytelling project. I informed students the week prior that they would be pulled out of class in disciplinary groups to be interviewed. My co-instructor and I interviewed groups simultaneously in separate rooms to save time. The interviews lasted approximately 30-45 minutes.

University faculty were also interviewed using a semi-structured interview prompt (see Appendix J) after the semester ended. I emailed each university faculty member who participated in the study requesting a face-to-face meeting to see if their attitudes, beliefs, or practices about literacy and literacy instruction had changed as a result of their mentorship role. Out of 13 university faculty members who participated, 11 agreed to be interviewed, 1 chose to email me reflection comments, and 1 did not respond to my requests. I attempted to interview all of the participants together to generate a conversation about their experiences, but due to time constraints and cancellations I was forced to interview all university faculty in a one-on-one setting in their offices. I showed each of them ($N = 11$) their initial responses from the pre-survey to help them recall their earlier thoughts about participating. An audio recording device was also used to document their responses.

Video Recordings

Three preservice teachers – one from each discipline (history, mathematics, science) – were given a handheld video camera to record their meetings with a university faculty member (see Figure 4). Preservice teachers were chosen based on their pre-survey responses and willingness to participate. I identified participants who expressed greater uncertainty about the role of literacy in their discipline, and apprehensiveness in participating in the mentorship. Giovanni, for example, a preservice chemistry teacher who agreed to videotape his meetings, wrote in the pre-survey, “I hope to gain more confidence in dealing with my content area. Honestly, I don’t feel very prepared to teach chemistry.” A total of 9 meetings were recorded and examined for research purposes. The primary reason for using a recording device was to analyze the body language, interview setting, and other non-verbal cues between preservice teachers and university faculty. The video recordings, along with memoing, were used for triangulation and to support the findings.

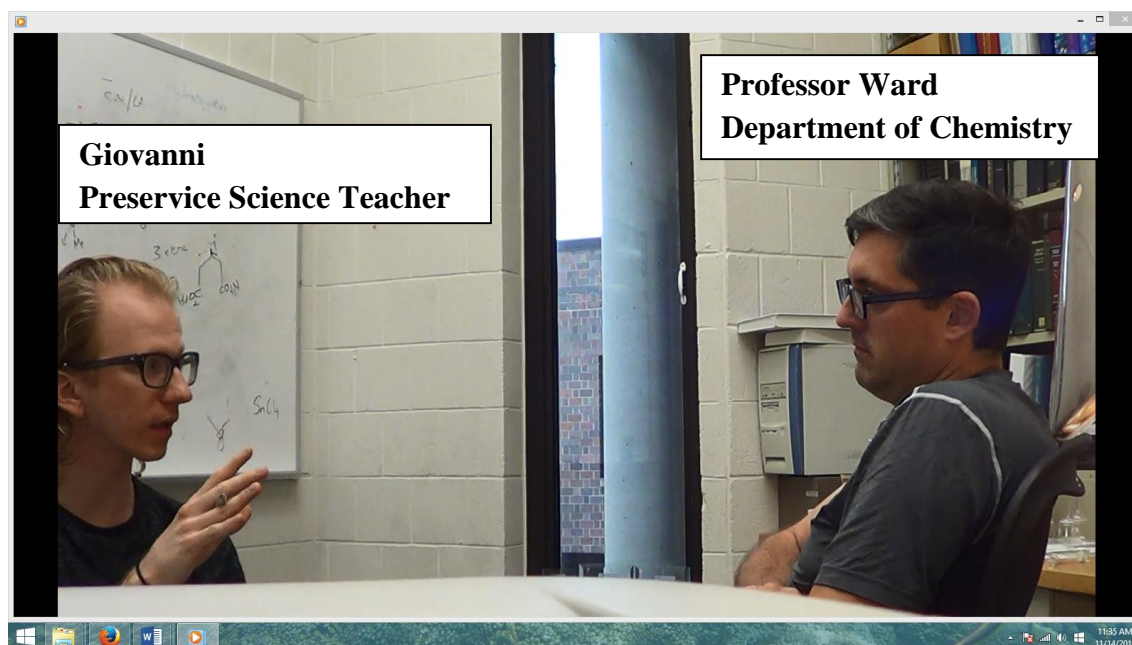


Figure 4: Disciplinary Expert Interview (first mentorship meeting)

Memo Writing

Researchers frequently write memos throughout the duration of a study to continuously reflect on what they are observing and learning. Memo writing, or note-taking, may include personal thoughts about the participants, emerging themes, and relationships between themes (Charmaz, 2006). Birks, Chapman, & Francis (2008) write,

Memoing as a research technique is not restricted to the analytical phase of research.

From the time a study is conceptualized, memos can help to clarify thinking on a research topic, provide a mechanism for the articulation of assumptions and subjective perspectives about the area of research, and facilitate the development of the study design. (p.69)

Moreover, because people tend to forget little details of past events, memoing is used to recall and verify what a researcher is thinking and feeling at a specific moment in time.

Several researchers identify specific rules or methodology to writing memos (Charmaz, 2006; Glaser, 1978; Strauss & Corbin, 1998). However, I approached memo writing as a “stream of consciousness” to get my fluid and immediate thoughts down on paper. This was easier for me than adhering to a structured format. I wrote a total of 15 memos between 8.26.2014 and 2.2.2015. I did not write memos on specific days or at specific times, but rather I wrote sporadically due to work and time constraints. All memos were typed and uploaded to NVivo, a qualitative data software program. Although my memos ranged in length from a few sentences to an entire page, I used memoing for three primary reasons: to question and reflect on my observations, identify common themes and patterns in the data, and corroborate findings during the data analysis phase. An example memo can be seen in Appendix K.

Research Procedures

Through the use of multiple data sources, including participant-observations, writing artifacts, interviews, surveys, and memoing, I examined how preservice teachers and university faculty made meaning from their mentor-mentee experiences in a content literacy course. In this section I describe the design of the study and research procedures, including a detailed timetable of data collection.

In the first week of the fall 2014 academic semester, preservice teachers were partnered with a university faculty member in their field of study. That is, a teacher candidate in history was paired with a historian, a teacher candidate in chemistry was paired with a chemist, and a teacher candidate in mathematics was paired with a mathematician. As the co-instructor on the content literacy course, I was responsible for uniting both parties based on areas of expertise and interests. However, preservice teachers were responsible for contacting their assigned faculty

member and scheduling days and times to meet. Per course curricula, preservice teachers were scheduled to meet with their university faculty member three times over the duration of the course; specifically, one meeting per month (i.e., September, October, and November) in the fall of 2014. The meetings were scheduled to last approximately 45 minutes - 1 hour, but varied depending on the topic and/or relationship between the preservice teachers and their assigned professor (see Table 6). Each meeting's agenda was outlined in the course syllabus.

Table 6
Total Minutes of Collaboration Between Three Case Studies

	Meeting 1 Disciplinary Expert Interview	Meeting 2 Think- Aloud/Modeling Using a Discipline- Specific Text	Meeting 3 Literacy-Focused Lesson Design Support	Total minutes
Miller-Lois (Mathematics)	34.29	56.36	21.02	111.67
Jones-Kim (History)	34.41	46.20	21.37	101.98
Ward-Giovanni (Chemistry)	53.16	35.51	24.52	113.19
Total minutes	121.86 (<i>M</i> = 40.62)	138.07 (<i>M</i> = 46.02)	66.91 (<i>M</i> = 22.30)	

Note: Total minutes of collaboration were gathered from 9 video recordings

As I stated previously, I did not want to come across as overwhelming and require too much of university faculty time during the recruitment process. The fear being, university faculty would opt out of the study, not because of their disinterest in the topic, but because of time constraints. Consequently, three meetings were deemed appropriate. With that in mind, it was imperative to

make each meeting meaningful, practical and relevant, and provide preservice teachers with an insider's look into disciplinary expertise. To reiterate, I am not claiming that three one-hour meetings is the precise number to elicit significant changes in preservice teachers' dispositions and teaching practices; rather, I am attempting to demonstrate a potential design of an effective teacher education program rooted in mentorships (see Table 7).

Table 7
Data Collection Timetable

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6
Topic	<i>Introduction to Adolescent Literacy</i>	<i>NO CLASS (memorial day)</i>	<i>Metacognitive conversations</i>	<i>Disciplinary Literacy</i>	<i>Identity, Language, and Literacy</i>	<i>Reading Comprehension</i>
Mentorship Activities	Preservice teachers were assigned to a university faculty member			Preservice teachers completed their first mentorship meeting (Disciplinary Expert Interview)	Disciplinary Expert Interview reflection paper collected	
Survey	<p>Pre-Survey: distributed to assess preservice teachers' attitudes, and confidence in, literacy instruction</p> <p>Pre-Survey: distributed to assess university faculty attitudes about literacy and responsibility for teaching literacy</p>					
Interview						
Participant-observation	X		X	X	X	X
Memo Writing	X		X			X

	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Topic	<i>Writing to Learn</i>	<i>Knowledge-Literacy relationship</i>	<i>Digital Literacy</i>	<i>Oral Language</i>	<i>Critical Literacy</i>	<i>Lesson design</i>
Mentorship Activities		Preservice teachers completed their second mentorship meeting (Think-aloud/Modeling Using a Discipline-Specific Text)	Think-aloud/Modeling Using a Discipline-Specific Text reflection paper collected			Preservice teachers completed their third mentorship meeting (Lesson-Focused Lesson Design Support)
Survey						
Interview		Preservice teachers interviewed by subject area (history, mathematics, science)				
Participant-observation	x	X	X	X	X	X
Memo Writing	X			X		X

	Week 13	Week 14	Week 15	> Week 15 (Spring, 2014)
Topic	<i>Mini-teaching Lesson</i>	<i>Mini-Teaching Lesson</i>	<i>Mini-Teaching Lesson/Course Reflection</i>	
Mentorship Activities	Literacy-Focused Lesson Design Support reflection essay collected			
Survey			Post-Survey: distributed to assess preservice teachers' attitudes, and confidence in, literacy instruction	
Interview				Post-interview: Interviewed university faculty to examine their role as a content literacy course mentor
Participant-observation	x	X	X	
Memo Writing	X			X

Note: Eight memos were created during the data analysis phase (spring semester)

First Mentorship Meeting

Being or becoming competent in a field requires more than advanced content knowledge. Mastering a Discourse requires distinct ways of speaking, thinking, acting, and knowing (Gee, 1996). According to Gee, belonging to a Discourse community involves acquiring a set of values and norms that are unique to that discourse. Consequently, the purpose of the first meeting was to help preservice teachers recognize that expertise embodies a particular “identity kit” (p.127). That is to say, acquiring expertise entails “ways of being in the world” (Gee, 1990, p.7).

Within the first two weeks of the course, preservice were responsible for contacting their assigned university faculty member and scheduling a place and time to meet. Preservice teachers were instructed to audio tape the interview and transcribe the responses. The interview protocol covered four key domains:

1. *Personal dimension* focused on the personal or identity aspects of expert work in each discipline.
2. *Cognitive dimension* focused on the ways in which an expert thinks and makes meaning with texts.
3. *Knowledge dimension* focused on the disciplinary knowledge unique to each discipline.
4. *Social dimension* focused on the expert’s role within a disciplinary community and the social practices involved with being a disciplinary expert.

The four domains were modeled after the Reading Apprenticeship framework (Schoenbach, Greenleaf, & Murphy, 2012). I developed the interview protocol (see Appendix C) with the guidance and support of a professor in the department of literacy, language, and culture (LLC)

who had experience teaching the preservice content literacy course. We met several times during the spring of 2014 to make corrections, edit, and refine the interview questions to ensure the interview protocol connected with the research questions. In the spring of 2014, we piloted the interview process to validate the instrument and to gain feedback from both preservice teachers and university faculty. The comments we received, both written and oral, helped us revise particular interview questions and reexamine how data should be collected and assessed. One university faculty member in the Department of History wrote via email, “I did enjoy the interview, and yes I can see it as an effective strategy for educating prospective teachers.”

Following the interview, preservice teachers were assigned to write a 3-4 page summary of each domain followed by a personal critique of the interview experience. Data were collected from the summaries and analyses of the disciplinary interviews.

Second Mentorship Meeting

Studies have shown that experts approach texts quite differently than novices (Chi, Feltovitch, & Glaser, 1981; Wineburg, 1991). For instance, novices tend to focus on specific details or isolated facts whereas experts organize their thoughts around large conceptual ideas. Additionally, experts remain flexible and are able to apply their knowledge to novel situations (Bransford, Brown, & Cocking, 2000). This process is often referred to as “adaptive expertise” (Hatano & Inagaki, 1986; Berliner, 2004). Accordingly, the second meeting (scheduled in week 8) intended to make visible the reading processes of disciplinary professionals so that preservice teachers could internalize them, and eventually model those processes to their own students.

Because thinking about one’s own thoughts while reading can be an unnatural process, I brought a sample text and think-aloud instructions with me (or sent it via email) when I met with each university faculty member prior to the fall semester. I provided a brief description of the

think-aloud method and explained what is expected of them during the activity. I presented each faculty member with a sample text within their area of expertise (e.g. I presented an amino acid diagram to a chemist; I presented a primary document of the “Marshall Plan” speech (1947) to a historian) and suggested he or she either (1) practice reading and thinking out-loud during our meeting or (2) take it home and practice before the fall semester. Whether it was due to time constraints or a feeling of uneasiness, all of the university faculty chose to read the document at a later time. However, many of them did express that teacher modeling is commonplace in their teaching practices.

For the think aloud meeting, university faculty were instructed to choose a discipline-specific text that they had not yet read, but were intending to do so in the near future. The text could take the form of an article, academic journal, graphic, spreadsheet, chart, book chapter, primary source, or any other text relevant to his or her discipline. Wyatt et al. (1993) contend that permitting professors to pick an article of his or her own choosing fosters more authentic reading because of their interest. University faculty were prompted to “think out loud” while reading their chosen text as their mentees observed, took notes, and audio recorded the session. They could say whatever thoughts came to mind after reading each sentence or while examining a diagram or visual, such as: what it reminded them of, areas of confusion, questioning, making predictions, or identifying main points. Preservice teachers were instructed to remind university faculty to think out loud while reading; that is, if they made no comment after 15 seconds, preservice teachers were directed to ask, “What are you thinking right now?”

It is also important to note that university faculty were encouraged to practice a think aloud with their mentee *before* the primary session. Preservice teachers were instructed to bring in a non-discipline related text and prompt their mentor to stop after each sentence to express his

or her thinking. Because think alouds can be an unnatural, awkward, and often intimidating experience, it was imperative university faculty felt comfortable articulating their thoughts in close proximity to an observer. Analysis of the think-aloud exercise constituted a 3-4 page reflection paper along with the audio taped interview transcript. In the paper, preservice teachers were prompted to provide background information on the experience, and compare and contrast how they read and made sense of the text with that of their university faculty member.

Third Mentorship Meeting

The third and final meeting occurred in week 12. Studies have shown that experts notice features of problems that novices tend to overlook (Chase & Simon, 1973; Chi, Feltovitch, & Glasser, 1981; Sabers, Cushing, & Berliner, 1991). This may be attributed to expert's deeper schema and how they organize their knowledge into meaningful patterns. One area where this type of thinking may prove useful is during teacher lesson planning. Because of their limited background knowledge and experience in teaching literacy, beginning teachers may overlook how discipline-specific literacy skills are manifest in content area instruction. With that in mind, university faculty can offer guidance on the types of skills and ways of thinking that should be present during instruction that is intended for middle and high school students.

Preservice teachers were asked to design a 20-25 minute mini lesson that specifically aimed at disciplinary thinking and meaning making. Preservice teachers were instructed to complete their literacy-focused lesson prior to meeting with their mentor. During the third meeting, preservice teachers brought with them the completed lesson plan, sharing step-by-step the objectives, learning goals, and activities. They were also instructed to have their mentor run through some of the activities to see for themselves how the lesson would unfold in the classroom. Throughout the demonstration, university faculty provided feedback on the activities

in relation to disciplinary thinking. After the meeting, preservice teachers were required to write a 1-page reflection piece, summarizing their mentor's feedback collaborative discussion. The rationale for this paper was to see what changes preservice teachers made to their initial lesson design as a result of this specific encounter.

It is reasonable to assume that university faculty had limited knowledge in the topic their mentee wished to use for their mini lesson. For example, a preservice history teacher may have wanted to design a lesson around the Civil Rights Movement of the 1960's, while the university faculty member area of expertise was in the U.S. involvement in World War II. Consequently, their responsibility was not to offer guidance on disciplinary knowledge; rather, their task was to express the ways of thinking an professional in his or her field would use to make sense of that knowledge.

The underlying purpose of this meeting was for preservice teachers to share with their mentor how the previous meetings shaped his or her understanding of literacy within the discipline and, ultimately, how it could manifest into an activity that is intended for middle and high school students.

Data Interpretation and Analysis

To answer my research questions, I used the qualitative techniques outlined by Creswell (2003) to guide my data collection, organization, and analysis. Creswell describes qualitative data analysis as a "process" of preparing the data, assessing the usefulness of the data, engaging in detailed coding, exploring overlapping themes, interpreting the meaning of the data, and finally validating the accuracy of the findings. Data sources (e.g. writing artifacts, interviews, surveys, and memo writing) were examined through the lens of each research question and theoretical framework to maintain focus (see Table 8).

Table 8
Research Questions and Corresponding Data Sources and Triangulation Methods

Research Question	Data Sources	Triangulation
1. What did preservice teachers learn about being a competent teacher of literacy through their mentorship experiences?	Pre-and-post survey, writing artifacts, and interview data	Researcher's memos and observational notes
2. How does observing university faculty perform a think-aloud support preservice teachers understanding of discipline-specific reading skills and reading instruction?	Post-survey, writing artifacts, and interview data	Researcher's memos and video recordings
3. How does a teacher preparation mentorship influence university faculty attitudes, beliefs, and practices regarding literacy in their subject areas?	Pre-survey and post-interview	Writing artifacts, researcher's memos, and observational notes

Throughout the data analysis process, I looked for language related to the mentorship framework, mentorship meetings, or direct experiences between preservice teachers and university faculty. For example, after collaborating on her lesson plan, a preservice mathematics teacher directly identified her mentor in her writing: "Mrs. Davidson helped me think about possible student mistakes." In another example, a preservice science teacher commented on the overall experience: "I think the apprenticeship made me less intimidated by chemistry as a whole." In contrast, data that did not explicitly mention the mentorship were not included in the findings. For example, a preservice mathematics teacher responded to a blog post:

I can honestly say that up until this point I had not considered literacy in math to be very important...But I agree with your entire post. Literacy does not simply mean just

assigning students a book about math to read, but as we learned in the first day of class, a text includes everything from songs, books, movies, logos, etc.

While this preservice teacher advanced her understanding of literacy, she did not clearly mention why her thoughts changed or who impacted her thinking. Specifically, she did not discuss the mentorship, or identify her mentor, as a primary reason for her evolving views. Consequently, I did not use this data excerpt in my findings.

Overall, I collected and analyzed a total of 74 writing artifacts. Writing artifacts comprised of reflection essays ($N = 42$) preservice teachers wrote after each mentorship meeting and weekly blog posts ($N = 32$). The blog posts were in response to a range of topics discussed in the course, such as identity, reading strategies, assessment, metacognition, and digital literacies. Additionally, I used 3 surveys and transcribed 14 interviews (see Appendices F, G, H, I, and J for respective interview protocols and surveys). Pre-and-post surveys were used to assess changes in preservice teacher's attitudes, beliefs, and practices towards literacy instruction and teaching. University faculty also completed a pre-survey to examine their understanding of literacy and teaching literacy. Preservice teachers were interviewed during week 8 of the semester to inquire about their mentorship experiences. The remaining 13 interviews were conducted with each university faculty member after the semester ended to document their mentorship role. Weekly observations, memos, and audio documentation of classroom instruction were used to triangulate the findings.

I primarily used examples and quotes from writing artifacts to support my findings because they represent the immediate thoughts of participants following a mentorship meeting. Rather than waiting to interview participants at the end of the semester, it was important to

collect data immediately following a meeting because their thoughts and feeling would be uninhibited. Collecting writing artifacts was also easier because of time constraints. Interviewing each participant (N = 13) following a mentorship meeting would have taken valuable time away from classroom instruction.

I used NVivo, a qualitative data computer software tool, for data collection and management. Computer-assisted software is frequently used for qualitative research because of its capacity to import large amounts of data and efficiently organize, store, and manage data (Yin, 2009; Saldaña, 2013). NVivo was well suited for my study because I was able to highlight key points before coding, write memos during data analysis, and simultaneously listen to and transcribe audio recordings. Organizationally, I was able to create folders for each discipline (history, mathematics, science), which allowed me to look for subtle patterns across and between disciplines.

Following Saldaña's (2013) coding methods, I performed several cycles of coding. In "first cycle coding," I examined data line-by-line using elemental methods, particularly descriptive and in vivo coding. Take the following data excerpt from a think-aloud reflection paper as an example: "During the reading, [Professor Baker] was always thinking ahead and giving explanations for certain parts of the document that were unclear. She used a lot of her prior knowledge and made a lot of assumptions." In examining how disciplinary professionals read texts, I developed four initial codes from this data excerpt: "predicting," "explaining," "use of prior knowledge," and "assumptions." In "second cycle coding" (Saldaña, 2013), I read and reread each data piece to make connections across codes, develop or eliminate existing codes, and generate final categories (see Table 9). From the excerpt above, I subsequently combined "assumptions" and "explanations" into a comprehensive code called "making inferences." I

would also use this code as a guide when reading other reflection papers across the disciplines. After a final round of coding, “making inferences” would become a sub-code (in addition to “predicting,” “questioning the author,” and “rereading,”) under a final category called “Close Reading.” Each research question was examined through this analytic framework. A total of 166 codes were created during the data collection and analysis phase of this study.

When I was finally ready to move from coding to writing my dissertation, I attempted to create a cohesive, narrative thread that unified major themes found within the data. I intended to communicate a story to others about the impact of a redesigned content literacy course. I primarily used quotes from participants because they provided a sense of relevance and authenticity to my storyline.

Table 9

Proficient Reading Skills Identified During University Faculty Think-Alouds

Category	Code	Description
Close Reading	Predicting	Thinking about what will occur later in the text
	Making Inferences	Paying close attention to the deeper meaning of texts
	Examining word choice	Understanding why an author used or excluded certain words
	Questioning	Asking questions about the text during reading
	Rereading	Surveying a text over and over again to increase comprehension
	Annotating	Adding notes or comments in a text
Purposeful Reading	Organizing thoughts	Establishing a clear purpose for reading
	Skimming	Prioritizing certain information/Surveying bold heading, pictures, and titles
Sourcing	Author perspective	Understanding why the author wrote the document (agenda)
	Origin of the text	Uncovering who wrote the text and when it was written
	Text reliability	Examining the trustworthiness of a text based on the sources used within the text
Activating background knowledge	Prior knowledge	Connecting information in the text to what a reader already knows
Analyzing graphical elements	Examining visuals	Interpreting a text through analysis of visuals, including charts and tables
	Translating	Turning words into visual elements, and vice versa, to support comprehension

After analyzing my data, I compared the writing artifacts, survey responses, and interview data with the observations, memos, and video recordings to triangulate my findings. Triangulation is the process of corroborating multiple sources of evidence to validate the findings (Patton, 2002). According to Yin (2009), using multiple sources of evidence aids in the

development of “converging lines of inquiry” which leads to a more accurate account of the studied phenomenon (p.115). Analyzing all of the sources together ensured greater consistency in my findings. For example, I found that several university faculty were either uncomfortable, or lacked the knowledge, to support preservice teachers in designing lesson plans. Professor Jones expressed in our post-interview discussion, “I’m not creative enough” to help someone plan a lesson. To corroborate this finding, I examined his mentees (Kim) reflection paper on the impact of her meeting with Jones. She wrote, “My meeting with Professor Jones didn’t provide me with any profound insight and I didn’t change anything with my lesson.” In other words, both sources (interview and writing artifact) validated my finding that Jones had difficulty in this particular task.

V. FINDINGS

The previous chapter outlined the methodology used to collect, organize, and interpret the data. I described in depth the “gaps” within literacy teacher preparation that sparked the need for redesigning a content literacy course. I also included a data collection timetable (See Table 7) to give the reader a clearer picture of how and when each step of the study occurred. This chapter provides a summary of the findings. To make sense of the data across multiple sources, I purposefully focused my data collection and analysis on the collaborative experiences of preservice teachers and university faculty within the mentorship model. The findings revealed significant insights into how a mentorship embedded within a content literacy course supported preservice teachers understanding of disciplinary literacies and literacy instruction and how university faculty perceived their own role in supporting preservice teacher’s literacy development. I will discuss each of these insights, in turn, below, beginning with my first research question.

RQ 1: What did preservice teachers learn about being a competent teacher of literacy through their mentorship experiences?

