

Learning Linguistics, Teaching for Change:
Preparing Secondary Educators to More Equitably Teach Disciplinary Literacies

A Dissertation Presented

by

KATHRYN ACCURSO

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Approved as to style and content by:

Margaret L. Gebhard, Chair

Elizabeth McEneaney, Member

Jonathan D. Rosa, Member

Jennifer Randall
Associate Dean of Academic Affairs
College of Education

DEDICATION

To teachers, students, and the imagination of more inclusive futures.

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In my development as an applied linguist, researcher, and teacher educator, I have been profoundly influenced by a number of people. Yet I've taken too few chances to appreciate them in print, so I'm grateful for this opportunity to reflect on and name some of the people who have inspired me, invested in me, and made this work possible.

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ABSTRACT

**LEARNING LINGUISTICS, TEACHING FOR CHANGE:
PREPARING SECONDARY EDUCATORS TO MORE EQUITABLY TEACH
DISCIPLINARY LITERACIES**

MAY 2019

KATHRYN ACCURSO,

B.A., UNIVERSITY OF MISSOURI COLUMBIA

M.A., UNIVERSITY OF MISSOURI COLUMBIA

Ph.D., UNIVERSITY OF MASSACHUSETTS AMHERST

Directed by: Professor Margaret L. Gebhard

This dissertation explores ways to better prepare secondary teachers in the United States for more equitably teaching disciplinary literacies to English language learners (ELLs), a current goal of many teacher educators, literacy researchers, and applied linguists that is echoed in federal and state-level education policy. Specifically, it investigates the affordances and constraints of using a critical social semiotic approach to secondary teacher education for this purpose. The dissertation is structured as a set of three research papers, each of which addresses a different aspect of this topic.

The first paper draws on existing literature to explore how a critical social semiotic approach has been used in recent K-12 teacher education and professional development efforts across the United States and to what effect. The second and third papers are empirical studies that seek to build on and add to this body of literature. Data

for these papers was collected in the context of a mandated one-semester course designed to prepare secondary pre-service teachers across content areas to better support the disciplinary literacy development of students designated as ELLs. The second paper draws on pre- and post-course survey data to explore changes in 55 secondary pre-service teachers' literacy teaching practices after they were introduced to a critical social semiotic perspective, specifically how they gave feedback on disciplinary writing. The third paper takes a more longitudinal approach to studying professional development in this same group of pre-service teachers. It combines qualitative case study and quantitative survey methods to more holistically explore what kinds of knowledge, beliefs, and practices these teachers developed over two years as they experienced multiple and, at times, contradictory discourses about language, language learners, and literacy teaching and learning during their pre-service programming, student teaching experiences, and first year of in-service teaching.

Cumulatively, this dissertation contributes to existing research in teacher education, literacy studies, and applied linguistics by offering a comprehensive literature review and additional empirical information regarding the opportunities and challenges of using a critical social semiotic approach to supporting secondary pre-service teachers' development as disciplinary literacy teachers and, possibly, change agents.

TABLE OF CONTENTS

	Page
DEDICATION	iv
ACKNOWLEDGEMENTS	v
ABSTRACT	viii
LIST OF TABLES	xii
LIST OF FIGURES	xiii
 CHAPTER	
1. INTRODUCTION	1
1.1. Chomsky’s Hold on U.S. Teacher Education.....	1
1.2. Exploring a Different Paradigm: Critical Social Semiotics	4
1.3. Purpose of the Dissertation.....	8
1.4. Guiding Questions	9
1.5. Overview of Dissertation Chapters (Three Manuscripts).....	9
1.6. References	17
2. REVISITING THE NEW LONDON GROUP’S PEDAGOGY OF MULTILITERACIES IN THE UNITED STATES	23
2.1. Preface	23
2.2. Introduction	24
2.3. Theory: A Multiliteracies Framework.....	28
2.4. Literature Review Methods	37
2.5. Literature Review Findings	45
2.6. Discussion.....	80
2.7. Future Directions	81
2.8. Conclusion	87
2.9. References	88
2.10. Works Reviewed	95
3. ANALYZING DIVERSE LEARNERS’ WRITING IN MATHEMATICS: SYSTEMIC FUNCTIONAL LINGUISTICS IN SECONDARY PRE-SERVICE TEACHER EDUCATION	105
3.1. Preface	105
3.2. Introduction	106
3.3. Conceptual Framework: A Social Theory of Meaning Making in Mathematics	112
3.4. Methods	118
3.5. Findings	125
3.6. Implications	139
3.7. References	143
4. EXPLORING A CRITICAL SOCIAL SEMIOTIC APPROACH TO SECONDARY TEACHER EDUCATION	151
4.1. Preface	151

4.2. Introduction	152
4.3. Conceptual Framework: Critical Social Semiotics.....	155
4.4. Methods	166
4.5. Case Study Contexts.....	170
4.6. Findings: Influences of a Critical Social Semiotic Perspective on PSTs’ Knowledge, Beliefs, and Practices	178
4.7. Discussion and Conclusions	200
4.8. References	207
5. CONCLUSION	246
5.1. Contributions and Limitations	248
5.2. What Got Left Out?	255
5.3. Remaining Questions.....	259
5.4. An Agenda for Research and Practice in Teacher Education.....	261
5.5. References	262