Multiple data sources, including reflection papers, interviews, and observational notes, were used for analysis. Saldaña’s (2014) first and second cycle coding methods were used to identify emerging themes of “literacy competency” among preservice teachers. Three findings surfaced from the data sources: (1) understanding the unique role of literacies in the disciplines, (2) meeting students’ diverse academic and cultural needs, and (3) continuous learning. In the sections below, I present a summary of each finding through the lens of preservice history, mathematics, and science teachers.

The Role of Literacies in the Disciplines

I redesigned a content literacy course to provide a space for preservice teachers to think about literacies through a disciplinary lens. This would allow preservice teachers to shift their understanding of literacies from a set of generalizable learning strategies used across the disciplines (e.g. KWL, concept maps, SQR3) to encompass a set of specialized tools, thinking strategies, and subject-matter knowledge used to make meaning in each particular discipline. I found that the majority of preservice teachers across the disciplines redefined their understanding of “literacy competency” to reflect how meaning is made in different disciplines or, more specifically, what characterizes historical literacies, mathematical literacies, and scientific literacies.

Historical Literacies

Teacher candidates in the College of Education are required to take the specific course I redesigned for this study (CI-414: Middle and High School Literacy) because it introduces them to the world of literacy; as such, several participants in this study enrolled in CI-414 with the mindset that literacy was important, but remained both apprehensive and inquisitive in regards to what they would specifically learn. In a pre-questionnaire, for example, Kim remarked, “I don’t know what exactly is expected from a high school history teacher regarding literacy, so it will be interesting to find out what I will have to learn to teach.” While Kim recognized the importance of literacy in relation to student learning, she was unclear about her role or responsibilities in supporting historical literacy development. Other preservice teachers, like Zach, entered the course with a deep knowledge of historical facts, but remained unsure about “how to teach reading” using historical texts.

Despite participants' initial uncertainties, their collaborative experiences with university faculty (i.e., historians) provided a window into the role of historical literacies in their prospective classrooms. Several dominant themes emerged, from the ability to craft historical arguments to sourcing primary documents. The process of "doing" history emerged as an overarching theme in the conversations between two preservice history teachers and their mentors. In other words, historical literacies was largely defined by the use of inquiry skills. Evidence of this understanding can be found in preservice history teachers' reflection papers. "I think when taken all together," Zach wrote, "the most important message from Professor Hindmand had to say when it comes to teaching history is that it is more about teaching the method of history than a set of facts." The historical "method" Professor Hindmand refers to, and which Zach embraced, represents the techniques and strategies used by historians to explain the past (Monte-Sano & Miles, 2014). This belief challenges the conventional wisdom held by many high school students that learning history is about memorizing facts and rote learning. Professor Jones, a university faculty member in the Department of History, echoed a similar sentiment to his mentee (Kim) during their first meeting together: "The best history is not just a catalog or an encyclopedia. It's not just telling you one thing after another. Its profound insights, asking the right questions, and analyzing texts." That is to say, being a competent teacher of literacy requires teaching historical inquiry skills, not simply conveying content knowledge.

One preservice history teacher began to perceive historical literacies as the ability to construct historical arguments. Rather than memorizing ambiguous names and dates, learning history is about debate and corroborating sources (Wineburg, 1991) to validate claims. After interviewing his mentor, Giovanni shared, "[Professor Morgan] wants to publish a book that provides ways to teach history as a debate, not a stagnant piece of information...I feel this is an

important aspect of history that is also left out of high school and sometimes college history courses.” The topic of argumentation resurfaced in Giovanni’s second mentorship meeting (i.e., Think-Aloud/Modeling Using a Discipline-Specific Text) when he observed Professor Morgan purposely seek out the author’s argument because it acted as a “road map for navigating the rest of the text.” As the literacy educator in CI-414, I intentionally devoted class time to discuss the role of argumentation in the history classroom to reinforce the idea of history as debate.

Represented in Table 10 below is a comprehensive definition of historical literacies. Historical literacies are not characterized by one skill, but rather encompass a set of practices used by historians to make meaning of the past. These practices emerged from the conversations between preservice history teachers and university faculty, and I organized them into a coherent table. With the inclusion of historical literacies in the Common Core State Standards (e.g. citing textual evidence, corroborating sources), it was important to validate my findings that even high school teachers are expected to embrace and teach these kind of historical thinking and reading skills.

Table 10
A Comprehensive Definition of Historical Literacies

Historical Literacies	Explanation	Example statements from preservice history teachers	Supporting evidence from the Common Core State Standards
Use of historical inquiry skills	Analyzing primary and secondary sources to develop a better understanding of the past	“The apprenticeship really taught me a lot about reading like a historian. There were a lot of things I didn’t notice in many texts that my mentor pointed out to me as being important when reading an historical document” (Giovanni, Post-Survey)	Cite specific textual evidence to support analysis of primary and secondary sources, connecting insights gained from specific details to an understanding of the text as a whole (ELA.CCSS.RH.11-12.1)
Constructing historical arguments	Finding and corroborating evidence to support a claim	“The one statement that really stood out to me throughout the entire interview was the quote, “History is furious debate formed by reason and evidence”. I feel this quote should be in the back of every history teachers’ mind” (Giovanni, Disciplinary Expert Interview Reflection Paper)	Evaluate an author’s premises, claims, and evidence by corroborating or challenging them with other information (ELA.CCSS.RH.11-12.8)
Using and examining multiple texts	Evaluating multiple sources of information presented in diverse formats	“[Professor] Jones really believes that the way you become an expert, and the way you recognize fellow experts, is by constantly exposing yourself to a variety of texts.” (Kim, Disciplinary Expert Interview Reflection Paper)	Integrate quantitative analysis with qualitative analysis in print or digital text (ELA.CCSS.RH.9-10.7)
Activating prior knowledge	Activating prior knowledge or schema to make text-to-text or text-to-self connections	“...the biggest thing I am taking away from this exercise is the importance of having background information when approaching a text” (Zach, Think-Aloud Reflection Paper)	Determine the meaning of words and phrases as they are used in a text (ELA.CCSS.RH.9-10.4)

Collaborating with university faculty also played a significant role in broadening preservice history teachers understanding of what constitutes a historical “text” and the importance of reading multiple kinds of historical texts. In the history classroom, as more and more students enroll in Advanced Placement (AP) courses, there will be greater demand on history teachers to help students analyze and synthesize multiple sources using Document Based Questions (DBQs). Accordingly, history teachers must become familiar with the kinds of texts historians use to research the past, such as photographs, timelines, tables, oral histories, movies, maps, and letters, etc. Kim listened to her mentor discuss the connection between reading historical texts and literacy competency in their first meeting together: “[Professor] Daley really believes that the way you become an expert, and the way you recognize fellow experts, is by constantly exposing yourself to a variety of texts.” She would later remark from the same meeting,

As a future teacher, this interview helped me understand how important it is to frequently expose my students to a variety of texts...I want my students to read primary sources, fiction novels, nonfiction works, and the news. I also think that the more you read, the better you read, and the better you read, the better you write.

Kim initially entered the course with uncertainty about “what exactly is expected from a high school history teacher regarding literacy.” However, as a result of her collaborative experiences with Professor Jones, her understanding evolved to embrace the use of multiple texts to support disciplinary learning in the classroom.

Porter discussed as well the implications of using historical texts on his classroom instruction. In a weekly blog post, he remarked, “The idea of thinking about non-traditional texts

like pictures and audio and phrase them as texts helped me take away that there is much more textual information out there that can be used in the classroom other than just written text (9.27.2014).” Porter’s point was that if history teachers broaden their understanding of a text to encompass “non-traditional texts” like images and sound, they will develop and discover many more resources for student learning.

Mathematical Literacies

The role of literacies in the disciplines is often less apparent to mathematics teachers than it is to teachers in other content areas (Metsisto, 2005). Literacy is often perceived in schools as reading literature or writing academic papers which bears little connection to solving math problems or teaching formulas and equations. That said, many preservice mathematics teachers in this study approached my literacy course with both uncertainty and concern. Ari, for example, wrote in a blog post, “When I first began this class I had a really hard time understanding how literacy had anything to do with math (9.15.2014).” Similarly, Marisol remarked, “Even when I had considered the idea, the struggle of thinking about how to incorporate literacy into a math classroom always stumped me.” As I stated in Chapter 2, many of these preconceptions stem from preservice teachers own experiences in the classroom (Lortie, 1975).

Preservice mathematics teachers began to see literacies as an integral part of their discipline and prospective teaching practices as a result of collaborating with university faculty (i.e., mathematicians) (see Table 11). Lois, for example, entered the course bearing similar preconceptions of literacy as her classmates mentioned above; to her, literacy was defined by “reading, writing, and words.” However, after observing her mentor perform a think-aloud Lois saw literacy as a critical component of mathematical problem solving: “When we were doing the

think aloud activity with Professor Miller...we were incorporating literacy while solving the problem. I never would have correlated the two if it were not for this class and apprenticeship.” Lois’s observation supports the growing body of research stressing the pivotal role of literacies in learning mathematics and ways of thinking to solve mathematical problems (Hutchison & Edelman, 2014).

Mathematical literacies was also defined by the use of metacognitive strategies to help student’s process information (Kramarski & Mizrachi, 2004). One of the salient insights three preservice mathematics teachers took away from their mentorship experiences was the importance of collaboration and creating opportunities for mathematical conversations. In response to a blog post (9.14.2014), Ari stated, “The first step [to solving problems] is to get students up and talking about what’s going on in an example problem together. I like the idea of students discovering math together and having conversations about what they’re doing correctly or incorrectly.” Ari’s emphasis on “discovering math” situates mathematical literacy as a collaborative inquiry process, as opposed to rote memorization of formulas. Alexandra too advanced her understanding of mathematical literacy to involve “having students talk to one another about how they solved a certain problem using math vocabulary or symbols” in order to “enhance their understanding of what they are learning.”

Represented in Table 11 below is a comprehensive definition of mathematical literacies. Mathematical literacies include a set of practices used by mathematicians to solve problems. I organized these practices into a coherent table based on the conversations between preservice mathematics teachers and university faculty. Similar to the discipline of history, mathematical literacies are included in the Common Core State Standards. I included several of these standards

in the table to make a connection between my findings and the expectations of high school mathematics teachers.

Table 11
A Comprehensive Definition of Mathematical Literacies

Mathematical Literacies	Explanation	Example statements from preservice mathematics teachers	Supporting evidence from the Common Core State Standards
Aiding in mathematical problem solving	Using inquiry skills to solve problems, especially when comprehension breaks down	“I have learned that reading a math problem is like a story. There’s pictures, variables (i.e. characters), a problem of the story (the hook), the process/steps to solving the problem (the plot)” (Lois, Post-Survey)	Mathematically proficient students start by explaining to themselves the meaning of a problem and looking for entry points to its solution (CCSS.MATH.PRACTICE.MP1)
Processing information through metacognitive conversations	Engaging in open dialogue with peers to support comprehension	“I like the idea of students discovering math together and having conversations about what they're doing correctly or incorrectly” (Ari, Blog Post, 9.14.2014)	Mathematically proficient students try to communicate precisely to others. They try to use clear definitions in discussion with others (CCSS.MATH.PRACTICE.MP6)
Using and examining multiple texts	Evaluating multiple sources of information presented in diverse formats	“During my think aloud interview, I did not expect my professor to be able to interpret exactly what the texts said through analyzing graphs and pictures.” (Rose, Post-Survey)	Mathematically proficient students can explain correspondences between equations, verbal descriptions, tables, and graphs (CCSS.MATH.PRACTICE.MP1)
Understanding the language of mathematics	Recognizing the unique language demands particular to each discipline	In English, “multiplying” means...makes things bigger. In math lingo, multiplying makes them bigger, smaller, or neither” (Lois, Blog Post, 9.28.2014)	Mathematically proficient students state the meaning of the symbols they choose (CCSS.MATH.PRACTICE.MP6)

Similar to historians, mathematicians read and analyze multiple kinds of texts. However, mathematical texts more frequently use numbers, symbols, charts, and other graphical elements to explain a given phenomenon. Three preservice mathematics teachers in this study recognized that being a competent teacher of literacy is understanding how graphical elements can aid in reading comprehension. For example, after observing her mentor engage in a think-aloud, Rose expressed, “During my think aloud interview, I did not expect my professor to be able to interpret exactly what the texts said through analyzing graphs and pictures. She did not even have to read the text to know what the article was about.” Rose appeared surprised that her mentor was able to interpret the text strictly using visuals, rather than concentrating on particular words or passages. Roses’ mentor demonstrated that visuals are not only imperative to comprehension, but can also lead to a deeper understanding. She subsequently wrote in a post-questionnaire, “My professor met my goals and taught me so much about teaching and how to interpret mathematical texts.” Ultimately, because middle and high students are expected to read and interpret symbols, tables, and charts, it is critical preservice mathematics teachers receive multiple opportunities to observe university faculty practice similar reading strategies before they enter the classroom.

Scientific Literacies

According to the National Science Education Standards (NSES, 1996), scientific literacy implies that a learner can

ask, find, or determine answers to questions derived from curiosity about everyday experiences. It means that a person has the ability to describe, explain, and predict natural phenomena. Scientific literacy entails being able to read with understanding articles about

science in the popular press and to engage in social conversation about the validity of the conclusions. (p.22)

From this perspective, scientific literacy is not something you *have*, but something you *do* (Ford, 2008). While both preservice science teachers (Luis and Giovanni) entered the course with a shared passion for teaching, Giovanni's thinking about the role of literacies in his classroom was more aligned with the NSES (1996) mentioned above. Giovanni expressed in a pre-questionnaire, "I hope that this apprenticeship will help me understand more the reasoning behind the solution to a chemistry problem." Giovanni's interest in the "reasoning" behind a disciplinary problem suggested that he thought about scientific literacies as a process of understanding.

Luis and Giovanni advanced their understanding of what constitutes a scientific text and the specialized language of science as a result of their collaborate experiences with university faculty (i.e., chemists). In an interview with Luis about his progressive understanding of scientific literacies from the start of the course, he stated,

I think [my understanding] has evolved because....when someone mentions literacy they instantaneously think about books or anything related to words...but as you learn in class, considering music annotations or mathematical equations it is a different way of approaching meaning of literacy which I never thought of before.

Luis approached my course with a preconception that incorporating literacies in his discipline involved strictly "books" and printed words – a commonly held belief among secondary content area teachers outside of English Language Arts. But his understanding of literacy, and especially texts, "evolved" to a "different way of approaching the meaning of literacy." In the same

interview, Giovanni reaffirmed a similar belief: “I would just think [literacy] is about reading, but it’s about interpreting visual things, interpreting whatever you come across.”

Luis, in particular, consistently discussed the “secret language” of science that all members of their discourse community share. Diver, Newton, & Osborne (2000) convey that “inducting learners into the particular ways of representing the world used by scientists” requires a socialization into the language of the discipline (p.298). Luis reflected on the language of science in his first conversation with Professor Ward:

I believe the most important idea I took from our meeting is that science is a language on its own and there is a specific way to approach it...it is safe to say that [my professor and I] shared the secret language of science, just as he mentions in the interview. There is a certain way that scientists communicate to each other. This is done by sharing the common vocabulary.

Even as a preservice teacher, Luis felt a part of the scientific community because he shared a common (“secret”) language with his mentor. Becoming a competent teacher of literacy requires a deep knowledge of discipline-specific vocabulary and ways of communicating because it supports disciplinary learning.

Although I outline a comprehensive definition of scientific literacies in Table 12 below, it is important to recognize that this data is compiled from only two preservice teachers in my study. It is likely that different definitions would emerge from a larger sample. Scientific literacies include a set of practices used by scientists to analyze texts and solve problems. These practices emerged from the conversations between preservice science teachers and university faculty. Because scientific literacies are addressed in the Common Core State Standards, I

included several of these standards in the table to illustrate what science teachers are expected to teach in the classroom.

Table 12
A Comprehensive Definition of Scientific Literacies

Scientific Literacies	Explanation	Example statements from preservice mathematics teachers	Supporting evidence from the Common Core State Standards
Use of scientific inquiry skills	Using advanced thinking and reasoning skills to solve problems, and engage in close reading	“[Professor Kent’s] comments helped me see the way experienced scientists see this type of literature, how to organize it, [and] analyze it” (Luis, Disciplinary Expert Interview Reflection Paper)	Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. (CCSS.ELA.LITERACY.RST.11-12.8)
Activating prior knowledge	Activating prior knowledge or schema to make text-to-text or text-to-self connections	Thanks to [Professor Kent’s] background knowledge he was able to draw a conclusion before he even read the conclusion” (Luis, Think-Aloud Reflection Paper)	Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept (CCSS.ELA.LITERACY.RST.11-12.9)
Using and examining multiple texts	Evaluating multiple sources of information presented in diverse formats	“Dr. Ward simplified reading an article in particular and gave me techniques for interpreting a graph used in chemistry” (Giovanni, Post-Survey Response)	Translate quantitative information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically into words (CCSS.ELA.LITERACY.RST.9-10.7)
Understanding the language of science	Recognizing the unique language demands particular to each discipline	“It is safe to say that [Professor Kent and I] shared “the secret language” of science, just as he mentions in the interview. There is a certain way that scientists communicate to each other.” (Luis, Disciplinary Expert Interview Reflection Paper)	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context (CCSS.ELA.LITERACY.RST.9-10.4)

Meeting Students' Diverse Academic and Cultural Needs

The data also revealed that a majority of preservice teachers redefined their understanding of “literacy competency” to reflect flexible, adaptive, and culturally responsive teaching practices to meet the academic and cultural needs of a diverse student population. Collaborating with a university faculty member with extensive knowledge in the language, practices, and ways of thinking in a subject area fostered a sense of humility among many preservice teachers. Preservice teachers who originally considered themselves competent in their discipline suddenly realized their ability to read texts and solve problems were inadequate compared to that of their mentor. These experiences were not demoralizing, but rather encouraging because they prompted preservice teachers to reflect on their teaching practices (e.g. when to anticipate student misconceptions) and step in the shoes of a struggling learner. Culturally responsive and flexible teaching practices are particularly important in supporting students’ development of disciplinary literacies because personal identities can shape interests and reading behaviors (McCarthy & Moje, 2002). Buehl (2011) reaffirms, “Clearly, students’ academic identities matter a great deal when we consider students’ abilities and willingness to meet the literacy demands inherent in learning within content disciplines” (p. 7). It is the responsibility of teachers to connect their instruction with students’ identities to spark interest and a desire to learn.

Adapting Historical Teaching Practices to Meet Students’ Needs

Effective teachers are able to adapt their teaching to anticipate and respond to students’ academic and cultural needs – a concept often referred to as *adaptive expertise* (Hatano & Inagaki, 1986). This perspective is in stark contrast to many teachers who feel that students should adjust their learning style to fit a teacher’s method of instruction. Becoming a flexible and

culturally responsive teacher of literacy is particular salient in the history classroom because of the multicultural and sensitive content that is often imbedded in a history curriculum: civil rights, immigration, racism and prejudice, war and poverty, etc.

One of the main topics discussed between preservice history teachers and university faculty (i.e., historians) were avoiding *expert blind spots* (Koedinger & Nathan, 1997) during instruction – that is, teaching through the lens of adolescent learners and not assuming students possess the same rich background knowledge as teachers. For instance, Kim prepared a history lesson on the geopolitical changes of the early 20th century that “required a degree of prior knowledge that the students did not have.” She later acknowledged, “I should not have expected someone to understand something as complicated as the dissolution of the Soviet Union.” Because Kim assumed students possessed deep background knowledge and, consequently, did not take the time to explain the aforementioned topic, students appeared confused during her lesson. After her final meeting with her mentor, Kim wrote, “I think another thing that I learned in general is that things that seem super obvious to me, won’t be obvious to my students. I need to make sure that I clarify and explain everything.”

Similarly, Zach possessed an abundance of historical knowledge and made general assumptions about what his students should know and be able to do in the classroom. However, his meetings with Professor Bier fostered a sense of humility and a new perspective on teaching when he realized that her knowledge far-surprised his own. He wrote, “In the end some definite things I took out of the interview was just how much I still don’t know and that was as someone who thought they were well versed in the field.” As a result, he expressed,

[My professor] helped me see how it must feel for students who will come into my classroom and not have the understanding that I have...For students coming into my future classroom with even less interest in the field and even less knowledge it has to be very hard to approach unfamiliar texts and read them meaningfully.

Jessica also reflected on avoiding expert blind spots after struggling with her questioning skills during her mini-lesson. Although Jessica had a clear understanding of the content, the rest of the class “weren’t really understanding what [she] was asking them” because she “didn’t ask the class the right questions.” In other words, Jessica was not asking appropriate questions because she made assumptions about what her students already knew, or could infer from the topic itself. Developing effective questioning techniques is a critical teaching skill because it allows teachers to assess students understanding of the material before, during, and after a lesson. Jessica recognized the power of questioning techniques following her discussion with Professor Baker:

In talking to my disciplinary mentor, I realized that if I don’t know what to ask the students, then the student’s won’t know how to answer...In the future, I think that I need think through my lessons in more detail, as in coming up with a list of more specific questions so that if one doesn’t work then I have more questions in my toolbox that will help get me to my goal. The more clear and confident I am with what I am trying to do, then the more successful I will be at reaching my goals.

Based on her mentor’s feedback, Jessica was able to see how effective questioning, and ultimately effective teaching practices, could foster a sense of confidence.

University faculty not only supported preservice history teachers’ instructional practices, but also assisted in their ability to develop and design cohesive lesson plans. Becoming a

competent teacher of literacy demands crafting organized lessons with clear learning goals and objectives based on learners' individual needs. For many preservice teachers, this course served as their first opportunity to design an authentic lesson and actually teach it in front of students. That being said, the third and final meeting between preservice teachers and university faculty was vital in providing substantive feedback. Three preservice history teachers (Porter, Jessica, and Zach) discussed the positive impact of this particular meeting on their conceptual understanding of the topic, choice of pedagogical strategies, and overall lesson design. Porter, for example, designed a lesson to examine the causes of World War 1 through analyzing historical maps. While Porter was knowledgeable in this area, his mentor raised several critical issues that are often overlooked in high school history textbooks:

[My professor] brought up that it would be beneficial to show how the countries weren't as reliant on the alliance system as alliances are made out to be. The countries that participated in WWI did so because they thought it was in their benefit to and none did so because they were entitled to by an alliance.

Not only did Porter walk away from this meeting with a deeper understanding of the event (i.e., WWI alliance system), but it allowed him to modify, and ultimately improve, his original lesson. He wrote, "Both my mentor and I thought that this information would be good if it was presented directly after this lesson - after the students know the main "contenders" in the war and know what the alliances are."

Jessica and Zach also modified their lessons based on meaningful suggestions proposed by their university faculty member. Jessica was concerned that her planned activities on "social deviance" would be too time-consuming (from my own personal experiences as a high school

teacher, the timing and flow of a lesson is critical, and it continuously poses a challenge). It is important to note that Jessica's mentor, Professor Baker, was a methods course instructor for social studies who specialized in improving the teaching practices of preservice history teachers. Consequently, Jessica was enthusiastic to seek feedback. She remarked, "She encouraged me to modify the gallery walk, because I wouldn't have enough time for it in the 25 minutes allotted for my lesson. This was my biggest concern going into my meeting with her, and she told me to make it a seated gallery walk. Which I did." Because of Professor Peter's recommendation, Jessica experienced no timing issues during instruction.

Zach, on the other hand, was not seeking advice on any specific part of his lesson on "historiography," but instead met with his mentor with an open mind. Zach's mentor recommended specific texts to use to improve his lesson – texts that Zach had never heard about prior to their discussion. He stated, "I was able to learn about 'Story Corps' from my third disciplinary reading meeting with Professor Hindmand. She immediately realized that the Crash Course video wasn't going to fit the lesson well and showed me Story Corps along with some other video suggestions." Ultimately, Zach decided to use this text in his lesson because it was better for "holding the classes' attention," he expressed.

Adapting Mathematical Teaching Practices to Meet Students' Needs

One of the primary reasons middle and high school students struggle in school, particularly in mathematics, is because of the persistent "gap" between the learner and the subject matter (Sherman, Elviss, & Yard, 2014). In other words, there is disconnect between students' ability levels, cultural experiences, and interests and the advanced mathematical content they are expected to learn. That said, the purpose of developing a mentorship model,

particularly between preservice mathematics teachers and mathematicians, was to help teacher candidates acquire the knowledge and pedagogical tools to close this gap.

Similar to the findings discussed in the previous section among preservice history teachers, one of the themes discussed between preservice mathematics teachers and university faculty was approaching content through the lens of adolescent learners – that is, avoiding expert blind spots and anticipating student mistakes. This finding emerged from the conversations between two preservice teachers and their mentors. In a post-questionnaire, Lois wrote that her mentorship with Professor Miller “helped put a lot of things into perspective” about the craft of teaching. Specifically, becoming a competent teacher of literacy requires “...learning new things about the way your students learn, and how to tailor your lessons to meet their needs,” Lois expressed. Because Professor Miller specialized in the mathematical learning of prospective K-12 mathematics teachers, her conversations with Lois about literacy practices typically evolved into discussions about student learning.

Rose and her mentor, Professor Davidson, shared similar beliefs about adapting one’s teaching methods to meet student’s needs. “I always say a student should never learn the way I teach,” Rose wrote in her final reflection paper, “I should teach the way the student will learn. Mrs. Davidson does this. She has been doing it her whole life, and I highly respect her.” Rose’s admiration for her mentor only reinforced her beliefs about student learning. Professor Davidson also provided substantive feedback on the design and implementation of Rose’s lesson plan on geometric shapes. Specifically, Professor Davidson advised her to anticipate areas of confusion: “Mrs. Davidson helped me think about possible student mistakes. One possible mistake was that the angles would not line up. She helped me through the entire student intervention. After

discussing this with her, I felt very prepared to present my lesson.” During her mini-lesson, Rose was cognizant of this particular issue and allotted time to provide clearer directions.

Four preservice mathematics teachers received substantive feedback on the organization and timing/flow of lesson planning. Along with stating clear learning goals and objectives, developing a lesson with smooth transitions and purposeful activities is paramount to effective teaching. In her reflection paper, Rose remarked,

Mary Davidson helped me a lot during the preparation of my lesson. When I went to her, she discussed the flow of my lesson with me. She recommended that I time myself throughout the lesson since the lesson had to be between 20 and 25 minutes. I took her advice, and I did. I ended up having enough time for my lesson.

Rick received similar guidance. He wrote, “When I met with Dr. Simon to discuss my lesson, he provided me with a great deal of advice. The lesson that I showed him was not fully put together and it did not flow as I wanted it to. He helped me smooth out some of the rough edges that my lesson had.” The “flow” and timing of a lesson is often affected by the types of activities and texts, and the order in which they are used. Some of the conversations between preservice mathematics teachers and university faculty revolved around adding or removing parts of the lesson to be more effective. Sarah wrote,

[Professor Vargas] really liked [my lesson]. She advised that I skip the clue portion in the strategy handout, only because a clue would take deep conceptual understanding. I completely agreed with where she was coming from. I decided to eliminate that portion. I found my meetings with her to be very productive. She really helped me in the process of coming up with this lesson.

As opposed to Sarah who received feedback to “skip” or remove part of her lesson, Rick and Lois were encouraged to use additional resources to improve their lesson: “Most importantly,” Rick remarked, “Dr. Simon gave me the idea to use the periodic table in my lesson...He gave me an idea, and pointed me in the right direction.” Lois was urged by her mentor to include mathematics software (GeoGebra) during her lesson to help students visualize the relationship between circumference and the diameter of Pi. After giving her lesson, Lois wrote in her reflection paper that this additional resource “really helped the students see that this relationships holds.”

Adapting Scientific Teaching Practices to Meet Students’ Needs

The esoteric terminology and dense formulas and equations taught in the science classroom can be a source of apathy and disengagement for many middle and high school students. According to Graff (2003), “academia reinforces cluelessness by making its ideas, problems, and ways of thinking look more opaque, narrowly specialized, and beyond normal learning capacities than they are or need to be” (p. 1). In other words, many students are inadvertently made to believe that they do not belong in school because they don’t look, write, or sound like university scholars. It is the responsibility of secondary teachers to demystify the scientific field and build bridges between scientific content and students’ lives.

Through collaborative conversations with university faculty (i.e., chemists), Luis and Giovanni received useful feedback on the difficulties of teaching science and how to anticipate and meet the needs of their prospective students. Luis, in particular, discussed at length with his mentor how to adapt instruction to address the scientific knowledge gap among adolescent learners: “The meetings with Professor Kent, the professor I was aligned with for my project, helped in a large amount. He helped me understand the way that certain types of texts are to be

presented to people with different scientific backgrounds.” Choosing appropriate texts based on students’ cognitive abilities, reading levels, and “scientific backgrounds” is paramount to creating successful literacy-focused lesson plans. Too often teachers select texts based on the title or other superficial elements without considering the readability level for their students. Luis remarked in his final reflection paper, “Another way I could improve my teaching style is to eliminate the “blindfold” that I have by slowing down the material and put myself in the shoes of my students to be able to see if the material presented makes sense according to the prior knowledge that the classroom has.” Luis recognized that he could improve his “teaching style” by avoiding expert blind spots and putting himself in the shoes of adolescent learners.

While Luis’s third and final mentorship meeting on lesson planning emphasized choosing appropriate texts, Giovanni’s final meeting focused on deepening his own conceptual understanding of the topic. “Dr. Ward’s suggestions weren’t for the lesson itself,” Giovanni expressed, “but for the way that I was thinking about the topic. Such would require me to rethink the entire lesson.” Giovanni initially viewed his mini-lesson topic, the Periodic Table, as a rote memorization exercise for students. However, his mentor offered a new perspective on the Periodic Table that addressed higher-order thinking skills for student learning. Giovanni reflected in a post-questionnaire,

Due to his experience with organic chemistry, [Professor Ward] discussed the importance of understanding the elements in the periodic table and their properties. Oftentimes, students memorize a lot in organic chemistry. He told me that it’s all about trends and that should be the focus. I completely agree! I hope that I can take this into my future class keeping memorization to a minimum and critical thinking to a maximum.

Instead of having students memorize an accumulation of facts, according to Professor Ward, the science classroom should be a space where students explore, ask questions, evaluate evidence, and focusing on common “trends.”

Giovanni’s mentor also provided constructive feedback on meeting the needs of adolescent learners in the science classroom. For his mini-lesson, Professor Ward recommend Giovanni to use the “hard/soft-acid/base theory” to help explain the stability of compounds. The theory required some memorization skills but it was “more relatable,” Giovanni wrote, “to students’ arsenal of knowledge.” Effective teachers of science are able to make meaningful connections between the esoteric terminology of science and students’ prior knowledge.

Continuous Learning

The pathway to becoming a competent teacher of literacy can best be described as a journey, not a destination. It requires hard work, patience, and continuous learning. Because this generation of students are often labeled as impatient and desire instant gratification, it is important that teachers convey the message that learning disciplinary ways of thinking and practice takes time and diligence. In this section I summarize the conversations and mentorship experiences between university faculty and preservice teachers on lifelong learning. Moreover, the multiple pathways to becoming a competent member of each disciplinary “community of practice” (Lave & Wenger, 1991), and its implications on secondary teacher practices, is represented in Tables 13, 14, and 15. In these tables I present a summary of the statements and/or suggestions expressed by university faculty toward developing disciplinary competency. I then describe how these statements and/or suggestions could impact a teacher’s instruction within that discipline.

The “Journey” to Historical Competency

University faculty (i.e., historians) have spent a majority of their academic careers reading, writing, speaking, researching, and publishing. Therefore, they are in an ideal position to discuss the time and energy it takes to read primary documents, evaluate evidence, and write evidence-based arguments. After discussing the amount of reading historians do on a daily basis with Professor Jones, Kim stated quite bluntly, “In order to get good at something, you have to keep doing it.” For prospective middle and high school teachers, communicating the message to students that mastering disciplinary ways of thinking, reading, and communicating requires patience and a strong work ethic is paramount to setting high expectations.

Table 13
Multiple Pathways to Developing Competency in History

Pathways	Implications for Classroom Instruction
Develop historical inquiry skills (e.g. interpretation, questioning, making inferences)	Practice close reading skills using primary and secondary sources
Stay current on relevant research	Share with students various articles, magazines, and journals on the field of history
Advance reading skills and reading stamina (i.e., read frequently, read multiple texts)	Expose students to many kinds of texts, both print and digital, including letters, photographs, audio, and diaries, etc.
Understand how to construct historical arguments	Practice citing textual evidence and corroborating sources using DBQ’s
Collaborate with colleagues/community of experts	Provide opportunities for students to interact with peers and teachers
Complete graduate work/training (e.g. PhD, master’s degree)	Show students the kinds of knowledge and practices expected from expert members in a community of practice

In states that have adopted the Common Core State Standards, teachers are now required to follow specific guidelines regarding what historical reading skills to teach, such as how to cite textual evidence to support analysis of primary sources (CCSS.ELA-Literacy.RH.9-10.1), determining the central idea of a primary source (CCSS.ELA-Literacy.RH.9-10.2), and comparing the point of view of two or more authors on the same topic (CCSS.ELA-Literacy.RH.9-10.6), etc. However, to become proficient in teaching historiography, teachers must practice reading and writing themselves – a sentiment that was reinforced during the mentorship. Porter wrote in his first reflection paper, “A great majority of [my mentor’s] time is spent reading and writing and they are constantly “acquiring tools” each and every day in their profession.” Porter added that improving reading proficiency was best acquired through “practice” in the words of his mentor. Likewise, Kim’s mentor emphasized the importance of practice in developing competency: “Professor Jones said that becoming an expert in history requires training and experience.” She continued, “Jones really believes that the way you become an expert, and the way you recognize fellow experts, is by constantly exposing yourself to a variety of texts.” Reading a range of texts in multiple formats, including books, journals, magazines, and video, etc. allows teachers to advance their own knowledge and reading skills.

Becoming a competent teacher of literacy also demands learning new skills and pedagogical strategies for classroom instruction. Developing these skills is an enduring pursuit that can take years – possibly a lifetime. Therefore, it is imperative that teachers remain lifelong learners. Giovanni’s mentor echoed this need:

[Professor Morgan] also stressed that although someone has been in teaching for a long time and is “pro” teaching does not mean they are an expert. He stressed the importance

of keeping up with journals and new information and studies to add to your arsenal... You should make yourself aware of current trends that may be of importance.

In light of the Common Core State Standards, teachers need to be aware of how such reforms may impact their teaching. Attending professional development meetings and “keeping up” with current educational research and “trends,” as Professor Morgan mentioned, is vital to supporting students’ literacy development.

None of the preservice history teachers expressed discouragement listening to their mentors discuss the amount of time and hard work required to become an expert member of a discourse community. On the contrary, this understanding provided preservice teachers with a “path to becoming one,” as Giovanni noted in a post-questionnaire. Of course, the purpose of this mentorship was not to develop literacy experts, but rather to provide preservice teachers with the tools and skills necessary to develop into effective teachers.

The “Journey” to Mathematical Competency

I mentioned in previous sections that the connection between literacy and mathematics is less apparent to mathematics teachers than it is to teachers in other subject areas. Becoming a competent teacher of literacy in mathematics begins with recognizing the pivotal role literacy plays in the mathematics classroom (Hutchison & Edelman, 2014). This will require mathematics teachers to keep an open mind and develop a thirst for continuous learning.

Lois reflected on the pathway to becoming an expert member of her discourse community after her final mentorship meeting and mini-lesson: “It is a constant process of reading, and learning new things about the way your students learn, and how to tailor your lessons to meet their needs.” Continuous learning, as Lois reiterated, is not only about deepening

content knowledge, but exploring ways to meet the needs of adolescent learners. Ari as well internalized a similar message from her mentor. She commented, “Something that stuck with me from this conversation was early on when Dr. Simon was asked, ‘How does someone become an expert in your field of work?’ He answered with practice, time, energy, patience and frustration.” There were several distinct points Professor Simon raised in his response to Ari’s question, most notably “patience” and “frustration.”

Table 14
Multiple Pathways to Developing Competency in Mathematics

Pathways	Implications for Classroom Teaching
Practice problem solving	Scaffold instruction to support students’ reasoning skills until they can solve problems independently
Reflect on both successes and setbacks	Use formative assessments to document the strengths and weaknesses of students
Stay current on relevant research	Share with students various articles, magazines, and journals on the field of mathematics
Collaborate with colleagues/community of experts	Provide opportunities for students to interact with peers and teachers
Complete graduate work/training (e.g. PhD, master’s degree)	Show students the kinds of knowledge and practices expected from expert members in a community of practice
Teach novice learners	Create a space for the higher-functioning or gifted students in class to teach struggling learners

Rose also reflected on the challenges many mathematics teachers experience as they develop into competent teachers. She wrote in her final reflection paper, “Mrs. Davidson has taught me that teaching is continuously learning. Every day we are going to experience

something new, and we will not truly understand what to do until we are placed in that position. We learn with experience.” She added, “I want to learn, see, grow, and use every bit of my talent to become an expert in the field of mathematics teaching.” Rose accepted the fact that beginning teachers experience setbacks, especially when encountering novel problems in the classroom. But she also acknowledged that setbacks are part of the process, or journey, on the pathway to becoming an effective teacher of mathematics.

Recognizing the pathway to becoming an effective teacher of mathematics also impacted preservice teachers’ identities. Lois expressed, “[The mentorship] helped put a lot of things into perspective as far as what is required of me when I actually become a teacher. The thing that surprised me the most would have to be the realization that teaching stretches far beyond a career, but it actually becomes your identity.” Ari, on the other hand, reflected on her identity as a college student and preservice teacher: “This interview and being in Dr. Simon’s class has given me multiple ideas on incorporating literacy that will not only be useful in a classroom but also in my own journey on receiving a Bachelor’s of Science in Math Education.” Similarly, Rick’ mentorship experience provided a space for him to think “long and hard about [his] journey into the field of mathematics.” From all these examples, continuous learning is as much about personal development, as it is about academic development.

The “Journey” to Scientific Competency

A mentorship framework creates a space where preservice teachers and university faculty can socialize, discuss problems, read texts, and develop classroom activities. These experiences were purposefully designed to support preservice teachers as they transitioned into competent

members of their discipline. One preservice science teacher (Giovanni) reflected on his “journey”:

[The mentorship] was truly a learning experience for me. You never really understand what it takes to be a researcher or professor until you speak with one, and I feel like I understand a lot more about that journey now. I think that most of what Dr. Ward is required to do requires lots of experience within the field.

Giovanni’s point was that authentic learning experiences (e.g. speaking with a professor) in teacher preparation programs are necessary to helping teachers improve their craft, especially as it relates to literacy instruction. Interestingly, Giovanni felt that he “never really [understood] what it takes” to develop scientific competency until speaking with his mentor as part of this study. This implies Giovanni seldom conversed with university faculty about science, research, or the craft of teaching beyond the subject matter being taught in a particular class. Giovanni would later reflect that “his field requires a lot of experience that can be optimally learned in an apprenticeship format. This is when theoretical knowledge becomes applied and thus solidified.” In other words, acquiring deep content knowledge demands working alongside, and learning from, university faculty.

Table 15
Multiple Pathways to Developing Competency in Science

Pathways	Implications for Classroom Instruction
Advance reading skills and reading stamina	Expose students to many kinds of texts, both print and digital, including scientific research papers, tables/charts, video, and audio, etc.
Stay current on relevant research	Share with students various articles, magazines, and journals on the field of science
Collaborate with colleagues/community of experts	Provide opportunities for students to interact with peers and teachers

Similarities and Differences across the Disciplines

In this chapter I outlined the findings through the lens of each discipline. In this particular section I provide an analysis across the disciplines and identify the similarities and differences in my findings. Using quotes and examples from writing artifacts, I found that participants from each discipline advanced their understanding of “literacy” as a result of their mentorship experiences. For the majority of participants, their understanding of literacy extended beyond basic reading and writing to encompass sets of unique meaning-making strategies and tools. However, participants from each discipline (history, mathematics, science) took away different beliefs about using literacy in the classroom. In history, for example, literacy was identified as a means to construct arguments and source primary documents. In mathematics, literacy was recognized as a means to solve problems, engage in metacognitive conversations, and analyze graphical elements. Finally, in science, literacy was described as a means to engage in scientific inquiry and communicate using the language of science. I also found similarities and differences in the pathways to developing literacy competency. In each discipline participants discussed the

“multiple pathways” to become a competency teacher of literacy through their conversations with disciplinary professionals. Disciplinary professionals in all three disciplines emphasized the importance of reading multiple texts, collaborating with colleagues, and staying current on relevant research. In history, however, historians underscored the importance of developing inquiry skills (e.g. making inferences, questioning) and constructing historical arguments, while in mathematics, mathematicians stressed the importance of practicing solving problems.

My first research question addressed what it means to be, or become, a competent teacher of literacy. I identified and summarized three emerging themes from the data sources: (1) understanding the unique role of literacies in the disciplines, (2) meeting students’ diverse academic and cultural needs, and (3) continuous learning. My second research question centers on one collaborative experience (i.e., Think-Aloud/Modeling Using a Discipline-Specific Text) between preservice teachers and university faculty. I provide a summary and analysis of this question in the sections below.

RQ 2: How does observing university faculty perform a think-aloud support preservice teachers’ understanding of discipline-specific reading skills and reading instruction?

In the second mentorship meeting, university faculty were instructed to perform a think-aloud using a discipline-specific text that they had not yet read, but were intending to do so in the near future. The text could take the form of an article, academic journal, graphic, spreadsheet, chart, or any other text relevant to his or her discipline. Wyatt et al. (1993) contend that permitting readers to pick an article of their own choosing for think-alouds fosters more authentic reading. At this meeting, university faculty were prompted to “think out loud” while reading their chosen text as their mentees observed, took notes, and audio recorded the session.

Preservice teachers recorded the reading strategies they observed in a reflection paper. Through detailed coding and data analysis, four main categories of proficient reading skills, and reading instruction, emerged: (1) close reading, (2) purposeful reading, (3) sourcing, and (4) activating background knowledge. These categories were developed through an analytic process of reading, developing initial codes, coding for similar reading behaviors, and combining codes into general categories⁶.

In the sections below I describe what preservice teachers learned about proficient reading skills and their own prospective reading instruction through the lens of each discipline. A summary of which skills were identified in each discipline is represented in Table 16.

Table 16
Proficient Reading Skills Identified in Each Discipline

Proficient Reading Skills					
	Close Reading	Purposeful Reading	Sourcing	Activating Background Knowledge	Analyzing Graphical Elements
History (N = 5)	X	X	X	X	
Mathematics (N = 7)	X	X		X	X
Science (N = 2)	X	X		X	X

⁶ This coding method is outlined in greater detail in Chapter 3: Methodology.

Proficient Reading Skills Identified by Preservice History Teachers

Close Reading in Reading Historical Texts

Close reading emphasizes that readers pay close attention to the deeper meaning of texts. This is often accomplished through re-reading passages, thinking about how and why a text is organized, paying close attention to words and syntax, and connecting the text to outside readings and broader societal issues. In sum, close reading is “an intensive analysis of a text in order to come to terms with what it says, how it says it, and what it means” (Shanahan, 2012). Because historical documents are often ambiguous, and authors write with specific agendas, the practice of close reading is pivotal in the history classroom.

Table 17
Close Reading Skills Identified During Historians' Think-Alouds

Proficient Reading Skills	Code	Description	Example statements from preservice history teachers
Close Reading	Predicting	Thinking about what will occur later in the text	"At times, Jones would read something and predict what the author was going to discuss next" (Kim)
	Making Inferences	Paying close attention to the deeper meaning of texts	"Although [Professor Morgan and I] utilized many of the same discipline specific tools to decipher the text, his obvious experience in the discipline allowed him to dig deeper and grasp more meaning" (Giovanni)
	Examining word choice	Understanding why an author used or excluded certain words	"[Professor Hindmand] brought up that any time someone is using terms like "us" and "them" that those are red flags and that is when she wants to really pay attention" (Zach)
	Questioning	Asking questions about the text during reading	"Another thing was that when looking at photographs [Professor Hindmand] brought up some questions that neither I, nor any of the other history majors, had brought up in class when looking at sample photographs" (Zach)

In one example, Giovanni observed his mentor (Professor Morgan) identify subtle details imbedded in a historical text on WWII mass murders: "The professor's think-aloud was similar to mine but in much more detail as he was able to pick up on small nuances that I had missed and was able to explain certain tones and undertones that I did not initially pick up on." Because of his extensive experience reading historical texts, Professor Morgan was able to identify subtle details and "undertones" within the text and make inferences that Giovanni overlooked. To

support their own students' literacy development, preservice history teachers, like Giovanni, should encourage students to "read between the lines" themselves.

Close reading also entails thinking about the specific words and phrases used by the author in a text. In the history classroom, students should be able to recognize that words can be used to privilege or suppress certain ideas, or change the meaning of the text itself. Zach captured this understanding in his writing: "[Professor Hindmand] brought up that any time someone is using terms like "us" and "them" that those are red flags and that is when she wants to really pay attention. In the context of Vito Russo's speech Professor Hindmand stated that he is trying to redefine who "we" is, hence the name of the speech, *Why We Fight*." Zach was acknowledging that how a reader interprets the plural pronoun "We" in the author's speech could provoke a different understanding, and reaction to, the author's message. Giovanni, on the other hand, observed his mentor underscore particular words to identify the author's own personal beliefs. He wrote, "Throughout the rest of the text [Professor Morgan] follows the argument of the author and points out which words lead him to believe Mazower is a fan or a foe." Many authors, like Mazower, do not explicitly state their viewpoints surrounding a topic; this, of course, would expose bias in their writing and skew the author's message. Proficient readers like Professor Morgan, however, intuitively search for specific words to uncover these hidden beliefs.

Lastly, close reading involves using the information in a text to ask questions and make predictions about what the author will say next (Buehl, 2011). Two preservice history teachers observed these proficient reading skills during their think-aloud meetings. Jessica shared, "During the reading, [Professor Baker] was always thinking ahead and giving explanations for certain parts of the document that were unclear. She used a lot of her prior knowledge and made a lot of assumptions." Kim too (see Figure 5) observed similar reading strategies in her meeting.

She expressed, “At times, [Professor] Jones would read something and predict what the author was going to discuss next by saying, “Now I guess he’s going to tell us.”” Professor Baker and Professor Jones understood the significance of “thinking ahead” while reading to confirm or refute their predictions about the text. This strategy allows readers to make connections between their own prior knowledge and the text.

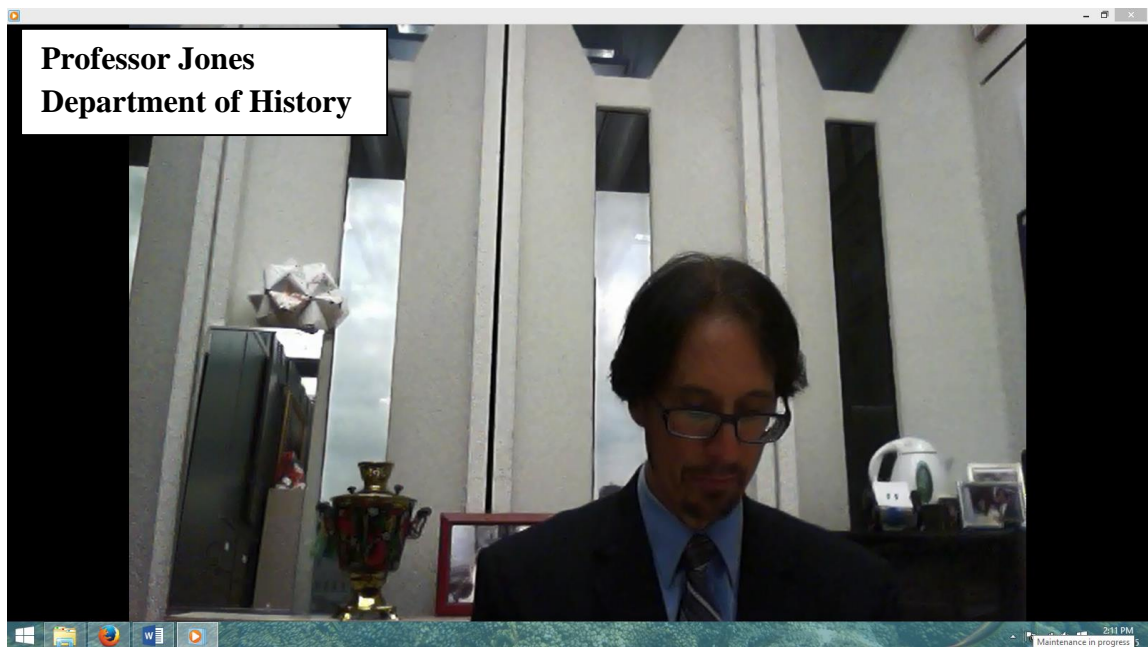


Figure 5: A university faculty member (historian) performing a think-aloud

Purposeful Reading in Reading Historical Texts

Assigning students to read a text without a clear understanding of why they are reading it, and for what purpose, is likely to impair reading comprehension (Tovani, 2000). Tovani writes, “A reader’s purpose affects everything about reading” (p. 24). As a social studies teacher myself,

I have seen many students over the years struggle to understand even basic texts because they have no clear direction while reading. It is the responsibility of the teacher to not only assign readings, but to make it explicit to students why they are reading it and what to look for.

During the think-aloud session, three university faculty focused on “purposeful reading” strategies to pick out vital information. In comparing his own reading strategies to his mentor, Porter wrote, “The main difference between how Professor Rabinowitz and I go about interpreting a text like the one he provided, is that he has an agenda of what he is looking to come out of the reading while I am trying to gather as much information that I think is beneficial for myself.” While it may appear obvious, having a clear “agenda” provides a blueprint for how to read a text. Professor Rabinowitz, as Porter noted, reflected on his purpose for reading even *before* he read a word. He wrote, “A question he asked before he started reading was what he was expecting to get out of reading this article.” Research suggests that successful thinkers develop a plan before reading or approaching a problem (Fogarty, 1994).