LIST OF TABLES

Table	Page
2.1. Designs implemented in empirical studies by type and frequency (n=82).	41
2.2. Characteristics of publications representing multiliteracies PD for K-12 teachers and students in the United States (2000–2018).	46
2.3. Frequencies of affordance codes in empirical studies of teacher learning (n=77).	53
2.4. Frequencies of affordance codes in empirical studies of student learning (n=54).	63
2.5. Number of empirical studies of student learning by grade level (n=54*).	64
2.6. Frequencies of challenge codes in publications reviewed (n=99).	76
3.1. Summary of SFL-based PD content by module.	120
3.2. Types of PST feedback on student math writing before and after SFL-based PD.	126
3.3. Examples of functional feedback on student writing following SFL-based PD.	137
4.1. Summary of critical social semiotic RETELL course content.	163
4.2. Participant demographics (n=55).	167
4.3. Refined pathway codes for characterizing pre-service teachers' learning.	171
4.4. Survey data indicating increased language awareness.	184
5.1. Types of delayed post-course feedback on student writing.	257

LIST OF FIGURES

Figure	Page
2.1. Multiliteracies framework.	29
2.2. Summary of literature search and evaluation process.	39
2.3. Frequency of multiliteracies PD publications in the United States by year.	42
2.4. Refined codes related to literature review research questions.	44
2.5. Number of publications coded for each literature review finding.	80
3.1. Features of the register of mathematics.	114
3.2. Pre- and post-test prompt and student math writing sample.	123
4.1. Stratified model of text/context dynamics.	156
5.1. Empirical data collected as part of dissertation study.	256

CHAPTER 1

INTRODUCTION

This dissertation explores ways to prepare teachers in the United States for more equitably teaching disciplinary literacies to English language learners (ELLs), a current goal of many teacher educators, literacy researchers, and applied linguists that is echoed in federal and state-level education policy. As many dissertations in education related fields do, it arises from an issue I encountered in my own experience as a teacher – a mismatch between my preparation and the realities of being a language and literacy educator in the context of globalization.

1.1. Chomsky's Hold on U.S. Teacher Education

For eight years, I worked as an English language and literacy teacher. Like many teachers across the United States, my preparation for this work began with a series of courses in linguistics. These courses introduced me to structural linguistics, formal subsystems of language, and the work of Noam Chomsky. Alongside my fellow future teachers, I spent a great deal of time studying the structure and form of different standardized languages, diagramming sentences in English, French, and Swahili to recognize variation in their syntax. We learned that humans have a distinct cognitive ability to “acquire” language by processing linguistic input, formulating linguistic output, and tacitly generating rules for each language following a decontextualized “universal grammar” that governs all human languages (Chomsky, 1986). This training in psycholinguistics was followed by courses in language teaching methods that mostly

focused on Steven Krashen's influential "natural approach." This approach entails designing lessons that support students in "acquiring" language naturally through playing games, singing songs, reading for pleasure, and free writing, rather than consciously "learning" grammatical rules (Krashen, 1982, p. 10). As Gebhard (2019) outlines, the logic behind this humanist approach is that too much explicit language instruction might interfere with students' innate ability to develop linguistic competence because it could increase anxiety, and thereby prevent them from processing language in the ways they did when acquiring their first language.

Following this preparation, I went on to teach ELLs in a number of different contexts: first-generation elementary and secondary students in rural Kenya; children of international scholars newly arrived in the United States; urban elementary students and their families in the Midwest and Washington, DC; and finally, secondary students poised to graduate high school, but who had been deemed unready to enroll in beginning college-level courses because they had "low levels of literacy." In these positions, I came to understand the gatekeeping role different literacies play in economic, social, and civic life, yet I routinely felt the limitations of my preparation for equitably addressing the specific needs and goals of my students. I could see that my students brought a great deal of linguistic and cultural knowledge to the classroom, yet their knowledge and linguistic resources routinely went unnoticed or unvalued, and I felt unequipped to draw on their different knowledges to help them develop the literacy skills valued in both schools *and* communities. I soon learned that many of my colleagues shared these frustrations, particularly as pressure intensified for all of us to be teaching "academic language," a construct that is often vaguely defined and not well-addressed in teacher preparation

programs (Bailey, 2007; Cummins, 2000; Francis & Rivera, 2007; Scarcella, 2003; Wong Fillmore & Snow, 2000).