Table 18
Purposeful Reading Skills Identified During Historians' Think-Alouds

Proficient Reading Skill	Code	Description	Example statements from preservice history teachers
Purposeful Reading	Organizing Thoughts	Establishing a clear purpose for reading	"A question [Professor Rabinowitz] asked before he started reading was what he was expecting to get out of reading this article. People reading historical texts are looking to get something out of the text that will be of worth for them" (Porter)
	Skimming	Prioritizing certain information/Surveying bold heading, pictures, and titles	"During [Professor Baker] reading out loud she also put more emphasis on the items that were bolded, underlined or in any way different from the regular font" (Jessica)

Because proficient readers have a specific agenda while reading, they are better able to disregard superficial or trivial information in a text and, instead, search for the author's main points. Preservice history teachers repeatedly reflected on the importance of "purposeful skimming" as an essential reading strategy for historians. Kim discussed this strategy in her blog post:

For just one of my history classes, we have to read about 200 pages for every class. I also have readings for all of my other classes. I don't have time for that! Skimming is a vital skill for any historian. When I interviewed my disciplinary expert, he made a special point of saying that a historian needs to know how to pick out vital information and prioritize it. Being able to skim and then summarize the main points is essential for a historian (9.28.2014).

Although Kim indicated that skimming is useful for timing issues, she emphasized that for proficient readers in any discipline it allows them to seek out the most salient information in a text. In other words, skimming is not just about reading words quickly, but rather distinguishing between meaningful and less important information. Jessica, on the other hand, observed her mentor (Professor Baker) skim her text to identify “items that were bolded, underlined or in any way different from the regular font.” When reading social studies textbooks, for example, students are often instructed to glance over a chapter before reading and focus on major headings, bold words, pictures, and summaries, etc. This well-known reading technique is referred to as SQR3: Survey, Question, Read, Recite, and Review. While novice readers need to be taught such strategies, proficient readers have already internalized these techniques.

It is important to note that I am not advocating that students, especially struggling readers, use skimming as a primary reading technique when reading complex texts. In fact, Buehl (2011) identifies skimming as a “pseudo” reading practice that impedes reading comprehension. But, as demonstrated by multiple historians, skimming can be an effective reading strategy for surveying a passage before reading, seeking out numbers, dates and bolded items, and prioritizing certain information. After observing Professor Morgan engage in a think-aloud, Giovanni remarked, “It also taught me the importance of reading for purpose...It provided a “road map” for navigating the rest of the text. Overall, I believe this exercise will greatly help me when I attempt to teach students about reading historical documents and history related texts.” The objective of this exercise, as Giovanni affirmed, was to strengthen prospective teachers own literacy teaching practices.

Sourcing in Reading Historical Texts

In Wineburg's (1991) landmark study of the cognitive processes used by historians, he identified *sourcing* as a key heuristic used to analyze historical documents. Sourcing is the skill of examining the author of a document, why the document was written, the date the document was written, and the credibility of the author and document. As prospective social studies teachers, teaching the skill of sourcing is critical for ensuring successful reading comprehension of historical documents. Consequently, it is imperative that preservice history teachers receive multiple opportunities to learn how to effectively source documents.

Table 19
Sourcing Skills Identified During Historians' Think-Alouds

Proficient Reading Skill	Code	Description	Example statements from preservice history teachers
Sourcing	Author Perspective	Understanding why the author wrote the document (agenda)	"Authors write texts to accomplish a means and taking every text I come across with a grain of salt will help myself and teach my students that texts are not as prestigious as I have always made them out to be" (Porter)
	Origin of the text	Uncovering who wrote the text and when it was written	"[Professor Morgan] goes on to recognize the name Mark Mazower and note that he is a prominent Modern European Historian and what this means for the credibility and worthiness of the text" (Giovanni)
	Reliability	Examining the trustworthiness of a text based on the sources used within the text	"However, [Professor Jones] found a lot of fault with the author's footnotes. Jones thought the sources in the footnotes were often very vague" (Kim)

Three university faculty focused on the credibility of the author and the primary sources used within the document itself. Giovanni acknowledged this point in his reflection paper: “[Professor Morgan] goes on to recognize the name Mark Mazower and note that he is a prominent Modern European Historian and what this means for the credibility and worthiness of the text.” Professor Morgan was articulating to Giovanni that knowing the author’s background can shed light on the trustworthiness of the document, even for secondary sources. Porter too observed his mentor assess the credibility of the author, but took it a step further and reflected on bias within the text:

The think-aloud interview helped me even more see that authors are writing with bias and that makes me more aware of credibility that can be found in a text. Authors write texts to accomplish a means and taking every text with a grain of salt will help myself and teach my students that text are not as prestigious as I have always made them out to be.

Porter was expressing that authors privilege certain viewpoints and suppress others, and that readers need to be cognizant of such biases when reading.

One preservice history teacher took away the importance of sourcing itself. In other words, from the think-aloud session, she became mindful of the fact that she was not sourcing documents in her own undergraduate studies. Kim expressed in her writing, “[Professor Jones] made me realize that I need to look more carefully at things like sources. This is important because I’m going to teach my students how to read and analyze primary and secondary sources, but I hadn’t been analyzing the sources well enough myself.” She later wrote,

I can honestly say that I did not even look at the footnotes while I was reading. I think that’s an important difference between a disciplinary expert reading a text, and an

average undergraduate student. This interview changed the way I looked at discipline specific texts because it made me realize how important it is to pay attention to sources. I know that as a teacher, I'll teach my students about primary and secondary sources, but I need to teach myself to critically analyze all of the sources that I come across. I have a tendency to consider anything that comes from a scholarly source to be accurate, but I know that's not always the case.

Kim's inability, or lack of awareness, to effectively source historical documents is not unusual or surprising; in fact, from my own personal experiences teaching a content literacy course to preservice history teachers, I noticed that they often struggled to read and interpret historical documents. However, if they are going to become effective social studies teachers they must first develop proficient reading practices, beginning in teacher preparation programs. Zach, for example, began to reflect on his own reading practices after the think-aloud session: "For my own personal historical literacy I plan to take a closer look at not just who the author is but who that author is reading."

Activating Background Knowledge in Reading Historical Texts

There has been extensive research over the past few decades on the factors that influence reading comprehension. One of the most vital is a reader's ability to make connections to his or her prior knowledge. Buehl (2011) affirms, "Comprehension falls apart when readers cannot, or do not, connect their accumulated store of knowledge and experiences to what an author is saying" (p.76). Much of this research centers on schema theory, which represents networks of information that students activate when faced with familiar or novel experiences. For example, when learning about World War I, we begin to make various connections within our mind:

Archduke Franz Ferdinand, trench warfare, Zimmerman Telegram, Battle of Verdun, and Treaty of Versailles, etc. For some readers, this event in history may spark more or fewer associations depending on their background knowledge, and thus, influencing comprehension.

Table 20

Activating Background Knowledge Identified During Historians' Think-Alouds

Proficient Reading Skill	Code	Description	Example statements from preservice history teachers
Activating Background Knowledge	Prior knowledge	Connecting information in the text to what a reader already knows	"Throughout the text, [Professor Jones] made various connections to prior knowledge, since he certainly has a lot of that" (Kim)

No other finding was more prevalent than university faculty use of prior knowledge when thinking aloud, according to preservice history teachers. As Zach stated quite bluntly, "I find that the biggest thing I am taking away from this exercise is the importance of having background information when approaching a text." Giovanni as well confirmed this finding in his writing. He wrote,

Overall Professor Morgan had much more background knowledge on the subject which led him to a better understanding of the text...Although we utilized many of the same discipline specific tools to decipher the text, his obvious experience in the discipline allowed him to dig deeper and grasp more meaning. This exercise made me realize the importance of background knowledge required to read discipline specific texts. His extensive knowledge of the topic allowed him to seemingly breeze through the text whereas I felt I needed to stop after each paragraph and think about what I just read.

Possessing deep background knowledge, Giovanni stated, allowed Professor Morgan to read with automaticity, and not consciously think about every word, paragraph, or idea he came across. Like Giovanni, Kim drew attention to her mentor's use of prior knowledge:

There were significant differences between how Professor Jones and I approached reading this text. Since this is his area of expertise, he knew where this text came from. He was also able to draw more connections to prior knowledge because he has read a lot about this era of Soviet history. My knowledge of this history is extremely limited, so I couldn't draw deep connections.

Jessica as well was impressed that her mentor (Professor Baker) "used a lot of her prior knowledge and sourcing skills in order to understand this text."

The purpose of this exercise (i.e., Think Aloud/Modeling Using a Discipline-Specific Text) was not only for preservice teachers to observe proficient reading skills, but also to reflect on their own prospective reading instruction. Because university faculty relied extensively on their background knowledge for reading comprehension, it made a considerable impact on preservice history teachers. Zach, in particular, was quite introspective after this experience. He expressed,

This makes me think of my potential students that I will have in my classroom someday and how I have to remember that they might not have any background narrative to the texts I am giving them to read. It is therefore very important that I use formative assessments to gauge where they are at before pushing them into the deep-end with a text that they don't have references for. If I find that they don't have that narrative then I need

to find ways to teach that to them before I can expect them to fully understand a document like Vito Russo's speech.

Zach, like many other preservice history teachers, used this collaborative experience as an opportunity to reflect on historical reading skills and reading instruction.

Proficient Reading Skills Identified by Preservice Mathematics Teachers

The commonly held belief that mathematics education is disparate from reading instruction is rooted in the perception that literacy occurs in the English Language Arts classroom and English teachers are best suited to teach reading skills. This belief is prevalent in other disciplines outside of ELA as well. However, reading not only occurs in the mathematics classroom, but it is often more difficult of a task compared to reading texts in other disciplines due to the graphical elements, dense vocabulary, and necessity to translate symbolic notations into sentences. Learning discipline-specific reading skills, and how to communicate such skills to their students, is important for prospective mathematics teachers. Through iterative coding and data analysis, I identified four main categories of proficient reading skills in secondary mathematics education: (1) close reading, (2) purposeful reading, (3) analyzing graphical elements, and (4) activating background knowledge.

Close Reading in Reading Mathematical Texts

With the adoption of the Common Core State Standards, the concept of "close reading" has resurfaced to illustrate students' abilities to read analytically and uncover the deeper meaning of texts. However, this concept is typically used to describe the type of reading expected in the English Language Arts classroom or history classroom, not mathematics. This is because reading is associated with sentences and paragraphs, rather than numerals, variables, or other unique

symbols. And yet, reading analytically to problem-solve and translate symbolic notations has always been a vital part of mathematics education. It is no surprise, then, that university faculty used close reading skills and expressed the importance of “dissecting” texts to increase comprehension during their think-aloud meetings.

One of the main observations from preservice mathematics teachers was how university faculty would scrutinize every sentence and equation in their text *before* moving on to the next section. That is to say, they wanted to develop a deeper understanding of the text beyond what the author explicitly stated. This finding was observed in three reflection papers. This viewpoint contrasts with many students who see mathematics as indisputable and absolute. Sarah wrote, “Whereas I was trying to read and absorb all this new information being presented, my mentor had a much better grip on the studies and was identifying the reasoning behind the data collected. This was a huge difference. As a result, she seemed to get more out of the reading.” Sarah, like many students, reads mathematics texts for factual information without giving much thought as to why or how the author used that particular information in the first place. Her mentor, on the other hand, recognized the importance of making inferences to support reading comprehension.

Table 21

Close Reading Skills Identified During Mathematicians' Think-Alouds

Proficient Reading Skill	Code	Description	Example statements from preservice mathematics teachers
Close Reading	Predicting	Thinking about what will occur later in the text	"[Professor] Saunder's said that when reading math texts, it is important to read what is written, ponder it, think about what will happen next, and then read ahead" (Marisol)
	Making inferences	Paying close attention to the deeper meaning of texts	"Whereas I was trying to read and absorb all this new information being presented, my mentor had a much better grip on the studies and was identifying the reasoning behind the data collected" (Sarah)
	Examining word choice	Understanding why an author used or excluded certain words	A major question asked while reading was what does the author mean by verification? That word came up a few times and every time Dr. Vargas looked puzzled by the author's usage of that word" (Sarah)
	Rereading	Surveying a text over and over again to increase comprehension	"In doing this activity, I learned that when reading math specific texts, it is important to read, ponder, think ahead, re-read, and then proceed to the next section" (Rose)
	Questioning	Asking questions about the text during reading	"Before reading Simon asked himself if he would need to open up any other documents, which he later learned in the preface that he wouldn't need to" (Ari)
	Annotating	Adding notes or comments in a text	"Mary drew pictures on the margins, to what the writing was saying to make even more sense about the text" (Alexandra)

Alexandra too observed similar close reading skills. She expressed, “Both [Professor Jones] and I were able to relate the text to previous material that we learned, and apply it to this reading. But [she] did engage more with the text than I did, and really made sure she understood what the author was trying to say.” Alexandra’s word choice of “engage” underscores a transactional approach to reading between the text and the reader (Rosenblatt, 1986) that proficient readers use, even in mathematics. “When I teach,” Alexandra added, “I’m going to tell my students to always make sure they are truly convinced with what the author is trying to say, also to make that they agree with what the author is saying.” In other words, she hopes to teach her prospective students that dissecting mathematics is not only appropriate, but it can lead to deeper understanding.

Because mathematics texts are quite complex, from the dense vocabulary to translating symbolic notations, university faculty stressed the importance of rereading to increase comprehension. Close reading often entails multiple rereadings because authors don’t explicitly state what they truly mean, and it is left to the reader to uncover the hidden meaning. Alexandra wrote in her reflection paper,

Every sentence [Professor Jones] would stop and think about the sentence to reread it, to make sure she agrees with what it is saying. She even checked the examples to make sure she is using the formula correctly and to see if the examples are correct. She even found a mistake with the wording contradicting the inequalities.

Marisol observed similar reading skills. She emphasized, “In doing this [think-aloud] activity, I learned that when reading math specific texts, it is important to read, ponder, think ahead, re-read, and then proceed to the next section.” The purpose of multiple rereadings, as Alexandra

and Marisol witnessed, is to verify what the author is saying and to confirm one's initial beliefs.

Ari, on the other hand, observed rereading as a means to slow down and process the information:

I loved that [Professor Simon] would stop and prove a theorem or lemma before he would continue to read. I would have just continued to read rather than make sure I understood what was going on. I will definitely use this as a tool from now on when reading math papers. I think this is also a great strategy to use in my classroom. If a student is reading an example they should try and work on it until they get stuck and then look at the answer. You can't learn if you aren't practicing and just reading the answers.

In other words, rereading provides students with additional opportunities to solve problems that would ordinarily be overlooked or skipped.

Close reading also entails questioning both the author and the text itself. Individuals who continually monitor their own thinking while reading a text are demonstrating metacognitive awareness, a skill paramount to proficient readers (Schoenbach, Greenleaf, & Murphy, 2012). Sarah, for example, observed several instances of questioning during her mentor's think-aloud: "I also noticed that [Professor Vargas] questions were much more high level than mine...For example, we both used questioning, but her questioning led to thinking and then answering. Whereas my questions did not guide my read and were left unanswered." Sarah was explaining that the type of questions a reader asks are not all the same; that is, questions that spark intrigue and higher ordered thinking should be privileged over others. Moreover, Sarah's mentor questioned the author's use of specific words in the text. Dr. Vargas was curious as to why the author used the word "verification" so often in her writing. Sarah remarked, "That word came up a few times and every time Dr. Vargas looked puzzled by the author's usage of that word." In the Common Core State Standards, students are expected to interpret words and understand how

they shape the meaning of texts. In mathematics, this is especially salient when reading difficulty word problems, for example.

Purposeful Reading in Reading Mathematical Texts

University faculty in both history and mathematics read with purpose. That is to say, they have a clear understanding of what they are reading, why they are reading it, and what specific parts of the reading should be privileged over others. Reading with purpose provides a pathway to stay on task. Even more so, having greater focus and direction leads to “more interaction with the text,” a preservice mathematics teacher (Sarah) wrote in her reflection paper. In the last section I described a proficient reading strategy called *purposeful skimming*, where readers survey a text for pertinent information before reading. Three university faculty in mathematics too organized their thinking based on the title, headings, key words, preface and table of contents. Marisol captured this finding in her writing. She wrote, “Before even beginning to read the text, I noticed that [Professor] Stellar read the title and the titles of the sections she would be reading. She skimmed the text, hovering for an extended period over the pictures.” Rose also stated, “Before [Professor Davidson] began to read the text, she first looked through the headings and pictures, and connected what she saw to what she had done with her students in the past.” Interestingly, Rose’s mentor surveyed the text not only to identify headings and images, but also to make connections to her prior knowledge and activate her schema. In contrast, Sarah’s mentor engaged in purposeful skimming to assess how the author arranged the text. She expressed, “Before reading, she glanced over the chapter and looked at the organization of the chapter. This is typically something that she does.”

Table 22

Purposeful Reading Skills Identified During Mathematicians' Think-Alouds

Proficient Reading Skill	Code	Description	Example statements from preservice mathematics teachers
Purposeful Reading	Organizing Thoughts	Establishing a clear purpose for reading	"Before Mary began to read the text, she first looked through the headings and pictures, and connected what she saw to what she had done with her students in the past" (Rose)
	Skimming	Prioritizing certain information/Surveying bold heading, pictures, and titles	"[Professor Simon] would stop at certain points to pick and choose what he wanted to read about. This is why he loved the table of contents, preface and overview." (Ari)

Teaching adolescent learners to read closely, and read with purpose, will not be an easy task for prospective teachers. Adolescents today have a need for instant gratification (Muther, 2013), and learning these skills takes patience and hard work. Sarah acknowledged that effective reading cannot be rushed after a conversation with her mentor:

Finally, my professor also helped me to realize how much time reading with purpose takes. In my [think-aloud] meeting with her I said, "You have an hour to read the text." She responded by saying, "No way. I can't finish the whole reading in that amount of time"...I am now seeing that reading in depth and with purpose takes time. If I want my students to really take away something from the article, I need to allot the appropriate amount of time to read it thoroughly.

Sarah realized from her meeting that, even for proficient readers like Professor Vargas, it takes time and diligence to comprehend complex mathematical texts. Furthermore, reading with purpose is a process that needs to be taught.

Analyzing Graphical Elements in Reading Mathematical Texts

Reading mathematical texts involves more than reading sentences and paragraphs on a page; rather, it entails reading symbols and graphical elements, such as tables, charts, and diagrams. Moreover, reading mathematical texts requires the ability to translate symbolic notations into sentences and vice-versa. For example, " $3x + 4 = 13$ " can be written as, "four more than three times a number is equal to thirteen." Proficient readers are able to read both written words and graphical elements, and read them simultaneously, to solve problems. During the think-aloud meetings, three preservice mathematics teachers observed their mentor make sense of graphical elements to increase comprehension. Several university faculty even ignored written text all together and only used focused on graphical elements. "During my think aloud interview," Rose wrote, "I did not expect my professor to be able to interpret exactly what the texts said through analyzing graphs and pictures. She did not even have to read the text to know what the article was about." Rose continued,

I never realized how important it was to make meaning of tables, charts, and visuals until I saw [Professor] Davidson interpret an entire reading through reading tables, charts, and visuals...When I teach, I want to teach prospective students the importance of reading tables, charts, graphs, etc. Not only do I want them to know how to read these, but how to make sense of them by creating conjectures as well as connections with prior knowledge on different material.

As a result of her observations, Rose anticipates teaching her prospective students the method of interpreting graphical elements.

Table 23
Analyzing Graphical Elements Identified During Mathematicians' Think-Alouds

Proficient Reading Skill	Code	Description	Example statements from preservice mathematics teachers
Analyzing Graphical Elements	Examining Visuals	Interpreting a text through analysis of visuals, including charts and tables	"During my think aloud interview, I did not expect my professor to be able to interpret exactly what the texts said through analyzing graphs and pictures. She did not even have to read the text to know what the article was about" (Rose)
	Translation	Turning words into visual elements, and vice versa, to support comprehension	"The other strategy [Professor Vargas] used was translation. She took a mathematical statement and wrote it in another way to see if she really bought what the statement was saying. It was so neat!" (Sarah)

Two preservice mathematics teachers also observed university faculty translate equations into words, and vice-versa, which proved to be an intriguing experience. As Sarah wrote, "The other strategy she used was translation. She took a mathematical statement and wrote it in another way to see if she really bought what the statement was saying. It was so neat!" In the image below (see Figure 6), Professor Miller used the chalkboard in her office to transform printed words into equations to see if changing the format altered her understanding of the problem.

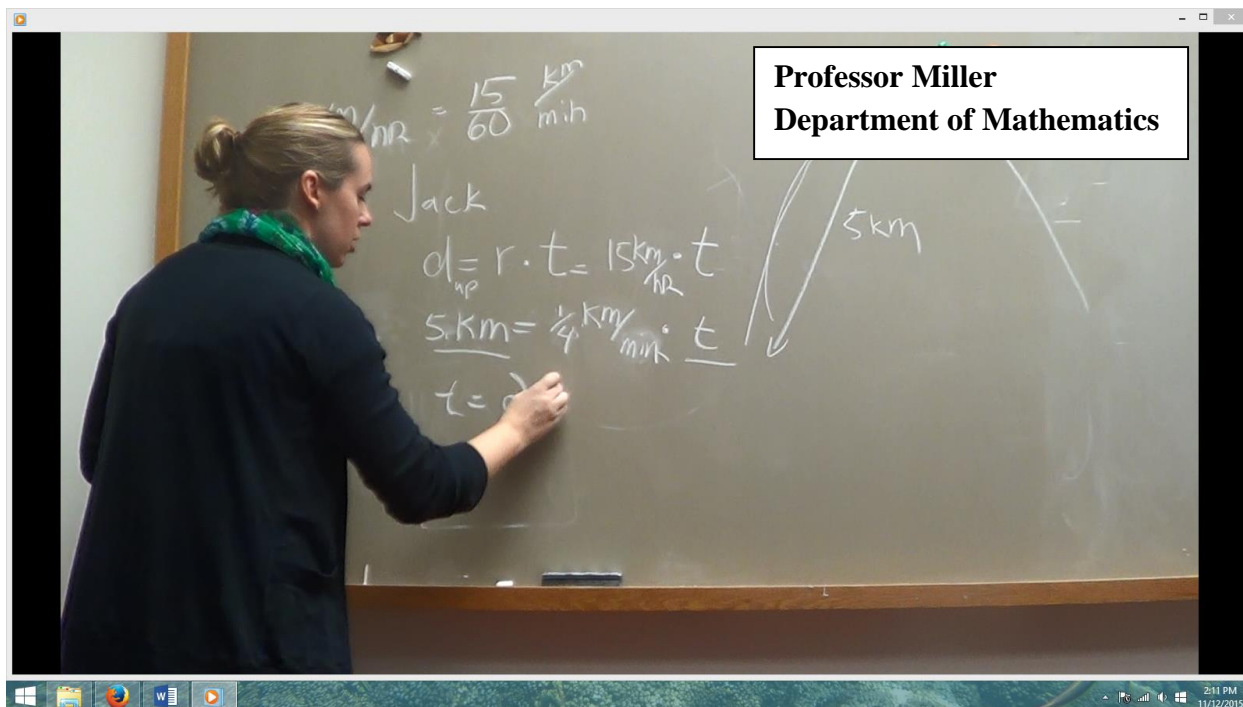


Figure 6: A university faculty member (mathematician) analyzing graphical elements

In addition to reading graphical elements, two preservice mathematics teachers observed their mentor annotate and make a variety of illustrations as a method of decoding the text. For example, Alexandra wrote, “[Professor Jones] drew pictures on the margins, to what the writing was saying to make even more sense about the text.” In one particular meeting, a disciplinary professional used physical objects during her think-aloud to help conceptualize the problem. Marisol recalled, “As [Professor] Stellar read, she brought out spheres she keeps in her office to try to visualize what the author is saying.” It is important that preservice mathematics teachers get exposed to innovative ways to read mathematics, like drawing pictures and using physical objects, because adolescent learners often need supplementary resources and creative strategies to solve problems.

Activating Background Knowledge in Reading Mathematical Texts

One of the main reasons proficient readers are able to read fluently and naturally is because they are able to make connections to prior knowledge. For example, a student's inability to decode a math word problem may not be the result of poor analytical skills, but rather due to misunderstanding the vocabulary used by the author. Some students bring an abundance of academic knowledge into the classroom from their out-of-school experiences, while others struggle to make connections between academia and their home life. In the mathematics classroom, it is important to acknowledge that students' prior knowledge affects their comprehension (Metsisto, 2005).

Table 24

Activating Background Knowledge Identified During Mathematicians' Think-Alouds

Proficient Reading Skill	Code	Description	Example statements from preservice mathematics teachers
Activating Background Knowledge	Prior knowledge	Connecting information in the text to what a reader already knows	"Before Mary began to read the text, she first looked through the headings and pictures, and connected what she saw to what she had done with her students in the past" (Rose)

The majority of preservice mathematics teachers ($N = 5$) documented their mentor's use of prior knowledge during the think-aloud session and throughout the mentorship experience. Some preservice mathematics teachers even expressed envy for such knowledge, as Rose expressed in her writing: "The knowledge that [Professor Davidson] has is immeasurable, and I wish to one day know a fraction of what she knows about mathematics teaching." Preservice mathematics teachers viewed prior knowledge as not only imperative for understanding various

math topics, such as geometry or algebra, but for teaching mathematics. Lois, for example, believed that “all teachers should have a well-grounded knowledge and deep understanding” of topics that appear over and over again in the mathematics curricula, such as the Pythagorean Theorem, area, functions, invariants, and proportional reasoning etc. For Rick, he was able to express compassion for his prospective students because the think-aloud session served as a humbling experience about how much he still doesn’t know in the field. In his reflection paper he wrote, “I feel that I will better empathize with my own students. I feel that I am now focused more on the details, and that things that seem obvious to me may not be for everyone else.” The deep background knowledge of Rick’s mentor fostered a sense of self-reflection on his own teaching practices.

As I stated previously, mathematics terminology is a critical reason why so many students struggle comprehending math problems. It is no surprise, then, that preservice mathematics teachers commented on the importance of building vocabulary knowledge to read texts fluently and be an effective teacher. Ari remarked after her think-aloud session with Professor Simon, “You have to build mathematical language and from there you can approach the text. You have to have enough math under your belt to understand the mathematical terminology behind the proof to be able to understand what’s going on.” Lois too commented on her mentor’s use of academic language:

Because Professor Miller is a math expert, she was able to connect to vocabulary and concepts more than I did. I had to really think about the vocabulary. Due to this, I spent more time on the introduction that I probably should have, though when I heard her think aloud, I was able to make more sense out of the article and vocab.

Lois's lack of vocabulary knowledge altered the way she read the text because she was so focused on decoding specific words in the introduction. In contrast, reading with automaticity, like Professor Miller, allows readers to focus on the author's central points.

Proficient Reading Skills Identified by Preservice Science Teachers

Researchers have found that reading mathematical texts and reading scientific texts require similar cognitive strategies (Shanahan, Shanahan, and Misischia, 2011). In this study, these similar cognitive strategies were documented by preservice teachers. For example, the use of graphical elements, such as tables, charts, and pictures, were essential to a mathematicians and scientists reading, but not emphasized by historians. The findings revealed significant insights into *how* university faculty (i.e., chemists) read texts and *how* preservice science teachers plan to approach reading instruction as a result of observing their mentor perform a think-aloud. Four main categories of proficient reading skills and reading instruction were identified in my analysis: (1) close reading, (2) purposeful reading, (3) analyzing graphical elements, and (4) activating background knowledge.

Close Reading in Reading Scientific Texts

Close reading is essential to examining scientific texts because of their “density and level of challenge” (Lapp, Grant, Moss, and Morgan, 2013, p. 111). Scientific texts are laden with academic vocabulary that can cause problems for struggling readers (Lee & Sprately, 2010). Upon reading the title of his mentor's think-aloud text, *Nucleophilic Substitution Catalyzed by a Supramolecular Cavity Proceeds with Retention of Absolute Stereochemistry*, Giovanni stated that “it sounded like a monster of an article.” Additionally, these kinds of texts contain graphical elements, such as tables, charts, and diagrams, forcing students to interpret both written text and

visuals simultaneously. Close reading allows for in-depth analysis of scientific texts to uncover the hidden meaning, argument, and/or central ideas.

Both university faculty members in chemistry chose discipline-specific texts that contained rich scientific language and visuals during their think-aloud meeting. Several close reading skills were identified by preservice science teachers, including making inferences and examining word choice (see Table 25). In regards to making inferences, scientists are forced to use inferential reasoning because authors do not always explicitly state their main argument or true beliefs. Instead, readers are left to gather evidence and make proclamations based on their observations. Professor Ward, for instance, pointed out that “one of the carbons was missing” from a diagram he was examining, not because the author included this information, but because of his own in-depth analysis. His mentee (Giovanni) wrote, “He accounted for this [missing carbon] by showing that two of the carbons were nearly identical.”

Table 25
Close Reading Skills Identified During Scientists’ Think-Alouds

Proficient Reading Skill	Code	Description	Example statements from preservice science teachers
Close Reading	Making inferences	Paying close attention to the deeper meaning of texts	“First, [Professor Ward] looked at the integration values in relation to the peaks and rounded the numbers to the nearest integer. He then analyzed which peak referred to which carbon. In doing so, he introduced the idea that more electron deficient atoms were shifted to the left while more electron rich atoms were shifted to the right of the spectra” (Giovanni)
	Examining word choice	Understanding why an author used or excluded certain words	“[Professor Kent] began by pointing out the importance of certain terms of the title” (Luis)

Examining word choice was another essential close reading strategy observed by both preservice science teachers. In a paper titled, *Pharmacological Mitigation of Tissue Damage during Brain Microdialysis*, “[Professor Kent] began by pointing out the importance of certain terms of the title,” expressed Luis. As a future science teacher, Luis could highlight root words, like “pharma,” as a reading technique to support students’ reading comprehension. Giovanni too observed his mentor emphasize certain words to better understand the text. He wrote, “Throughout the think-aloud, Dr. Ward explained terms that I didn’t remember from organic chemistry like “ee” (enantiomGiovanni excess) and a racemic mixture.” Giovanni recognized that Professor Ward’s deep vocabulary knowledge aided in reading fluency and automaticity.

Purposeful Reading in Reading Scientific Texts

Struggling readers tend to confront many challenges when reading scientific texts, such as the vocabulary density, academic language, graphic representations, and text structure (Buehl, 2011). However, proficient readers are able to overcome comprehension difficulties because they consider how a scientific text is organized and structured to locate relevant information. In other words, they read with purpose. Scientific papers, for example, are typically formatted in sequence using bolded headings: title, abstract, introduction, methodology, results, discussion, and references. Helping adolescent learners understand how scientific texts are organized, and what skills scientists use to read them, can support scientific learning (Diep, 2014). Both preservice science teachers in this study, Luis and Giovanni, observed their mentors stress the importance of text organization and purposeful reading during the think-aloud session. Luis noted,

Considering that scientific articles are the main source of literature it is important to know how to read them and understand the way they are organized to get the best out of

them. According to Dr. Kent it is important to learn what the different sections of a scientific article are composed of...By understanding the way these articles are organized, scientists can be more efficient in their reading.

Luis recognized that “scientific articles” are the primary texts read in the scientific community and, consequently, students should become familiar with how to examine them.

Table 26
Purposeful Reading Skills Identified During Scientists’ Think-Alouds

Proficient Reading Skill	Code	Description	Example statements from preservice science teachers
Purposeful Reading	Organizing Thoughts	Establishing a clear purpose for reading	“It seems like for the professor it was very important to narrow what he is looking for in the reading before he digs into the full article. Information in such articles can be very overwhelming but it can help immensely if you know how to prepare yourself before reading” (Luis)
	Skimming	Prioritizing certain information/Surveying bold heading, pictures, and titles	“Now, if I ever teach how to analyze a chemistry journal article, I will focus on this idea of general understanding and skimming for important data...Looking at the abstract and visual aids can help one in determining where to look for information ” (Giovanni)

Understanding how scientific texts are organized can also help readers identify or pick out specific pieces of information that are most important to them. Depending on what a reader is looking for, such as the type of study (experimental, correlational, survey), analytic tools, data

sources, or findings, etc., they will alter what and how they read each section. Luis supports this observation in his writing:

Even though every section is important, Dr. Kent commented that it is often the case that when doing research, scientists are looking for very specific bits of information, so by knowing and understanding each section, the efficiency of finding what you are looking for will become much better.

Luis would later reflect on how purposeful reading strategies may impact his prospective reading instruction. He wrote,

It seems like for [Professor Kent] it was very important to narrow what he is looking for in the reading before he digs into the full article...I will also pitch these techniques to my students when learning about these sorts of scientific articles. It will be very beneficial for them to be able to understand how these articles are organized and how to approach them.

Luis's point is that purposeful reading can be an effective pedagogical technique to support scientific learning. Giovanni too (see Figure 7) observed his mentor (Professor Ward) focus on specific parts of the text to guide his reading. Professor Ward was able to locate specific details using the "abstract" as a blueprint for "determining where to look for information," Giovanni wrote. When answering text-dependent question in class, it is important for students to know where to find pertinent information.

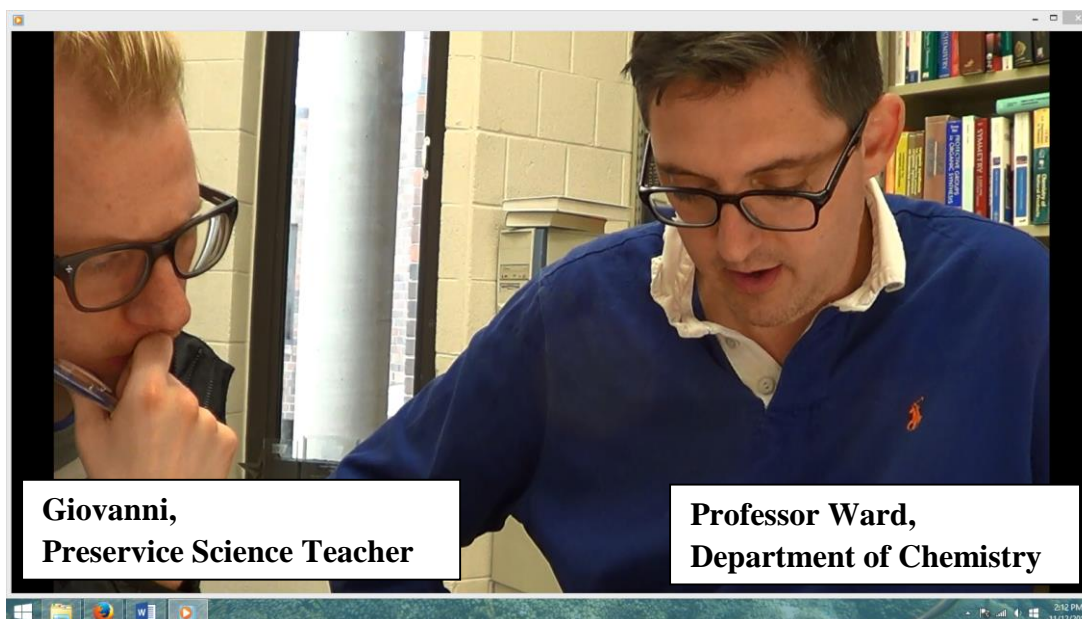


Figure 7: A university faculty member (chemist) performing a think-aloud

Analyzing Graphical Elements in Reading Scientific Texts

University faculty across the disciplines, especially in mathematics and science, used graphical elements, such as tables and pictures, to read texts. Scientific textbooks in particular contain numerous visuals, and students must be able to draw inferences and make connections between written text and visual text. Oftentimes, the visual elements of scientific texts can provide just as much, or even more, information about the meaning of the text than sentences and paragraphs. Luis reaffirmed this observation in his writing: “[Professor Ward] mentioned that the most important information was presented in the graphs and really pointed out some differences between the different graphs and how they are important in understanding the information presented by the author.” Giovanni was also fascinated that his mentor focused more on pictures than written text during his think-aloud:

I was especially surprised in Dr. Ward's reading of the journal article. He looked mainly at the pictures and skimmed the text to further understand the drawings. I tried to understand the article by reading it word for word...Overall, this left me quite confused - and bored at the same time.

Giovanni's point was that visual aids are critical to reading comprehension, even for proficient readers. Furthermore, reading "word for word" is not always the most effective method of reading a scientific text. Giovanni also commented that his mentor would survey the pictures to get a "general idea" of the text.

Table 27
Analyzing Graphical Elements Identified During Scientists' Think-Alouds

Proficient Reading Skill	Code	Description	Example statements from preservice science teachers
Analyzing Graphical Elements	Examining Visuals	Interpreting a text through analysis of visuals, including charts and tables	"I was especially surprised in Dr. Ward's reading of the journal article. He looked mainly at the pictures and skimmed the text to further understand the drawings" (Giovanni)
	Translation	Turning words into visual elements, and vice versa, to support comprehension	Also, [Professor Kent] was able to read the article and the graphs at the same time, relating the information presented and getting the most out of the pictorial representations" (Luis)

One reading strategy Luis observed during the think-aloud session was the ability to read the written text and visual text simultaneously. In his reflection paper Luis wrote that his mentor spent most of his time "going back and forth from the graphs to the explanation by the author." From this statement, it can be argued that proficient readers often use multiple representations to

support their reading comprehension. When comparing his own reading skills to that of his mentor, Luis commented,

[Professor Kent] was able to read the article and the graphs at the same time, relating the information presented and getting the most out of the pictorial representations. On the other hand, I only saw the graphs once and kept on reading the article. This didn't seem very useful since I was not able to relate the information presented in the graphs as well as I could have if I had used professor Kent's technique.

Luis's point was that even though he "saw" the visuals, he did not connect them to the written text or use them to support his overall understanding of the journal article.

Activating Background Knowledge in Reading Scientific Texts

Science is often a source of obfuscation because its academic jargon and abstract concepts appear disconnected from everyday life. Without a rich scientific background, many students struggle to make meaningful connections to science-related topics and terms. These students also struggle reading scientific texts because their attention is focused on decoding words, rather than comprehending central ideas. Both university faculty in science stressed the importance of prior knowledge to reading instruction and reading comprehension during their think-aloud sessions. Luis expressed, "Thanks to [Professor Kent's] background knowledge he was able to draw a conclusion before he even read the conclusion. He also mentioned that he knew the author's work... This is how far an expert in a certain area can go; it's an ability that only experience can give you." Luis's point is that background knowledge materializes from "experience" and, specifically, it can help readers anticipate what an author is going to say.

Table 28

Activating Background Knowledge Identified During Scientists' Think-Alouds

Proficient Reading Skill	Code	Description	Example statements from preservice science teachers
Activating Background Knowledge	Prior knowledge	Connecting information in the text to what a reader already knows	"In dealing with the NMR, Dr. Ward was at a bit of an advantage since he knew the general structure of the chemical" (Giovanni)

While proficient readers have specialized knowledge in a singular field of study, it is also important to possess generalized knowledge to adapt one's thinking to novel situations. This allows readers to connect new information to their existing schema, or what they already know. For Giovanni, this observation had a significant impact on his understanding of science and prospective teaching practices:

I realized from this think-aloud that a general understanding is more important than a specialized knowledge. One's area of interest or research is an area of specialization that one must master. However, in dealing with texts outside of that specialization, it is more important to understand the general concepts and ideas being used. Now, if I ever teach how to analyze a chemistry journal article, I will focus on this idea of general understanding and skimming for important data. It is often difficult for students to know what to read for.

Giovanni addressed several key points in his writing. Foremost, to make sense of texts "outside" of your specialty area, it is important to possess broad scientific knowledge. This is important because secondary teachers are required to teach many topics within a discipline (e.g. A psychology teacher must have background knowledge in human development, therapy, cognition, research methods, and personality). Giovanni also emphasized that generalized

knowledge can support purposeful reading strategies because students often don't know "what to read for."

Possessing deep background knowledge in a discipline can improve the mindset of a reader, even when faced with a complex text. One of the biggest differences between Giovannis's reading skills and his mentor's was the "level of confidence," he wrote. While Giovanni was apprehensive to read a scientific journal article, his mentor showcased optimism that he could "handle" a novel text.

Similarities and Differences across the Disciplines

My findings revealed that preservice teachers observed university faculty use multiple proficient reading skills to make sense of discipline-specific texts. Five primary reading categories were identified and discussed: (1) close reading, (2) purposeful reading, (3) sourcing, (4) activating background knowledge, and (5) analyzing graphical elements. Close reading, purposeful reading, and activating background knowledge were identified in all three disciplines. However, compared to historians and scientists, mathematicians engaged in more advanced close reading skills, such as annotating and rereading. University faculty in all three disciplines read with purpose (e.g. organized their thoughts *before* reading) and used their prior knowledge to make sense of the texts. Sourcing was observed in the readings of both historians and mathematicians, but I only categorized sourcing under historians because it was observed more frequently; only one instance of sourcing was identified by a preservice mathematics teacher. Analyzing graphical elements, on the other hand, was identified in the readings of mathematicians and scientists, but not by historians. Mathematicians and scientists examined tables and charts to better understand their texts, while historians focused more on written words.

My second research question examined how observing university faculty perform a think-aloud shaped preservice teachers' understanding of proficient reading skills and reading instruction. My third and final research question looks at the mentorship model from the perspective of university faculty. I provide a summary and analysis of this question in the sections below.

RQ 3: How does a teacher preparation mentorship influence university faculty attitudes, beliefs, and practices regarding literacy and literacy instruction in their subject areas?

At the end of the mentorship experience, I interviewed 11 out of 13 university faculty members who participated in the study and interviewed them about their experiences⁷. They reflected on their own beliefs concerning literacy and literacy practices and if the course (CI-414) mentorship influenced the way they viewed disciplinary literacy instruction. The interviews were audio taped, transcribed, and then uploaded to NVivo qualitative data software for analysis. First and second cycle coding methods were used (Saldaña, 2014) to make meaning from the data and generate common themes that emerged across the disciplines of history, mathematics, and science. Data from preservice teacher sources, including reflection papers, interviews, and questionnaires, were used for triangulation to validate many of the comments made by university faculty about the impact of the mentorship.

I found that the mentorship either supported or confirmed university faculty preexisting attitudes about the importance of literacy and literacy instruction (because I used convenience sampling, the majority university faculty who participated in the study already had the mindset

⁷ I was unable to meet face-to-face with two university faculty members because of time constraints and other personal reasons. One university faculty member emailed me her responses to the post-questionnaire and the other could not be reached

that advancing reading and writing skills were essential to student learning). Moreover, the mentorship provided a space for university faculty to self-reflect on their own strengths and weaknesses regarding literacy instruction. For example, offering guidance to preservice teachers on lesson planning proved challenging for several mentors, while it was easier for others. Many university faculty members also expressed interest in modifying their own classroom practices, such as incorporating more think alouds and group reading activities, as a result of their experiences working with preservice teachers.

In the sections below, I describe how the mentorship influenced university faculty attitudes, beliefs, and practices regarding literacy through the lens of each discipline.

University Faculty in History

It would be misleading to proclaim that university faculty (i.e., historians) never considered the role of literacy in history prior to participating in this study. In a pre-questionnaire Professor Rabinowitz was asked about the relationship between history and literacy. He wrote, “I cannot conceive of one without the other.” Professor Jones as well expressed his commitment to literacy instruction in a post-interview: “I think it’s kind of what we always do. The more I sit down with students and go over primary sources with students or read specific texts with them the actual aspect of literacy will be promoted.” Jones’s point was that in the process of learning and doing history, the elements of literacy, even if not discussed explicitly, will manifest in that process. Nevertheless, the mentorship allowed historians to reflect upon their own understanding of literacy and the role it plays, or could play, in their discipline.

Teaching undergraduate students how to source primary documents or corroborate multiple sources was commonplace in the classrooms of many university faculty. However,

thinking about these practices as elements of “literacy” was often less apparent. One university faculty member, in particular, almost never made a connection between her teaching methods and literacy until participating in this experience. In the transcript below, Professor Hindmand stated,

I hadn’t really considered fully before that the notion of historical literacy is what should matter to me. I think the conversation you and I had about literacy when we first started talking was eye-opening because, of course, this is the thing that I was saying, like I do these things, I don’t think about them as being about literacy. Knowing that there is something called historical literacy, I mean for me it becomes a nice rubric or a way to attach myself to other people doing other kinds of things.

Professor Hindmand was expressing in our interview that teaching her students how to read and analyze historical documents had always been a part of her teaching, but seldom attached the concept of “historical literacy” to it. That is, she never thought of her teaching practices as “being about literacy” prior to this mentorship. Rather, it was something intuitive in nature. Professor Hindmand’s realization that she does teach historical literacy fostered a sense of reassurance in her own teaching practices. More importantly, it provided a mental framework or “rubric” for how to approach teaching.

For one university faculty member, participating in this study reinforced certain beliefs about how to prepare preservice history teachers for classroom instruction. Specifically, there should be a greater focus on the process of learning history in methods courses than absorbing subject-matter knowledge. In a post-interview, Professor Morgan reflected on how a mentorship framework within a content literacy course (CI-414) could support this kind of learning:

I mean fundamentally what we are trying to do here, without being completely propagandist about it, is in fact insist that history teaching is about having students figure out how to do the discipline...Students take history classes, they kind of get it, but in the history classes they almost never, and likely in fact never, do any kind of thinking about the discipline. Which we should.

Professor Morgan's point was that history methods courses are not providing students with an inside look into the meaning-making practices of the discipline. In his words, students are "not going to talk about how a particular historian, or a set of historians, came to different ideas based on what kind of archives they might have or their politics and things like that." Mentoring with a university faculty member, however, is one way that preservice teachers can gain insight into the process of doing history.

One of the most meaningful experiences for university faculty, which also had a considerable influence on their views of literacy, was performing a think-aloud in the presence of their mentee. For each university faculty member, this exercise served as an opportunity to reflect on their ability, or inability, to communicate their implicit thoughts to students. Professor Morgan expressed his trepidations in a post-interview: "I remember even from the first time that I was fearful that this would be difficult to articulate or that I would stumble. But it was fun. I really enjoyed it actually...It was kind of like, oh wow, I can articulate this and there are some though processes going on even if they're not conscious or explicit." This experience fostered a sense of confidence in Professor Morgan's own abilities to "articulate" his thought processes. On the contrary, performing a think-aloud underscored the difficulty of expressing one's implicit thoughts to other university faculty. For Professor Rabinowitz, making associations and noticing repetitions in a text comes naturally, but "that's where," he voiced in our interview, "it becomes

difficult to convey how you do that.” In other words, articulating such intrinsic thoughts from decades of practice is not a natural or easy process.

Supporting preservice teacher’s disciplinary ways of thinking and practice also influenced how university faculty thought about their own pedagogical teaching practices. And for two university faculty members, they even expressed interest in adding certain activities to their toolbox or modifying how they approach literacy instruction. Because the primary focus of many university faculty at large research-intensive universities is centered on research and writing, classroom teaching often becomes secondary. In this study, meeting with preservice teachers forced university faculty to think about instruction, pedagogy, and lesson planning through the lens of their particular disciplines. For instance, Professor Jones was surprised that his mentee (Kim) did not routinely source documents in her own undergraduate studies; consequently, he explored the possibility of modeling such reading strategies for own his own students:

You know, one thing that was funny was like, [Kim] said, “I notice that you’re looking at the footnotes all the time you know. I never do that I just read the text.” And I can’t possibly read a book without looking carefully at every footnote...So maybe that would be interesting for them to see? Maybe I should do it. Huh. What do you know? Great.

Jones appeared surprised by his own revelation that teacher modeling could be an effective instructional technique. He would later discuss the possibility of having students analyze documents in groups as a means to get “everyone involved.”

During my interview with Professor Morgan, he also showed interest in modifying classroom instruction as a result of working with his mentee (Giovanni). His teaching had always

centered on improving students' writing skills because, in his words, "it's clearly more visible when there are problems...and you can make more improvement more quickly." However, because the mentorship focused on discipline-specific reading skills, he thought "making [reading instruction] more explicit" in his own classroom would better prepare students for learning history.

In the third and final meeting together during the semester, university faculty were asked to assist preservice teachers in designing a literacy-focused lesson plan. Their responsibility was to offer guidance on both the conceptual issues and lesson organization. The mentorship provided a window for university faculty to reflect on their own competency and confidence in literacy pedagogy. The findings showed that university faculty held mixed feelings. Professor Baker, for example, held the academic position of Associate Director of the Teaching of History Program at the university so she felt extremely comfortable supporting her mentee's (Jessica) lesson. Jessica wrote in her reflection paper that Professor Baker encouraged her to step into the shoes of her prospective students to anticipate student misconceptions. Other historians, however, did not feel as comfortable:

KUSHNER: The last meeting was creating a lesson together. How was that experience?

RABINOWITZ: I was no help at all.

KUSHNER: Why do you say that?

RABINOWITZ: Because I had no idea how to do that actually. But I found it interesting what [Porter] had done.

Professor Rabinowitz was interested in literacy pedagogy, but lacked the knowledge in lesson design to support Porter. From my personal interactions with Professor Rabinowitz during the semester, it was clear that his strength as an academic revolved around content knowledge, not training teachers. Professor Jones too felt inadequate in his ability to assist his mentee (Kim) in creating a lesson. He stated in our post-interview, “I’m not creative enough” when it comes to lesson design. This observation was supported in Kim’s writing: “My meeting with Professor Jones didn’t provide me with any profound insight and I didn’t change anything with my lesson.”

University Faculty in Mathematics

Similar to historians, the majority of mathematicians emphasized reading and writing skills in their own classroom prior to participating in this study. This was partly due to recruiting university faculty who taught mathematical methods courses to preservice mathematics teachers. Prior to meeting with her mentee (Lois), Professor Miller wrote that “being mathematically literate is an important component of being a mathematics learner...There are ways to engage with a text that seem particular to mathematics.” Professor Miller clearly understood the specialized role of literacy in mathematics. It is important to note, however, that using the specific term “literacy” among mathematicians was not as common compared to university faculty in other disciplines. “It is not a term that I typically use in mathematics,” expressed Professor Jones. Nonetheless, the mentorship provided a space for each university faculty member to reflect on their own understanding of literacy practices and instruction.

Collaborating with preservice mathematics teachers and discussing the complexities of reading mathematical texts gave university faculty an inside look into the mind of non-expert readers. From their perspective, even college students majoring in mathematics don’t fully

understand the kind of thinking and reasoning skills necessary to do mathematics at a higher level. Professor Simon stated,

Anything that you learn from the youth, from a study like this, is important because it's sort of shocking [students'] perceptions and misperceptions about how people read math or how they learn math; what students or teachers or potential teachers think mathematicians do or people who are mathematical thinkers; how they go about trying to digest mathematical argument or computation. It's sort of mindboggling.

Simon was proclaiming that the kind of mathematical reasoning skills exhibited by proficient readers confounds many students, even prospective teachers. This is often attributed to the lack of understanding into the process of doing mathematics – a process that appears effortless and orderly because students only see the finished product. Simon discussed during a post-interview how this belief contributes to the “misconceptions” about how competent readers solve problems. Simon’s mentee (Rick) supported this mindset in his writing: “[Professor Simon] spoke of some mathematicians as being more machine-like, possessing the ability to simply churn through mathematical text and understand everything. These people are the minority, and most people do not understand everything that they read (even the experts).” In our interview together, Simon provided an analogy of looking at a beautiful painting in a gallery without giving thought into the messy, chaotic, and disorganized process of the artist behind the scenes. Watching an experienced teacher can feel somewhat similar, as students are disconnected from the jumbled and iterative process of lesson planning.

Like Simon, Professor Miller acknowledged her mentee’s (Lois) misconceptions about how competent readers think through problems. She stated, “I want [students] to know this is

hard for me. You know it's not that I'm smart, it's just that I stay with problems longer. I just stay with readings longer. It's not that we have the magical answers." Professor Miller was addressing Lois's comments about getting "confused" when reading a complex mathematical text. She was trying to express to Lois that even expert readers get confused and that reading "doesn't come easy" for her all the time either. Lois subsequently internalized this understanding, as evident in her writing:

Seeing [Professor Miller] struggle made me feel comfortable that I was not alone when I got stuck. If the teacher had moments where she had to question and talk more about her approach while working on a problem to the class, I think students can benefit from the think aloud activity.

Lois's point was that it is important for teachers to convey to their students that experiencing confusion is expected and normal. Moreover, approaching a class with this mindset will create a comfortable and safe learning environment.

In addition to refocusing their attention on the process of doing mathematics, the mentorship also forced university faculty to reflect on their own pedagogical teaching practices. Each university faculty member who participated in the study had an interest in the craft of teaching, and several even specialized in mathematics education. Professor Vargas, for example, used her mentorship meetings with Sarah to "provide opportunities for her to learn about student thinking, task design and its implications, teacher interventions, [and] multiple ways of thinking." In other words, Vargas believed that literacy, student learning, and classroom instruction were not mutually exclusive issues.

The think-aloud session, in particular, was an eye-opening experience for three university faculty members on the importance of making their implicit thoughts visible to learners. Even though the act of teacher modeling was familiar, performing it one-on-one in such an explicit manner created a fresh perspective. When asked about using this technique in her own classroom, Professor Davidson responded, “I think I got a much higher possibility of [modeling] now with more emphasis on conceptual understanding as opposed to just procedural in mathematics, so there is a need for people to not just go through the procedures but to explain what they are doing and why it works.” Davidson’s point was that teacher modeling had always been a part of her instruction, but now recognized its use for conceptualizing mathematics topics. Professor Miller also thought there “should be” more opportunities for teacher modeling in her undergraduate methods classes.

In addition to teacher modeling, the mentorship meetings also prompted two university faculty members to think about engaging preservice teachers in more collaborative and communicative activities. Professor Davidson believed that students should practice articulating their thoughts in front of their peers. She stated in a post-interview, “I think we have to get our students to do that - not just mimic what we do but get them go up there and explain what they’re doing...Getting them talking about what they’re doing rather than saying, “is this right?” A classroom culture built on a foundation of questioning and inquiry allows students to become independent learners and less dependent on teachers.

Professor Miller, on the other hand, believed that collaboration should be encouraged between preservice teachers and university faculty. In fact, one of the salient themes across all the disciplines was creating more opportunities for this kind of cognitive apprenticeship (Collins, Brown, & Newman, 1989). Participating in this study, declared Professor Miller, reinforced the

need for teachers to meet “one-on-one with students.” As a student once herself, Miller “always yearned for that as a graduate student; for the professor to come talk to [her].” Although it appears trivial, simply creating opportunities for students and teachers to come together and talk about the meaning-making practices of a discipline can make a significant impact on both parties. Turning the process of learning into a social experience creates more opportunities for self-reflection.

University Faculty in Science

While participating in this study did not radically alter university faculty (i.e., chemists) understanding of literacy, the mentorship proved to be a meaningful experience for self-reflection on scientific thinking, teacher modeling, and lesson planning. Collaborating with preservice teachers elicited greater insight into university faculty own literacy practices and disciplinary ways of thinking, such as how to read a complex text, attributes that define a disciplinary professional, and use of academic language.

The mentorship experience served as a mirror for both Professor Ward and Professor Kent to reflect on their own meaning-making practices. Ward remarked in a post-interview discussion, “I think whenever you self-reflect about anything you ‘prove’ what you do. Right? So I thought that would be useful just to think about how I process information.” The think-aloud meeting, in particular, offered insight into how each university faculty member communicates ideas and “process information.” For Ward, the think-aloud meeting incited a sense of reluctance and uneasiness:

KUSHNER: Reflect a little bit about the think-aloud session with Giovanni. How was that experience?

WARD: I found it a bit unnatural...I've done it for so long that I found it hard.

KUSHNER: Well one of the issues is that it's so intuitive for us; we've done it for so long. When we're asked to say what we're thinking, why we're focusing on this word, why we skipped this part, etc. It can be tricky.

WARD: Ya, but I think the difficulty in expressing that to someone who is not an expert...At a certain point you need to know the material.

Ward stressed two major points as to why he struggled making his implicit thoughts visible to Giovanni. Foremost, reading chemistry texts has become such a natural and intuitive process that explaining this kind of tacit thinking proved difficult. Secondly, it is quite challenging for him to explain concepts to learners who lack expensive background knowledge in a topic.

While university faculty have a firm grasp of the content in their discipline, that doesn't necessarily translate to understanding how to teach that content to students. In the last mentorship meeting of the semester, university faculty were instructed to offer guidance and help preservice science teachers (re)conceptualize a literacy-focused lesson plan. Professor Kent realized that his ability to link content with pedagogy was lacking:

I thought about being a high school teacher, and especially that last meeting, how would I present these very basic concepts? I would have a problem...I was more left with, "uh, I don't know how I would do that." I mean maybe if I taught general chemistry I would have a better handle on how to do that.

I want to stress that Kent was directly talking about teaching high school students, which may not be indicative of his ability to prepare lessons for undergraduate courses. Despite Kent's

apprehensiveness, he still made a considerable impact on his mentee's (Luis) lesson plan. Luis wrote in response to their third and final meeting together, "The meetings with professor Kent, the professor I was aligned with for my project, helped in a large amount. He helped me understand the way that certain types of texts are to be presented to people with different scientific backgrounds." Professor Ward also supported his mentee's (Giovanni) lesson plan. This observation is evident in Giovanni's writing: "[Professor Ward] began to suggest that I rethink the way I was thinking about my lesson...Dr. Ward made me look at solubility and chemistry itself differently."

Similarities and Differences across the Disciplines

This research question centered on university faculty attitudes, beliefs, and practices from their mentorship experiences. I found that the university faculty across the disciplines (history, mathematics, science) not only supported my project, but 7 out of 13 faculty members were able to reflect on their own teaching practices and reference possible improvements. University faculty in all three disciplines reflected on the concept of "literacy" and how they linked the term to their subject area. During my post-interview discussions, I found that one historian and two mathematicians discussed the importance of literacy in their courses currently, but never connected the concept to their teaching. University faculty across the disciplines also reflected on the think-aloud activity and their ability, or inability, to communicate implicit thoughts. One historian, in particular, argued that the think aloud activity is only effective if students possess prior knowledge in that field. When discussing the literacy-focused mini teaching lesson, one scientist and one mathematician underscored the difficulty of helping preservice teachers design the lesson. These issues were not identified among mathematicians. Lastly, university faculty in history and mathematics discussed (possibly) modifying their instruction based on participating

in this study. One historian stated he would like to create more opportunities for students to practice sourcing primary documents in his classroom. Additionally, one mathematician stated she would like to practice modeling in front of her students.

V. DISCUSSION AND IMPLICATIONS

This study is about redesigning one content literacy course at one university, during one semester, with one literacy educator, in which I am attempting to demonstrate a potential redesign of an effective teacher education program rooted in mentorships. However, taking a step back, it is also a study about *people, relationships, and institutions*. This study concerns the next generation of teachers and how they are prepared for not only literacy instruction, but meeting the academic and sociocultural needs of a diverse student population. A highly qualified teaching workforce possesses the knowledge and skills to support students who come from different backgrounds and learn in different ways (Bransford, et al., 2005). This study calls attention to not only university faculty but also all stakeholders in the teacher learning process, and encourages them to question, “Whose responsibility is it to support preservice teachers’ disciplinary literacy development?” Finally, this study has placed a spotlight on not only teacher education courses, but the design and organization of teacher education institutions. Effective teacher education programs are designed around a coherent, shared vision of teaching and learning among all faculty (Darling-Hammond, 2006b). I will discuss each of these insights in the sections below.

This chapter, then, is about making sense of, and reflecting on, the meaningful experiences that emerged between preservice teachers and university faculty as they participated in the mentorship framework I redesigned. The purpose of this chapter is to consider the implications of the findings through the lens of multiple stakeholders (e.g. preservice teachers, university faculty, literacy educators) and address the broader issues of people, relationships, and institutions. I organize this chapter as follows: I begin by revisiting the need for this study. Next, I address the implications of the findings on the people who played a pivotal role in my study

(e.g. preservice teachers, university faculty, literacy educators), what transpired from their interactions with each other, and how their collaborative experiences manifested within a teacher education program. After that, I examine how this study aligns with and extends current research. Finally, I discuss limitations of my study and directions for future research.

Revisiting the Need for the Study

This study was grounded in the belief that in order to prepare secondary content area teachers for disciplinary literacy instruction, they must learn, and have modeled for them, the literacies of their disciplines by disciplinary professionals (i.e., university faculty). While researchers are currently exploring ways to improve communication between literacy educators and university faculty (Draper & Siebert, 2010; Draper, Broomhead, Jensen, & Nokes, 2012), this action research study (Sagor, 2000) intended to advance this model by constructing a space for preservice teachers to also join this learning community. To investigate this designed mentorship framework, I specifically attempted to answer three research questions:

RQ 1: What did preservice teachers learn about being a competent teacher of literacy through their mentorship experiences?

RQ 2: How does observing university faculty perform a think-aloud support preservice teachers' understanding of discipline-specific reading skills and reading instruction?

RQ 3: How does a teacher preparation mentorship influence university faculty attitudes, beliefs, and practices regarding literacy in their subject areas?

These questions were developed to explore how redesigning a content literacy course rooted in a mentorship framework impacted preservice teachers' disciplinary ways of thinking and practice.

I also sought to examine changes in university faculty beliefs and teaching practices as a result of taking on the role of a mentor.

I discussed in Chapter 3 that my motivation behind redesigning a content literacy course was not a single event but rather a series of occurrences that I directly experienced in the classroom as both a student and teacher. I describe several of these experiences as a set of “gaps” in the way content area teachers are prepared for secondary literacy instruction (see Table 3). One of these critical moments occurred when I was a teaching assistant in the fall of 2013; I had a memorable interaction with a preservice mathematics student who felt disconnect between her personal needs and the literacy course curricula. “I don’t really think what we talk about in class applies to me,” she expressed to me during in an informal conversation. Looking back, both the primary instructor and myself had no formal training in mathematical literacy or understood the kind of meaning-making strategies necessary to support teacher candidates studying to be effective mathematics teachers. As a result, we stuck to using generalizable literacy strategies and talked about literacy as if disciplines and context were irrelevant. This eye-opening experience proved to be one of the main drives for my dissertation and I became compelled to redesign a content literacy course where every learner felt that their unique academic and personal needs were being met. Moreover, this experience called attention to the unrealistic expectations placed on literacy educators to possess the kind of disciplinary expertise that is required to adequately prepare preservice teachers for disciplinary literacy instruction in every content area. At this moment I realized literacy educators must seek support from disciplinary professionals (e.g., university faculty) outside the course to bridge these knowledge gaps.

More broadly, I designed this study because teacher education is important. Teacher education programs have been criticized for decades for their inability and ineffectiveness to

prepare teachers for their work (Darling-Hammond, 2006b). This has resulted in a growing number of alternative pathways into teaching that circumvent university-based teacher education programs. I argue that teacher education programs within research-based universities can be effective routes to certification if they are integrated, collaborative, and all faculty share a common vision of teaching preparation. I attempted to address each of these elements in my course redesign. Furthermore, these institutions can be effective if university faculty, and students, begin to value teacher education and not privilege specific disciplines in the arts and sciences over education. This begins with changing the culture within departments and colleges and making an argument that a strong teacher education program benefits the entire university. I designed this study because I felt a need to reinforce the importance of teacher education and to act as an advocate for the teaching profession.

Implications of the Findings through the Lens of Multiple Stakeholders

In this section I discuss the implications of my findings from the perspective of preservice teachers, university faculty, and literacy educators. While each group played a critical role in my study, the implications of the findings vary for each stakeholder.

Preservice teachers

Fourteen preservice teachers of different disciplines (e.g., history, mathematics, science), educational pursuits (middle school, high school), races/ethnicities (e.g., white, Iranian, Hispanic, African American), and interests (e.g., U.S. army, finance, chemistry) participated in my study. Yet, the one constant was their interest in teaching and improving the lives of students. Evidence of this observation can be found in the pre-survey responses when preservice teachers first became aware of their participation in the mentorship model. Alexandra wrote,

I am actually really excited to have a professor apprenticeship. I think it is a smart idea to have us pair up with a professor and have more one on one time with a professional in our content area. I think it will definitely benefit all of us as future teachers and give us inside knowledge on how professionals in our discipline think while solving a problem, that way we can carry on these “thinking tips” to our prospective students.

Porter expressed similar enthusiasm: “I look forward to learning from and getting to know a history professor and using their knowledge of the topic to better my understanding of how I can use what I've learned to help my future students.” While none of the preservice teachers entered my course knowing in advance they would be paired with a disciplinary mentor, they each embraced the opportunity to work alongside a “professional” to improve their teaching practices. With the state of education constantly changing and teachers being asked to implement new reforms, it is critical that aspiring teachers remain open-minded to new ideas and experiences; these are essential traits for new teachers (i.e., flexible, unbiased) once they enter the classroom (Bransford, et al., 2005).

Throughout the semester, and across multiple data sources, preservice teachers referenced their evolving understanding of literacy, from a generalizable approach to reading and writing where skills are uniform across disciplines, to a disciplinary approach where each subject-area possesses its own unique literacies (Lee & Spratley, 2010). This finding indicates that university faculty frequently discussed the specialized ways to think about, and make meaning in, each particular discipline. The analysis also revealed that preservice teachers aligned their definition of “literacy competency” to what it means to be historically literate, mathematically literate, or scientifically literate. For example, among preservice history teachers, historical literacies largely focused on developing a set of inquiry skills, such as analyzing primary documents to help

explain the past. Historical literacies was also defined by one's vast knowledge of the past. Zach reflected on the importance of prior knowledge when reading texts: "...the biggest thing I am taking away from this exercise is the importance of having background information when approaching a text." In mathematics, engaging in metacognitive conversations was seen as an integral component of mathematical literacy. Mathematical literacy was also defined by the ability to read graphical elements. Scientific literacy, on the other hand, largely focused on the ways of knowing and "doing" science (Lemke, 1990). Most of the preservice science teachers emphasized the specialized knowledge that was required to be a part of the scientific community; membership in this community was characterized by understanding the "secret language" of science that Luis wrote about in his first reflection paper. Preservice science teachers also saw literacy as a set of inquiry skills to examine scientific texts.

There are several reasons why preservice teachers shifting their understanding of literacy to a disciplinary approach matters. Foremost, it demonstrates that a mentorship model of teacher preparation can change the way preservice teachers think about meaning-making practices in their discipline. More specifically, it creates a space for preservice teachers to see literacies as a unique set of practices that allow students to think more deeply, read more intently, solve problems, and communicate using the language in their field. Additionally, preservice teachers shifting their understanding of literacies demonstrates that a mentorship model of teacher education is aligned with the Common Core State Standards. I outlined a comprehensive definition of disciplinary literacies in Tables 13, 14, and 15 (Chapter 4) that position each definition with a specific standard. For example, preservice science teachers discussed the significance of observing their mentor read and analyze graphical elements in a text. The authors of the Common Core State Standards expect students to "translate quantitative or technical

information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words” (CCSS.ELA.LITERACY.RST.9-10.7).

Research suggests that preservice teachers are often resistant to teaching literacies in the content areas (Hall, 2005; Moje, 2008; O’Brien & Stewart, 1990). The implications of my findings suggest that with an effective support system (e.g. university faculty) and course design, preservice teachers can see the value of disciplinary literacy instruction that aligns with state and national standards.

University Faculty

My original intention in the design of this study was to only focus on the experiences of preservice teachers who enrolled in my content literacy course. I saw the role of university faculty, conversely, to merely act as mentors and collaborators. However, through multiple discussions with various members of my dissertation committee, it became clear that the experiences of university faculty as a result of participating in the mentorship was as consequential a finding as the experience of preservice teachers. Accordingly, the beliefs and practices of university faculty moved from the periphery to a primary focus of analysis.

Most of the university faculty who participated in my study initially had an interest in literacy and literacy instruction – it is reasonable to assume that this intrigue was a key reason they were willing to participate as mentors in the first place. However, literacy was still perceived as a technical skill to many participants rather than a method to make meaning in a discipline. This finding is not too surprising; literacy is still commonly defined by the ability to read and write, and the concept of disciplinary literacies is not used in everyday discourse. When

asked about teaching literacy before the semester began, one mathematician (Professor Jones) stated, “It is not a term that I typically use in mathematics.”

Participating as a mentor in this study allowed some university faculty to rethink their understanding of literacy. Professor Hindmand provided insight into this finding: “I think the conversation you and I had about literacy when we first started talking was eye-opening because, of course, this is the thing that I was saying, like I do these things, I don’t think about them as being about literacy.” Similar to Professor Vargas, Professor Hindmand never connected her teaching practices to disciplinary literacy; however, she subsequently made this connection which proved to be an “eye-opening” experience.

The experience that triggered the most discussion and self-reflection across the disciplines was the think-aloud activity in the second mentorship meeting. I think this task sparked the most conversation because, outside of their classroom, university faculty had never been instructed to read a text and think out loud in front of an observer; it was also a bit unnatural. Many university faculty enjoyed this task, possibly because they had previous experience teacher modeling or because of the challenge. In a post-interview discussion, one historian (Professor Baker) reflected on why she enjoyed the experience: “I loved the think aloud. I loved that. Because it really put me on the spot in a good way; that I had to do this thing in front of someone else who was recording me and I just enjoyed it. I really did. I pulled a lot of that process by doing it.” While being “put on the spot” was intimidating for some teachers, Peter’s valued this part of the task. As expected, some university faculty found the think-aloud activity either odd or difficult. These participants reflected on their inability to articulate such implicit thoughts, especially to a novice learner with no prior knowledge of the topic. Before the

study began, I had assumed that many university faculty, despite their vast knowledge, would struggle with this kind of activity because their knowledge was so inherent.

At the onset of my study I was skeptical that university faculty would sacrifice their time and energy to support my project. This is because education is not a high priority at large research-intensive universities (Goodlad, 1994) and literacy instruction did not appear to be a salient topic in the arts and sciences. However, university faculty embraced the opportunity to mentor preservice teachers into disciplinary ways of thinking and practice. In fact, while thirteen university faculty participated as mentors based on course enrollment numbers, I had originally recruited a total of twenty-three faculty members across the university. This implies that education, and specifically literacy, is an important issue to members outside of the College of Education. My findings add to the ongoing research of university faculty participation in teacher development (Darling-Hammond, et al., 2005; Goodlad, 1994) and suggest that designing intentional collaborations between university faculty in education and in the disciplines is achievable and will produce engaged participation that benefits preservice teachers.

Literacy Educators

I took on the role of a researcher, participant-observer, and literacy educator in my study. As the literacy educator, I held several responsibilities: design a curriculum, plan lessons, instruct, grade papers, and most relevant to this study, act as a mediator between preservice teachers and university faculty. Looking back at my experience, my main responsibility was to establish and maintain relationships between both parties. My relationship with preservice teachers was built on a foundation of trust that I was pairing them with a competent, friendly, and supportive disciplinary professional; that the mentorship meetings were useful and not a waste of time; and that if they signed an IRB form I would still approach my role as an instructor

with as much thoughtful planning and work as if they were not also participating in my study as research participants. Although I paired preservice teachers with university faculty who shared common interests, this experience sparked the most controversy. The first memo I wrote during the study addressed this specific issue:

Reflection 1 - Matching students with professors: Partnering students with professors for their apprenticeship was more "personal" than I anticipated. Students were very passionate about which professor they were assigned to. Verbally, many students voiced their opinion during class about which particular professor they would like to work with. In addition, students approached me after class to discuss. It was not that students were against or disliked certain professors; rather, it seemed like they had a prior "rapport" with specific professors. OR, they truly enjoyed taking classes with certain professors in the past. One may assume that students would want to apprentice with the "brightest" or most "accomplished" professor (e.g. I mentioned at one point that a chemistry professor I solicited went to MIT and how smart she was). But having a sense of trust, comradery, and rapport appeared to be more important. (8.25.2015)

The implication of this findings suggests that literacy educators who wish to implement a similar course design should consider not only the academic component, but the emotional side of pairing two strangers together and hoping for a successful experience. One way to address this issue is allow preservice teacher to choose a disciplinary professional to mentor with during the semester.

My relationship with university faculty was a little more complex because after my initial recruitment I did not have substantial contact with them until the study ended. Aside from a few banal email exchanges, preservice teachers were responsible for scheduling their own meetings

and relaying instructions about assignments. It was not until after the study ended that I realized maintaining ongoing conversations with university faculty throughout the mentorship would have been meaningful in my findings. During the post-interview discussions, several university faculty expressed observing disciplinary “bottlenecks” (Middendorf & Pace, 2004) during the meetings. Bottlenecks represent common areas in a subject area where students consistently get stuck, feel confused, or misunderstand concepts. I urge literacy educators to not only act as meditators, but engage in collaborative discussions with university faculty to share ideas and discuss prevalent issues. This would create a more authentic, collaborative learning community among all stakeholders.

The role of a literacy educator in this kind of study extends beyond designing mentorship meetings. Rather, they are addressing the broader issue of access to knowledge and diversity within teacher education programs. Creating a collaborative learning space supports educational equity among beginning teachers. Teacher education programs are quite diverse, suggesting that the quality of preparation varies from institution to institution. Darling-Hammond et al., (2005) explain, “Although knowledge about teaching and learning has grown, the odds that teachers will have access to this knowledge are far less than certain. This is because of wide variations in the nature and quality of teacher education programs” (p. 444). Designing a program that allows aspiring teachers to collaborate with disciplinary professionals (i.e., university faculty) across disciplines may relieve some of the unequal access to knowledge. This provides a more justifiable reason to redesign the way preservice teachers are prepared for instruction.

I conclude here with several suggestions for literacy educators who wish to implement a similar course design. Foremost, literacy educators should reach out to university faculty outside of the College of Education to show interest and commitment to student learning. Literacy

educators should begin to have conversations about what knowledge, skills, and practices are being taught in content area courses and how these skills and practices overlap with their own instruction. I encourage literacy educators to spark conversations about the importance of teaching literacies in all subject areas. Next, literacy educators should try to align or bridge their course curricula with the curricula of methods courses to create a cohesive experience for students. This entails connecting course goals, objectives, and learning experiences so students can practice specific skills repeatedly. Bridging course curricula also provides opportunities for students to see different university faculty think about and make sense of similar concepts. Lastly, I encourage literacy educators to plan collaborative activities (i.e., learning experiences) between preservice teachers and university faculty. Find out how much time university faculty are willing to give up each semester to mentor preservice teachers into disciplinary ways of thinking and practice. I also encourage literacy educators to brainstorm with university faculty to develop innovative learning experiences. The goal is to develop a sustainable mentorship program year after year.

Aligning This Study With and Extending Current Research

There is a growing body of literature on designing teacher preparation programs around collaborative spaces and communities because of the understanding that learning is a shared experience (Au, 2002; Cochran-Smith & Lytle, 1999; Grossman & McDaniel, 1990; Murphy, 1990). These kinds of spaces allow preservice teachers to immerse themselves around, and learn from, peers, faculty, and professionals of their disciplinary communities of practice (Lave & Wenger, 1991).

This study is aligned with research studies that recognize and work to rectify the “fragmentation” that occurs in the teacher learning process (Darling-Hammond, 2006b; Goodlad,

Soder, & Sirotnik, 1990; Zeichner & Gore, 1990). Darling-Hammond (2006b) explains how “faculties in the arts and sciences are insulated from education professors” (p.279). In my own experiences meeting with university faculty in the College of Liberal Arts and Sciences I too found that the majority of professors had little to no interaction with the College of Education. The problem with such a disjointed system is a lack of clear vision and core curriculum within a teacher preparation program; preservice teachers may move from class to class and receive multiple, and even conflicting, messages about best practices and the role of literacy in the disciplines.

Foremost, this study aligns with current research that has profound impact on the way preservice teachers are prepared for literacy instruction (Barr, Watts-Taffe, & Yokoto, 2000; Draper & Nokes, 2010; Fang, 2014; ILA, 2015; Moats, 1999). With the growing ELL population in our nation’s schools, increasing learning standards, and the newly adopted Common Core State Standards, teachers are expected to enter the classroom with a deep understanding of language, reading, and cognitive development. In this study I sought to address the way preservice teachers learn the unique literacies of their discipline to meet the needs of diverse student learners. I address this topic in greater detail later in this chapter.

This study extends the research of Draper, Broomhead, Jensen, and Nokes (2012). Currently, researchers are exploring how building collaborative relationships among literacy educators and content area educators can support literacy teacher preparation. In this study, as the literacy educator I also developed a meaningful relationship with university faculty, but took it one step further and included preservice teachers in on these conversations. This is important because it allowed preservice teachers to learn from all stakeholders in the teacher learning process. It also permitted them eavesdrop on the “behind-the-scene” discussions surrounding

disciplinary literacy instruction. University faculty as well were able to reflect on their own attitudes toward disciplinary literacies and literacy instruction.

This study also extends the research of Schoenbach, Greenleaf, and Murphy (2012). Their work on “apprenticing” learners into the ways of thinking, reading, and reasoning in their subject area served as a model for redesigning the literacy course curricula. Incorporating the Reading Apprenticeship (RA) framework in my study was instrumental to reinforce the collaborative discussions and activities between preservice teachers and university faculty. In this framework of learning teachers are encouraged to recognize their own disciplinary expertise to model discipline-specific literacy skills. Literacy educators, however, face a unique challenge of meeting the disciplinary literacy needs of students from multiple fields of study. Using the RA framework in conjunction with mentorships could be an effective solution.

Limitations of the Research

Acknowledging and accepting the limitations of this study is both humbling and empowering because it motivates me to continue this work in the future. Only fourteen students enrolled in my course (CI-414) which was a smaller sample than I had anticipated based on enrollment in previous semesters. Preservice teachers and university faculty met three times over the duration of one semester. This makes it difficult to generalize and predict how preservice teachers and university faculty in a different setting or over a more extended period of time would experience a similar course design. Additionally, taking on the role of both course instructor and researcher I may have missed key interactions and discussions about the mentorship because I was focused on lesson planning and teaching. My focus on teaching also restricted how much time I could devote to interviewing and other data collection methods; there

were several times in class that I did not ask preservice teachers to go into further depth about their mentorship experiences because of time constraints. Also, because I was not present at each mentorship meeting, I trusted preservice teachers to accurately depict what they experienced with their mentor in blog posts and reflection papers. Preservice teachers may have misunderstood or misinterpreted their mentors' responses (e.g. what reading skills they observed during the think-aloud), which I then used for analysis. Finally, it was not until my post-interview meetings with university faculty that I realized I should have been more explicit about their role in my study. Aside from being a mentor, a few university faculty members were uncertain about what they should have been learning or thinking about during the study.

Future Research Opportunities

Increasing the number of meetings between preservice teachers and university faculty, and extending the length of the overall mentorship, could provide a more sustainable and impactful experience for both parties. Time constraints and sensitivity to university faculty needs limited the number of meetings I could design and ultimately implement during the semester. With support from department chairs and administration across the university, I believe it is possible to integrate an ongoing mentorship within a teacher preparation program. In addition to a traditional adviser/mentor in education, I propose a type of teacher preparation where a university faculty member in the arts and sciences is paired with a new student to “apprentice” them into the ways of thinking, reading, writing, and communicating in their field. As co-advisers, both faculty members collaborate to address the individual needs of each student.

This study also exposed the myriad of “mentorship” activities that could be developed between preservice teachers and university faculty. In this study, three activities were created:

(1) Disciplinary Expert Interview, (2) Think-Aloud/Modeling Using a Discipline-Specific Text, and (3) Literacy-Focused Lesson Plan Support. One university faculty member (Professor Morgan) suggested to include activities that focused on writing skills as well. However, the most insightful feedback came from one university faculty member (Professor Rabinowitz) who felt that merely discussing discipline-specific literacy skills was not enough to make a lasting impact: “I didn’t mind spending time with [Porter]. He was a pleasant person and I enjoyed talking to him. But I can’t imagine he got a lot out of it though. It is so abstract this way. You got to do it. And you have to do it on something that you care about and know about.” Rabinowitz’s point was that developing competency in a discipline requires a true apprenticeship where novice learners get opportunities to “do” the discipline alongside an expert. This might entail preservice teachers and university faculty performing a specific task together: reading and analyzing a text, designing a lesson plan, writing an evidence-based argument, or solving a challenging problem.

Another area of future research surrounds the relationship between university faculty and departments in the teacher learning process. At large universities there is an essential need to build connections and sustained relationships across and between colleges to ensure a clear and shared vision among all education stakeholders. I propose more opportunities for interdisciplinary discussion to meet the diverse needs of all students.

Concluding Remarks

I see my project as a gateway into future projects that are rooted in similar ideas and experiences. I would like to examine further the concept of “expertise” in disciplinary learning. More specifically, what constitutes a “disciplinary expert” across the disciplines and how would using different kinds of experts (e.g. university faculty, specialists outside of academia) impact preservice teachers’ disciplinary literacy development? Additionally, I would like to continue

designing new, authentic experiences between preservice teachers and university faculty to support disciplinary literacy development in addition to those I have already designed.

Appendix A
Course Syllabus

UNIVERSITY of ILLINOIS at CHICAGO
COLLEGE of EDUCATION

CI-414, fall 2014
Middle and High School Literacy
4 credit hours
Department of Curriculum and Instruction

Instructor: Nathan Phillips, Ph.D.
Office: 1230 ETMSW
Office Hours: Mondays 4-4:40pm
and by appointment **Email:**
phillpn@uic.edu **Cell:**
615.663.2426

Instructor: Steven Kushner
Office Hours: By appointment
Email: skushner@uic.edu
Cell: 847.989.2003

Course meeting time: Mondays 5-8:00pm in BSB 331

Prerequisites (CI 414): Junior standing or above and consent of the instructor. Departmental approval required.

Required textbook and readings:

Buehl, D. (2011). *Developing readers in the academic disciplines*. Newark, DE:
International Reading Association.

Buehl, D. (2013). *Classroom strategies for interactive learning (4th ed.)*. Newark, DE:
International Reading Association.

Other weekly readings will be posted to Blackboard and listed on the weekly schedule below.

Methods of instruction: We will engage in different forms of inquiry to address our questions about teaching and learning. These methods of inquiry and self-development include face-to-face and online discussions (including via our class blog at CI414Fall2014Literacy.blogspot.com), participation in new forms of media, and apprenticing with university professors to understand how experts read and makes sense of discipline-specific texts. Furthermore, our hope is to develop a collegial atmosphere in which we can draw on traditions in pedagogy and theory, while also helping to establish a vision of being teacher-leaders in our schools and across the globe.

Course background and purpose:

The UIC undergraduate course catalog describes CI 414 this way: “Focuses on the teaching of reading and writing strategies appropriate for disciplinary learning and expression. Field work required. *Prerequisite(s)*: Junior standing or above; and consent of the instructor.”

That’s all true, but here’s another try at describing the course:

The goal of this course is to support your efforts and ours to integrate the teaching and learning of literacy practices in subject-area instruction. In doing so we will learn about the complex, rich, literate lives of young people—the ways that they are connected and often navigate expertly across multiple media as they read, write, and produce texts of all kinds. We will also investigate the ways that our students struggle to make connections in and out of school, to read and write and produce texts that will matter for them now and in the future. And we will work to learn ways to support our students in becoming readers, writers, and producers across the disciplinary domains that we teach. In this way, teaching disciplinary literacies is teaching for social justice, connecting students’ lives, communities, and cultures to ways of knowing and being across their lives in a way that empowers their participation in society.

This will involve thinking about the ways meaning is made in our disciplinary fields (e.g., How do I read and write equations, maps, historical analyses, news programs, lab reports, or memos? What are the essential questions I’m trying to investigate and answer in science, history, social studies, or English?) and also thinking about how meaning is made and learning takes place in our subject-area classrooms (e.g., How do I read this textbook, write this research paper, analyze this French poem, create this map, write this proof, or read this handout?). And because literacy and learning within your classrooms will involve learners who are from diverse backgrounds with diverse funds of knowledge, varying histories of academic success, and diverse motivations, we will work to adapt what we learn and what we do together to support all the learners we will be privileged to interact with in our classrooms.

This course is framed around the Reading Apprenticeship (RA) framework. Emerging from the belief that expert readers’ implicit thoughts while interpreting and acting on discipline-specific texts should be made visible to students, RA focuses on apprenticing students to become more confident and proficient readers and thinkers in their subject area. The Reading Apprenticeship framework is embedded within our course curricula through metacognitive conversations—that is, conversations about the thinking processes both students and teachers engage in as they read. In this class, both the instructors and students will engage in various metacognitive activities (e.g. think-aloud interviews) to better understand how language mediates learning in your particular disciplines.

In our efforts together to integrate learning and teaching literacy practices in subject areas, you may feel like you’re bridging domains. Bridges are subject to tension (pulling forces) and compression (pushing forces). We might think about teaching disciplinary literacies in the same way: time; standardized testing; national, state, and local standards; and teacher, parent, and administrative commitments to print literacies and certain methods of instruction act as compression forces on the curriculum, contracting our efforts to integrate literacies in our classes. While, on the other hand, new technologies, ever-present media streams, students’ varied literacy practices, and multiplying text forms act as tensions, stretching and expanding the possibilities for disciplinary literacies. As we investigate methods for teaching literature and media, we will, inevitably, feel the discomfort that comes from being pushed and pulled.

Course goals and objectives:

In this course, you will:

1. Understand reading, writing, listening, speaking, and digital production practices (i.e., literacies), particularly as they relate to adolescents.
2. Explore middle and high school contexts of literacy across students' lives—both within and outside of school.
3. Learn and adapt reading and writing strategies for diverse learners and apply them across disciplinary contexts and subject areas.
4. Explore the literacy demands of various disciplinary texts.
5. Understand the role of technology in literacy.
6. Explore motivational contexts for literacy.
7. Understand the role of assessment and apply appropriate formative assessment practices to teaching and learning literacies within the disciplines.
8. Prepare, deliver, and critically analyze lesson plans and instruction that integrate literacy strategies across disciplinary contexts.
9. Engage in reading apprenticeship practices that explore disciplinary literacies from the perspective of disciplinary experts.

Grading: Course grades will be determined according to the following distribution among assignments.

Assignments	Possible Points	Points Earned
Participation (includes blog posts/responses)	20	___/20
Literacy Autobiography	10	___/10
Text Set and Analysis	10	___/10
Animoto Digital Presentation (in-class assignment)	10	___/10
Mini-teaching Lesson (includes analysis)	20	___/20
Apprenticeship Meeting Reflection Essays (total of 3)	30	___/30
	100	___/100

Grading Scale: **A** 100-90; **B** 89-80; **C** 79-70; **D** 69-60; **Fail** <59

Attendance: This is a participation-intensive course, and our class time together is valuable. In case of any upcoming absence, please contact us **in advance**. You may miss one class without penalty. You are responsible for all content from class. Missing a second or third class will lower your participation score. If you are absent more than three times, you must withdraw from the course.

Late Assignments Policy: Grades will be lowered for assignments that are turned in late. This can affect your overall grade. Please arrange any type of extension in advance.

Schedule of Readings and Assignments

Note: The schedule is subject to revision. Non-textbook readings are available on Blackboard.

<i>Date</i>	<i>Key Topics/Ideas/Questions</i>	<i>Readings/Assignments Due</i>
Monday August 25	Course Introduction <ul style="list-style-type: none"> ○ Syllabus overview ○ Signs-ups for blog post schedule & mini-lesson ○ Examining adolescent literacy, multiliteracies, and texts <p><i>Key Questions:</i></p> <ul style="list-style-type: none"> ❖ What is literacy? ❖ What is a text? 	<p>DUE:</p> <p>Course survey (email and print a hard copy)</p> <p>Buy assigned textbooks</p> <p>Bring syllabus and textbooks</p>
Monday September 1	NO CLASS (Labor Day)	
Monday September 8	Metacognitive Conversations <ul style="list-style-type: none"> ○ G.R.R. (I Do---We do---You Do) ○ Modeling effective reading strategies ○ Metacognitive Bookmark ○ “Think-aloud”/“Talking -to-the-text” <p><i>Key Questions:</i></p> <ul style="list-style-type: none"> ❖ What is Reading Apprenticeship? ❖ What is metacognition? ❖ How can teacher modeling support student learning of content material? 	<p>Readings:</p> <ol style="list-style-type: none"> 1. What is Metacognition? (Vargas, 2006) 2. Apprenticing Adolescents to Reading in Subject-Area Classrooms (Schoenbach, Braunger, Greenleaf, & Litman, 2003) 3. Buehl DR (Chapter 5) <i>History</i> (p.188-192) <i>Science</i> (p.198-203) <i>Mathematics</i> (p.203-208)
Monday September 15	Disciplinary Literacy <ul style="list-style-type: none"> ○ From genGiovanni to discipline-specific literacy ○ Disciplinary expertise ○ Comprehension of discipline-specific texts <p><i>Key Questions:</i></p> <ul style="list-style-type: none"> ❖ How does disciplinary literacy differ from content area literacy? ❖ What literacies support meaning-making in my discipline? 	<p>Readings:</p> <ol style="list-style-type: none"> 1. Buehl DR (Chapter 1, pp.10-30) 2. Foregrounding the Disciplines in Secondary Literacy Teaching and Learning (Moje, 2008) <p>DUE:</p> <p>Complete apprenticeship meeting #1</p> <p>Blog post/response</p> <p>Strategy presentation</p>

Monday September 22	Literacy, Culture, and Identity <ul style="list-style-type: none"> ○ Adolescent learners ○ Funds of knowledge ○ Differentiated instruction/scaffolding ○ Motivation and self-efficacy <p><i>Key Questions:</i></p> <ul style="list-style-type: none"> ❖ Who are adolescents and how can I support adolescent literacies and learning? 	<p>Readings:</p> <ol style="list-style-type: none"> 1. Buehl DR (Chapter 1, p.1-8) 2. Effective Literacy Instruction for Adolescents (Alvermann, 2002) <p>DUE:</p> <p>Apprenticeship meeting #1 Reflection Essay</p> <p>Blog post/response</p> <p>Strategy presentation</p>
Monday September 29	Reading Comprehension <ul style="list-style-type: none"> ○ Who are “struggling” readers? ○ “Reading AND...” ○ Modeling effective reading strategies ○ Text-to-self, text-to-text, text-to-world ○ Vocabulary instruction <p><i>Key Questions:</i></p> <ul style="list-style-type: none"> ❖ What strategies support reading comprehension? ❖ How can I support readers of all ability levels and backgrounds in ways that are supportive, responsive, and inclusive? 	<p>Readings:</p> <ol style="list-style-type: none"> 1. Buehl DR (Chapter 2). In addition to reading the entire chapter, pay close attention to the pages aligned with your discipline: <i>Science</i> (p.54-57) <i>History</i> (p.57-61) <i>Mathematics</i> (p.61-66) 2. Reading in the Disciplines (Lee & Spratley, 2010) <p>DUE:</p> <p>Blog post/response</p> <p>Strategy presentation</p>
Monday October 6	Writing to Learn <ul style="list-style-type: none"> ○ Modeling effective writing skills ○ Writing strategies ○ They Say, I Say ○ Writing prompts (25-word abstract/RAFT/exit slips/Possible sentences) <p><i>Key Questions:</i></p> <ul style="list-style-type: none"> ❖ How can I support young people in writing in my discipline? 	<p>Readings:</p> <ol style="list-style-type: none"> 1. Write Like This: Teaching Real World Writing through Modeling and Mentor Texts (Gallagher, 2011) <p>DUE:</p> <p>Blog post/response</p> <p>Strategy presentation</p>
Monday October 13	Knowledge – Literacy Relationship <ul style="list-style-type: none"> ○ Building knowledge schema ○ Activating prior knowledge ○ Vocabulary knowledge <p><i>Key Questions:</i></p> <ul style="list-style-type: none"> ❖ How do experts organize their knowledge compared to novice learners? ❖ How do academic knowledge gaps affect the reading of disciplinary texts? 	<p>Readings:</p> <ol style="list-style-type: none"> 1. Buehl DR (Chapter 3). In addition to reading the entire chapter, pay close attention to the pages aligned with your discipline: <i>History</i> (p.92-97) <i>Science</i> (p.97-101) <i>Mathematics</i> (p.101-105) 2. Buehl (Chapter 4)

Monday October 20	Digital Literacies <ul style="list-style-type: none"> ○ Designing digital texts ○ Reading digital texts <p>(UIC COMPUTER LAB TBA)</p> <p><i>Key Questions:</i></p> <ul style="list-style-type: none"> ❖ How can digital texts and technologies support young people in engaging in disciplinary literacies in my classroom? 	<p>Readings:</p> <ol style="list-style-type: none"> 1. Digital Literacies: Concepts, Policies, & Practices (pp.1-16, Lankshear & Knobel, 2008) <p>DUE:</p> <p>Complete apprenticeship meeting #2 ANIMOTO PRESENTATION Blog post/response Strategy presentation</p>
Monday October 27	Literacy Assessments <ul style="list-style-type: none"> ○ Purpose of rubrics ○ Offering substantive feedback ○ Self and peer assessment ○ Create a rubric for mini-teaching lessons <p><i>Key Questions:</i></p> <ul style="list-style-type: none"> ❖ How can I make use of a variety of assessment methods to gather evidence of student learning? 	<p>Readings:</p> <ol style="list-style-type: none"> 1. Formal vs. Informal Literacy Assessments (URL) <p>DUE:</p> <p>Apprenticeship meeting #2 Reflection Essay Blog post/response Strategy presentation</p>
Monday November 3	Oral Language <ul style="list-style-type: none"> ○ Linguistic diversity ○ “Code-switching” ○ Empowering student voices ○ Fostering academic language ○ Discussion-based activities <p><i>Key Questions:</i></p> <ul style="list-style-type: none"> ❖ How can oral language both hinder and support learning in my classroom? 	<p>Readings:</p> <ol style="list-style-type: none"> 1. Literacies and ethnolinguistic diversity: Chicago (Farr, 2008) 2. Anchor Standards for Speaking and Listening (Common Core) <p>DUE:</p> <p>Blog post/response Strategy presentation</p>
Monday November 10	Literacy Standards <ul style="list-style-type: none"> ○ Purpose/rationale of the Common Core State Standards (CCSS) ○ Discipline-specific reading, writing, speaking, and listening standards ○ Aligning student learning activities to CCSS <p><i>Key Questions:</i></p> <ul style="list-style-type: none"> ❖ How does CCSS relate to literacy and learning in my classroom? ❖ How can I align my course assignments and daily activities with CCSS to support students’ engagements with complex texts? 	<p>Readings:</p> <ol style="list-style-type: none"> 1. Anchor Standards for Reading and Writing (Common Core) <p>DUE:</p> <p>Blog post/response Strategy presentation</p>

Monday November 17	Critical Literacy <ul style="list-style-type: none"> ○ Challenging authors and texts ○ Fostering social justice CCSS <p style="text-align: center;">MINI-TEACHING LESSONS (4)</p> <p><i>Key Questions:</i></p> <ul style="list-style-type: none"> ❖ How can teachers emphasize social justice and power relations in society through analyzing texts? 	Readings: <ol style="list-style-type: none"> 1. Critical Media Literacy: Research, Theory, and Practice in “New Times” (ALvermann & Hagood, 2000) <p>DUE: Apprenticeship meeting #3 Reflection Essay Blog post/response</p>
Monday November 24	Honoring Urban Youth <ul style="list-style-type: none"> ○ Valuing diversity ○ In-school and out-of-school challenges confronting adolescents of color <p style="text-align: center;">MINI-TEACHING LESSONS (4)</p> <p><i>Key Questions:</i></p> <ul style="list-style-type: none"> ❖ How can I support readers of all ability levels and backgrounds in my classroom in ways that are supportive, responsive, and inclusive? 	<p>DUE: Blog post/response</p>
Monday December 1	Moving forward <ul style="list-style-type: none"> ○ Final remarks: ○ How will I implement what I have learned into my classrooms in supporting students’ literacy practices across their lives? ○ What have I learned from my apprenticeship experiences? ○ Course reflections <p style="text-align: center;">MINI-TEACHING LESSONS (4)</p>	

Description of Assignments

*** Literacy Autobiography**

What significant factors and/or events have contributed to your development as a reader and writer? The purpose of this assignment is to reflect on your life experiences that have shaped how you think about literacy, and of course, teaching literacy. For example, you may write about what books you enjoyed as a child, classes you took in high school or college that

influenced your current thoughts about reading and writing, books your parents kept at home, personal writings when you were younger, such as journals or diaries, teachers that impacted your view of literacy, the role language played in your family or in social groups, etc. Arrange these important experiences into a personal narrative that captures your views of literacy today. As you write, be reflective about certain events, underscoring specific events that shaped your current relationship with language and literacy. Your final narrative should be 4-5 pages, typed and double-spaced. Due **Monday September 8**.

***Text Set and Analysis**

You will assemble a set of 5-10 texts that are typically taught in your subject area or that you plan to teach. All of the texts should revolve around a single topic, concept or instructional unit. It could be something quite narrow (e.g., properties of triangles, Lincoln's Second Inaugural, Peruvian food) or it could be something quite broad (e.g., the "AmGiovannian Dream," history of mathematical thinking, themes in literature). This text set will include multiple texts representing a range and variety of text types, including print, audio, graphic, and video. In addition to summarizing your texts, you will analyze them for their complexity for readers in your class. **Specific guidelines for creating this text set and analysis will be forthcoming in class.** Due **Monday October 6**.

***Animoto Presentation**

Animoto is an online video creation service that produces video slideshows from photos, music and text. While this service is often used to create personal slideshows, it can also be used as an educational tool. Using photos and text, a student can create a slideshow of historical events, scientific discoveries, mathematical problems, and fiction/nonfiction synopses. Your task is to choose a topic, concept, or instructional unit within your discipline and create a 2-5 minute multimodal slideshow using photos, text, and music. You must use a minimum of 10 photos/images and written text. Your slideshow should act as a model to show your own students the effectiveness of creating digital texts. Due (in-class) **Monday October 13**.

***Text Strategy Mini-Lesson**

a. Mini-lessons

Plan and conduct a "mini-lesson" for our class. Your lesson should include **at least two texts, at least one literacy strategy** (these can come from the *Classroom strategies for interactive learning* book or from strategies discussed and presented in class), and draw on what we are learning in class—specifically, the lesson should engage with aspects of disciplinary literacy. Write a complete plan for your lesson, carefully following lesson planning guidelines provided in class. **Instructions on lesson planning will be forthcoming.** Plan on the lesson lasting 20-25 minutes. We will have time in class for approximately 5-10 minutes of questions and response after each lesson.

b. Lesson Analysis

Write a reflection/response to your mini-lesson. Because mini lesson analysis will happen at different times in the summer for different students, the deadline for this analysis will be different for every pair of mini lesson presenters.

Write an analysis (approx. 3-4 pages, double spaced) of your planning, preparation, teaching, and class feedback.

Append to the analysis a copy of your lesson plan.

c. Feedback from Same-Day Partner Teachers

The day that you present your lesson in class, the other student(s) teaching that week will provide an informal assessment of the lesson to support the writing of your lesson analysis.

Each lesson analysis is due **one week** following the day you present the lesson in class. This means that this due date is “rolling” for class members—every presenter has different due dates. No late papers.

***Apprenticeship Meetings with your Assigned UIC Disciplinary Professor**

As part of the course curricula, you will be assigned to observe, model, and interact with a UIC professor in your discipline. For example, if you are a history major you will be partnered with a historian, if you are a mathematics major you will be partnered with a mathematician, and if you are a chemistry major you will be partnered with a chemist, etc. The purpose of this apprenticeship is to understand the literacy practices and meaning making processes of experts as they interpret documents, solve problems, and discuss what it means to develop competency in a subject area. As a prospective teacher, you will further develop advanced literacy skills to support your own students in reading and making sense of discipline-specific texts. We hope this apprenticeship will be one step towards your personal development of advanced discipline-specific literacy practices and towards your transition into becoming a successful teacher.

You are scheduled to meet with your professor 3 times during the duration of the fall semester. The meetings will occur outside of class at a time and location that is convenient for both parties. The course calendar above includes deadlines by which you will need to have held each meeting (September 15, October 13, and November 10). Each meeting is scheduled to last approximately 1 hour. The meetings are purposefully designed and structured to support your literacy development. The first meeting will comprise of a semi-structured interview to better understand how disciplinary experts identify with their subject areas, think about and make meaning with texts, develop disciplinary knowledge, and collaborate with other members of their disciplinary community. The second meeting will constitute a “think-aloud” activity using multiple (multimodal) texts to expose professors’ implicit thinking and reading processes. In the third and final meeting professors will be asked to offer feedback and provide guidance on a literacy-related lesson plan you design. **Specific guidelines for each meeting will be forthcoming in class.**

Appendix B

Metacognitive Bookmark

METACOGNITIVE BOOKMARK

Predicting

I predict...

In the next part I think...

I think this is...

Visualizing

I picture...

I see...

Questioning

A question I have is

I wonder about...

Could this mean...

Making connections

This is like...

This reminds me of...

Identifying a problem

I got confused when...

I'm not sure about...

I didn't expect...

Using fix-ups

I'll reread this part...

I'll read on and check back...

Summarizing

The big idea is...

I think this point is...

So what it's saying is...

Appendix C

Interview with a Disciplinary Expert Assignment

Student Directions: The purpose of this interview is to help you better understand what it means to read, write, and think like a disciplinary expert. Through this interview, we hope you gain insight into how experts make meaning from and with texts and identify within their disciplines or fields. Below is an interview protocol—a sample summary statement to share at the beginning of the interview and a list of questions to ask your interviewee. Be sure to ask the **bolded questions** under each category, but feel free to (1) pick and choose from other questions and (2) ask follow---up questions if they seem appropriate. Keep track of your pacing through the interview so that you don't extend the interview longer than your interviewee agreed it would go (30---45 minutes). Be sure to take good notes or record the interview (with your interviewee's permission) so that you can describe what you learned in your brief summary and analysis (DUE March 6).

Interview Protocol

Sample Introductory Statement (to share or summarize with interviewee):

The purpose of this interview is to find out more about literacy within your discipline or field. Specifically, I will ask you about how you read, write, and think as a disciplinary expert. I will start with a few questions to help me understand your job and how you position yourself within your discipline or field. And then I will ask about the personal, cognitive, social, and knowledge dimensions of literacy within your discipline. We will take about 30---45 minutes.

Starters: *To begin, these are questions to clarify your work and disciplinary identity.*

- What is your job title?
- What are your main responsibilities in this job?
- What do you consider your discipline or field of work (e.g., science, engineering, accounting, mathematics, history, genetics, linguistics, etc.)?
- Can you name 3---4 other jobs that are also within your discipline but that are different from your job?

Personal Dimension: *These questions are intended to focus on the personal or identity aspects of your work in your discipline.*

- What are the possible pathways to disciplinary expertise in your discipline? In other words, in general, how does someone come to be

an expert in your discipline?

- How did you come to be an expert in your discipline?
- **What texts and/or literacy practices (e.g. reading, writing, producing and interpreting texts, etc.) are recognized within the discipline and are part of the process of becoming a disciplinary expert?**
- What criteria/values/attributes define an expert in your field? In other words, how do you know, identify, or recognize a disciplinary expert?
- Are you consciously aware of your strengths and weaknesses while reading/writing disciplinary texts/documents?

Cognitive Dimension: *These questions are intended to focus on the ways in which an expert in your discipline thinks and makes meaning from texts.*

- **Can you walk me through a disciplinary problem/issue/area of work that you are currently investigating/working on?**
 - Guiding Questions/Follow Ups:
 - What do you do day---to---day to work through/investigate/solve this problem?
 - What kinds of literacy practices are involved in working on this problem? (For example, what do you read and write while working on your current project? What kinds of texts do you produce and interpret?)
- **Can you describe for me a text that you read with some regularity or would read as an important part of your work? (A text can be visual, audio, paper, a chart, a graph, a journal article, output from a technical device, a primary source, a novel, a film, etc.)**
- **What is your process for reading this text?**
 - Guiding Questions/Follow Ups:
 - Where are you as you read this text?
 - What are you doing?
 - What are you looking for?
 - What are you hoping to get out of the text?
 - What is your purpose for reading?
 - What is your process for retaining information (e.g., taking notes, highlighting, recording what you see, etc.)?
- In this class, we're working on identifying strategies that disciplinary experts like yourself use while reading. We think of strategies as ways of approaching texts and making meaning from texts. With that in mind, if you were to teach a newcomer to your field (e.g., a graduate student, new lab technician, etc.) about reading the kind

of text that you just described, what would you teach him or her?

- Guiding Questions/Follow Ups:
 - What would you tell a newcomer about how to approach a text?
 - What to pay attention to?
 - How to make meaning from a text?
- *Note to interviewers for a possible follow up: Can you identify the strategies the disciplinary expert discussed? If you described one or more strategies that the interviewee mentioned (e.g., sourcing, summarizing, predicting, questioning, etc.), would the interviewee agree that the strategy description aligns with their practices in teaching newcomers?*

Social Dimension: *These questions are intended to focus on your role within a disciplinary community and the social practices involved with being a disciplinary expert.*

- **How do you share knowledge with other members of your disciplinary community (e.g. publishing, writing, speaking, mentoring, etc.)?**
 - Guiding Question/Follow Up:
 - What methods of communication, texts, and/or practices of literacy are important for sharing/discussing/debating/distributing knowledge in your profession/discipline?
- **What texts are important to this community?**
- In what contexts or settings do you interact or work with other disciplinary professionals in your field (e.g. professional conferences, staff meetings, research, etc.)?

Knowledge Dimension: *These questions are intended to focus on the disciplinary knowledge unique to your discipline.*

- **What would you say are essential categories, areas, or kinds of information that a disciplinary expert must know in order to do the work of your discipline?**
- **What is the process for coming to know what is essential to know in your discipline?**
 - Guiding Question/Follow Up:
 - What texts and/or literacy practices are part of this process?
- Are there things that you know and that are central to your work but that you don't think all experts need to know?
- Is there specific language (e.g. particular words/phrases) that only members within your discipline would use/understand?

Appendix D

Think-Aloud/Modeling Using a Discipline-Specific Text Assignment

	Possible pts	Points earned
Background information	____/1	____/1
<ul style="list-style-type: none"> ○ What text did your professor choose (journal article, spreadsheet, graphic, book chapter, etc.)? Describe the features of the text. You may want to include language, format, publisher/source, intended audience, goal/purpose, images/representations, etc. Why did your professor choose this text (i.e., what is her or his purpose in reading it)? 		
During your own think-aloud	____/2	____/2
<ul style="list-style-type: none"> ○ What elements of the text did you notice and/or focus on <i>before</i> reading (e.g. vocab, title, source, author names, etc.)? ○ During your reading, what seemed significant? ○ What questions, if any, did you ask yourself before, during, and after reading? ○ What connections, if any, did you make to other texts? ○ What discipline-specific reading skills were helpful in making sense of the text? 		
During your professor's think-aloud	____/2	____/2
<ul style="list-style-type: none"> ○ What parts of the text did he or she focus on <i>before</i> reading (e.g. vocab, title, source, author names, etc.)? ○ What did he or she think was significant? ○ What questions, if any, did he or she ask themselves before, during, and after reading? ○ What connections, if any, did he or she make to other texts? ○ What discipline-specific reading skills did your professor use to make sense of the text? 		
Analysis	____/5	____/5
<ul style="list-style-type: none"> ○ What were the similarities and differences between your text interpretation and your professor's? ○ How did the think-aloud interview, if at all, change the way you think about reading discipline-specific texts like disciplinary experts? ○ How did the think-aloud interview, if at all, change the way you think about teaching discipline-specific reading skills? 		

Appendix E

Literacy-Focused Mini Teaching Lesson

At least two weeks before your mini-lesson presentation date:

- 1) Meet with your partner to begin working on your lesson plan. Together, you will present one lesson. Your lesson could be interdisciplinary, depending on your partnership and interests.
- 2) Contact Nate and/or Steve (via email or arrange for a face---to---face meeting) to talk about your plan and get the go---ahead to move forward on planning. When you contact us, please send a brief outline with answers to the following questions:
 - a. What is it I want students to know and be able to do as a result of this lesson?
(Also, What have they learned before that will be a foundation for what I want them to learn now?)
 - b. What instructional activities will support them in learning what I want them to learn?
 - c. How will I know what they have learned?

During the week leading up to your mini---lesson presentation date:

- 1) Refine your lesson plan with your partner.
- 2) Use the Lesson Planning Guide below as you prepare your lesson. Be sure to include all required elements in your final lesson plan.
- 3) Remember that your lesson must include the following:
 - a. At least 2 texts
 - b. At least one literacy strategy
 - c. Be 15-20 minutes in length
 - d. Draw on and engage with aspects of disciplinary literacy
- 4) Feel free to contact Nate and/or Steve with questions or to get feedback as you prepare.

Appendix F

Preservice Teacher Pre-Survey

Survey: Attitudes Toward Teaching Reading in Content Classrooms

Name: _____ Discipline/Major _____

Year at UIC _____ Do you plan to teach Middle School or High School?

Please answer each of the questions below from your perspective as a prospective content area teacher. A “content area teacher” teaches content related to a specific academic discipline (e.g., mathematics, chemistry, biology, history, economics). You may underline, **bold**, or highlight the numbers below.

	1 Strongly Agree	2 Agree	3 Tend to Agree	4 Neutral	5 Tend to Disagree	6 Disagree	7 Strongly Disagree
1. As a math, science, or history teacher, it is my responsibility to help students improve their reading abilities	1 Strongly Agree	2 Agree	3 Tend to Agree	4 Neutral	5 Tend to Disagree	6 Disagree	7 Strongly Disagree
2. As a teacher, I should introduce discipline-specific vocabulary to students before they come across disciplinary terms in an independently completed reading assignment	1 Strongly Agree	2 Agree	3 Tend to Agree	4 Neutral	5 Tend to Disagree	6 Disagree	7 Strongly Disagree
3. My primary responsibility as a teacher will be to impart subject matter knowledge	1 Strongly Agree	2 Agree	3 Tend to Agree	4 Neutral	5 Tend to Disagree	6 Disagree	7 Strongly Disagree
4. Few students can learn all they need to know about how to read in the first six years of schooling	1 Strongly Agree	2 Agree	3 Tend to Agree	4 Neutral	5 Tend to Disagree	6 Disagree	7 Strongly Disagree
5. The ability to teach discipline-specific reading skills should be a requirement for earning secondary teaching certification	1 Strongly Agree	2 Agree	3 Tend to Agree	4 Neutral	5 Tend to Disagree	6 Disagree	7 Strongly Disagree
6. Only English teachers should be responsible for teaching reading in secondary schools.	1 Strongly Agree	2 Agree	3 Tend to Agree	4 Neutral	5 Tend to Disagree	6 Disagree	7 Strongly Disagree

7. If I want to improve students' interests in reading, I should show them that I like to read	1 Strongly Agree	2 Agree	3 Tend to Agree	4 Neutral	5 Tend to Disagree	6 Disagree	7 Strongly Disagree
8. As a content area teacher, I should teach content and leave reading instruction to reading teachers	1 Strongly Agree	2 Agree	3 Tend to Agree	4 Neutral	5 Tend to Disagree	6 Disagree	7 Strongly Disagree
9. As a content area teacher, I feel a greater responsibility to teach content than to teach reading	1 Strongly Agree	2 Agree	3 Tend to Agree	4 Neutral	5 Tend to Disagree	6 Disagree	7 Strongly Disagree
10. As a content area teacher, I should help students learn to set purposes for the reading we do in my class	1 Strongly Agree	2 Agree	3 Tend to Agree	4 Neutral	5 Tend to Disagree	6 Disagree	7 Strongly Disagree
11. Every content area teacher should teach students how to read material in his or her content area	1 Strongly Agree	2 Agree	3 Tend to Agree	4 Neutral	5 Tend to Disagree	6 Disagree	7 Strongly Disagree
12. Reading instruction in secondary schools is a waste of time	1 Strongly Agree	2 Agree	3 Tend to Agree	4 Neutral	5 Tend to Disagree	6 Disagree	7 Strongly Disagree
13. Students who think about their own thoughts processes (metacognition) while reading facilitates learning	1 Strongly Agree	2 Agree	3 Tend to Agree	4 Neutral	5 Tend to Disagree	6 Disagree	7 Strongly Disagree
14. When students solve problems collaboratively, it usually results in deeper understanding for all students	1 Strongly Agree	2 Agree	3 Tend to Agree	4 Neutral	5 Tend to Disagree	6 Disagree	7 Strongly Disagree
15. As a content area teacher, I should model for my students how to read and make sense of discipline-specific texts	1 Strongly Agree	2 Agree	3 Tend to Agree	4 Neutral	5 Tend to Disagree	6 Disagree	7 Strongly Disagree
16. Observing an expert think out loud while reading a discipline-specific text is an effective learning strategy	1 Strongly Agree	2 Agree	3 Tend to Agree	4 Neutral	5 Tend to Disagree	6 Disagree	7 Strongly Disagree

Reflection:

As part of the course curricula, you will be observing and working with a UIC professor in your discipline. For example, if you are a history major you will be partnered with a historian, if you are a mathematics major you will be partnered with a mathematician, and if you are a chemistry major you will be partnered with a chemist. The purpose of this apprenticeship is to “peek inside” the mind of experts as they read documents, solve problems, and discuss what it means to make meaning and develop competency in a subject area. As a prospective teacher, it is imperative for you to develop advanced literacy skills to support your own students to read and make sense of discipline-specific texts. We hope this apprenticeship will be one step towards reaching this level of competency and becoming a successful teacher.

Knowing that you will be guided through this course by both the course instructors and disciplinary insiders, what do you hope to gain from this apprenticeship experience? What questions do you have? Briefly list and/or discuss your goals, thoughts, questions, expectations, and/or concerns in the space below:

This image shows a single sheet of white paper with horizontal blue ruling lines. The lines are evenly spaced and run across the width of the page. There are approximately 20 lines visible. The paper has a slight shadow on the right side, suggesting it's resting on a surface.

Appendix G
Preservice Teacher Post-Survey

At the beginning of the course you were asked about your expectations regarding working with a UIC professor. After reading your original response (email attached):

1. How did the apprenticeship meet your expectations? Did your UIC professor meet your goals?
2. Did you take away something (e.g. idea, learning strategy, or teaching method) that you didn't expect? If so, what?
3. Any recommendations/suggestions about having a student-professor apprenticeship for future literacy classes? For example, would you change any of the meetings? Would you have students and professors work on different tasks? Etc. Your opinion is important.

Appendix H

University Faculty Pre-Survey

Instructions: The purpose of the following questionnaire is to explore your thoughts concerning working with a teacher candidate this semester. The six questions address issues surrounding disciplinary literacy, teaching strategies, metacognition, and overall expectations. Your responses to the following questions will be used as data collection for my dissertation. The questionnaire should take approximately 15 minutes to complete. Your responses will vary in length from a few sentences to a paragraph.

1. From your understanding, what is your role as you work with a teacher candidate this semester?
2. Briefly define “literacy” as you conceptualize it.
 - 2a. What connection do you see between “literacy,” and the “content” (e.g., algebra, history, chemistry) you teach?
3. What responsibility do you feel, if any, for preparing the next generation of teachers to read texts/documents using methods that disciplinary insiders (e.g. historians, scientists, and mathematicians) use?
 - 3a. Who do you feel is best suited to prepare teacher candidates to teach their students to interpret and compose discipline-specific texts (e.g., lab reports, mathematical equations, primary source documents, graphs, charts)? For example, are reading specialists, literacy educators, professors in the arts and sciences, or others best suited to prepare teacher candidates? Explain.
 - 3b. What do you feel are the best methods to prepare teacher candidates to read texts/documents like disciplinary insiders?
4. In the second apprenticeship meeting you will be asked to participate in a “think-aloud interview” where you talk out loud as you read and make sense of discipline-specific texts. The purpose of this exercise is to make visible disciplinary insiders’ implicit thinking processes and reading comprehension strategies when interpreting discipline-specific texts. Prior to participating in this “think aloud interview,” what is your sense for how it will go for you personally? Do you anticipate any difficulties in articulating your implicit thinking processes and reading comprehension strategies? If so, what kinds of difficulties do you anticipate?

5. Do you incorporate metacognitive (think out loud) strategies—as described above—in your own teaching? If so, why do you use this technique and for what purpose?
6. What do you hope to learn from this experience?

6a. What do you hope your mentee will learn from this experience?

Appendix I

Semi-structured Interview Questions: Week 8 Reflection

1. How is class going?
2. From the start of the semester until now, how have your thoughts changed/evolved about literacy and teaching literacy in your discipline?
3. Do you feel more confident about teaching students how to read and make sense of texts in your discipline? If so, what specific activities in-class and/or experiences with your professor had the greatest impact?
4. What are your thoughts about modeling reading strategies for students? Is this something you would try in your own classroom? Why or why not?
5. Describe your experiences, so far, apprenticing with your professor this semester. Likes? Dislikes? Take-aways?
6. Looking ahead, what do you hope to take away/learn from your apprenticeship experiences by the end of the semester?

Appendix J

University Faculty Post-Interview Questions

1. Can you describe your overall experiences mentoring with a preservice teacher this semester? Did this experience meet your initial expectations?

2. In the second meeting you performed a think aloud with a text of your choice. Was this a natural process or did you find it difficult to articulate your implicit thoughts?

2b. Based on your experience, did you find the think aloud approach an effective learning technique that can be used with your own students?

3. As you reflect upon your initial views of literacy and its relation to mathematics, did this experience support or challenge your attitude and understanding of “literacy” and its connection to your discipline? Explain.

4. Upon reflection, do you feel this mentorship project – that is, supporting preservice teachers understanding of literacy through the lens of experts – was effective? Would you recommend future classes to participate in a similar project?

Appendix K

Example Memo

Initial observations from reading a few think-aloud reflection papers (11.9.2014):

- Many students (Zach, Porter, maybe Giovanni) stated that they used the same reading strategies as their professor, BUT the professor had more background information which made reading much easier and fluid
- Students also discuss how professors were able to make "connections" to other texts and personal knowledge
- Both Jane and Jessica talk about their professors "skimming" the text - that is, they didn't read word for word but rather looked at specific information

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STEVEN KUSHNER
33 W. Delaware Pl, Apt 12A Chicago, IL 60610
skushner228@gmail.com
847.989.2003

RESEARCH INTERESTS

Teacher education, secondary education/pedagogy, disciplinary literacy instruction, education technology, teacher modeling, collaborative learning communities, academic identities

EDUCATION

- | | |
|------|---------------------------------------------------------------------------------------------------------------|
| 2016 | PhD, Curriculum and Instruction , Literacy, Language, and Culture
University of Illinois at Chicago |
| 2010 | MA, Psychology
National Louis University |
| 2008 | MA, Secondary Education
National Louis University |
| 2006 | BS, Psychology and History
University of Illinois at Urbana-Champaign |

CERTIFICATION

- | | |
|------|--------------------------------------------------------------------------------------------------------------------------------------|
| 2007 | Illinois Professional Educator License (PEL)
<i>Endorsements: Secondary Education, Social Science (History/Psychology)</i> |
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UNIVERSITY TEACHING EXPERIENCE

- | | |
|---------------|--------------------------------------------------------------------------------------------|
| 2013– Present | Graduate Teaching Assistant/Adjunct Instructor
University of Illinois at Chicago |
|---------------|--------------------------------------------------------------------------------------------|
- *CI 484: Curriculum and Instruction in the Middle School*. Undergraduate course in the College of Education. Responsibilities included instructing pre-service math, science, history, and psychology teachers in the philosophy, curriculum and instructional methods for teaching young adolescent learners (grades five through eight). (Fall 2015, Spring 2016)
 - *CI 414: Middle and High School Literacy*. Undergraduate course in the College of Education. Responsibilities included instructing pre-service math, science, and history teachers in disciplinary literacy and assessing students' understanding of reading and writing in their particular disciplines. (Spring 2015, Fall 2014, Spring 2013, Fall 2013)

- *CI 504: Secondary Literacy*. Master's course in the College of Education. Responsibilities included instructing in-service math, science, and history teachers in disciplinary literacy and assessing students' understanding of reading and writing in their particular disciplines. (Summer 2014)

2013

Writing Center Tutor

Writing Center, University of Illinois at Chicago (Summer 2013)

HIGH SCHOOL TEACHING EXPERIENCE

2007 – Present

Bremen High School District 228, Midlothian, IL.

Social Studies Teacher, Bremen High School

Social Studies Teacher, Hillcrest High School

- I have taught, and currently teach, a range of courses, including AP Psychology, Honors Psychology, Sociology, and US History
- Committee member for developing an AP Psychology curriculum for the school district. Responsibilities included setting clear goals and objectives, creating enduring questions for each chapter, aligning the new curricula to the American Psychological Association (APA) psychology standards, designing summative assessments for each chapter, and choosing an appropriate textbook
- Committee member for revising the US History curriculum. Responsibilities included amending the current semester exams and aligning the curricula to the Common Core State Standards
- Presenter at Teacher Institutes and social studies department meetings on improving faculty instructional methods
- Extracurricular activities: Boys varsity tennis coach (2007-2011)

RESEARCH EXPERIENCE

2015 - 2016

Graduate Research Assistant

Supported professors of literacy in the College of Education on a grant proposal to receive funding from the National Science Foundation (NSF)

Duties:

- Identifying peer-reviewed articles for writing literature reviews
- Creating annotated bibliographies
- Audio transcription

2013

Independent Study

Received IRB approval to explore how high school students see themselves as

academic writers. Paper presented at the Illinois Reading Council Conference (2014).

PUBLICATIONS

Kushner, S. (December, 2015). E-tutoring: The benefits and limitations of online tutoring. *Through the Glass: A UIC Writing Magazine*.

Kushner, S. (2013). Academic word compositions: A disciplinary writing comprehension activity. *Colorado Reading Journal*, p.11-23.

Online Editorials

Kushner, S. (2015). Improving our schools from the inside out. *Edutopia*. Retrieved from <http://www.edutopia.org/blog/improving-schools-from-inside-out-steven-kushner>

Kushner, S. (2011). Taking a lesson from a family road trip. *Thinkmap Visual Thesaurus: Teachers at Work*. Retrieved from <https://www.visualthesaurus.com/cm/wordshop/taking-a-lesson-from-a-family-road-trip/>

Kushner, S. (2009). Big brother in the classroom. *Thinkmap Visual Thesaurus: Teachers at Work*. Retrieved from <http://www.visualthesaurus.com/cm/teachersatwork/1848/>

CONFERENCE PRESENTATIONS

Kushner, S. (accepted – April, 2016). *Constructing a mentorship framework to support middle and high school literacy teacher preparation*. American Educational Research Association (AERA) Annual Meeting, Washington, D.C.

Kushner, S. (December, 2015). *Using think-alouds as a pedagogical tool to support pre-service teachers' literacy development*. Literacy Research Association Annual Conference, Carlsbad, CA.

Kushner, S. (2014, October). *Confronting academic discourse: Exploring students' academic identities through teacher modeling*. Paper presented at the IRC Conference, Springfield, IL.

Kushner, S. (2012, December). *A "core" problem in adolescent literacy reform: The enduring baggage of literacy*. Paper presented at the LRA Annual Conference, San Diego, CA.

Workshops & Demonstrations

Kushner, S. (2014, March). *Teaching psychology at the high school level*. Presentation for undergraduate pre-service teachers at UIC (invited speaker). University of Illinois at Chicago, Chicago, IL.

Kushner, S. (2014, May). *Exploring memory through tip-of-the-tongue phenomenon*. Presentation at the Midwest Institute for Students and Teachers of Psychology (MISTOP). College of DuPage, Glen Ellyn, IL.

Kushner, S. (2013, October). *Relinquishing control: Presenting (orderly) student-centered discussion activities*. Presentation at District 228 Teacher Institute Day. Country Club Hills, IL.

Kushner, S. (2012, October). *Teaching mental illness*. Presentation at the Chicago Teachers of psychology in Secondary Schools (CHITOPSS) Conference. St. Charles, IL.

PROFESSIONAL SERVICE

2015 – Present **Faculty Sponsor, Future Educators Association (FEA)**

HONORS/AWARDS

UIC College of Education, Teacher Innovation Grant Award, 2014