The realization that K-12 teacher education needs to be more responsive to changing realities within the profession, particularly with respect to language and literacy, ultimately led to this dissertation. It motivated me to look for a better way to account for variation and language use in context, an approach to teaching and learning that could help me scaffold different literacies, and some notion of how any of these new perspectives could lead to different social futures for my students, given the histories of racism, nationalism, and linguistic prejudice that have shaped the education being offered to them in most institutional contexts. It led me to pursue a scholarly path to influence future teachers' ability to access linguistic theory for theoretical and pedagogical tools that would allow them to more equitably support diverse students' literacy development in an era of globalization and school reform.¹

My path toward a more socially accountable linguistics was shaped significantly by my early career experiences as an education researcher at the Center for Applied Linguistics. There, I studied the types of language use valued in U.S. public schools and how to assess ELLs' development of this type of language. I analyzed disciplinary writing samples to examine the effectiveness of different scaffolds. And I went on to offer language-based professional development to English language and content teachers across the country through a partnership with the WIDA consortium. Through this

¹ Scholarship in a number of related fields suggests this might be a productive path. For example, within applied and educational linguistics, see Halliday (1982), Pennycook (2001), and Rothery (1996); within "mainstream" teacher education, see Gebhard and Harman (2011), Godley & Reaser (2018), Reagan (1997), and Schleppegrell (2004); and within second language teacher education, see Freeman and Johnson (1998), Gebhard, Chen, Graham, and Gunawan (2013), and Kramsch (2014).

experience, I met teachers nationwide who were concerned about their ability to support ELL and other minoritized students' literacy development, particularly as they watched these students fail high-stakes standardized exams and drop out at much higher rates than their peers.² I realized all teachers, not just English language and literacy teachers, might be better equipped to understand their students and teach disciplinary literacies if they had a dynamic and context-sensitive perspective of language, learning, and social change.

1.2. Exploring a Different Paradigm: Critical Social Semiotics

A great deal of scholarship has echoed the issues I experienced with Chomskyan linguistics and Krashen's natural approach (e.g., Gee, 2012; Hasan, 1998; Hyland, 2004; Lantolf, 2000; White, 1987; see Larsen-Freeman & Long, 2014 and Lightbown & Spada, 2013 for reviews). For example, critics have argued that Krashen's hypotheses cannot be tested and his prescriptions for classroom practice lack empirical evidence (e.g., Liu, 2015; McLaughlin, 1987). Based on these critiques, other language and literacy scholars have explored responses such as task-based instruction (e.g., Long, 1985). A number of studies have shown that by implementing empirically-tested tasks, teachers can support ELLs in negotiating meaning through conversational modifications such as repetitions, recasts, and confirmation checks (e.g., Bygate, Skehan, & Swain, 2001; Ortega, 2009; Swain & Lapkin, 2000). These modifications generate comprehensible input, yield comprehensible output, and provide students with feedback to support the acquisition of

² The observation that students labeled as ELLs perform differently on standardized exams and drop out of high school at higher rates is substantiated by national data. In fact, such "gaps" have been reported every year since the United States Department of Education and National Center for Education Statistics began collection data on this population of students (e.g., Aud et al., 2011, p. 183; Aud et al., 2012, pp. 203–207; Aud et al., 2013, p. 54; McFarland, Cui, & Stark, 2018; McFarland et al., 2018, p. 99). For analyses of these patterns and their implications for teacher education, see Menken (2008, 2010).

grammatical competence. Teachers can also provide explicit instruction regarding targeted grammatical forms to support students in acquiring grammatical competence following the order in which such competence is thought to develop (see Spada, 1997 for a review of classroom and laboratory research). Moreover, teachers can attend to important individual and cultural differences to better enable students to participate in classroom activities (e.g., Dörnyei, 2014; Hinkel, 1999; Kramsch, 1993, 1995).

However, the more I worked alongside content teachers, I realized that these studies rarely address the highly challenging leap students must make from using oral language to negotiate “here-and-now” meanings to being able to read, write, and discuss dense disciplinary texts (e.g., Chaudron, 1988; Ellis, 1994; Grant, Wong, & Osterling, 2007; Schleppegrell & Colombi, 2005). Additionally, research that has focused on the more mentalistic aspects of language acquisition has done little to address the ways issues of race, class, gender, and national origin have shaped K-12 students’ access and support for disciplinary literacy development in modern educational systems (e.g., tracking practices; Callahan, 2005; Gebhard, 2019; Harklau, 1994).

Therefore, this dissertation explores critical social semiotics, an alternate paradigm that attempts to address the limitations of psycholinguistic explanations of language and learning and respond to inequities produced and reproduced in schools. In this perspective, language is understood as a culturally sensitive meaning-making resource (Halliday, 1993; Hasan, 1996). Instead of focusing on isolated categories of words, decontextualized rules for assembling these words into sentences, and how teachers can design “natural” interactions to support students’ innate cognitive capacity for language acquisition, this theory focuses on the meanings people make in different

contexts and the grammatical resources they use to do so effectively. As subsequent chapters in this dissertation will explain, this theory describes three interrelated types of meaning made in every communicative act –*ideational*, *interpersonal*, and *textual* – and the semiotic resources that realize these meanings. Ideational meanings construct ideas and experiences, including disciplinary knowledge, understandings, and concepts. Interpersonal meanings construct social identities, relationships, power dynamics, attitudes, and feelings. Recognizing how interpersonal meanings are made in a variety of texts can support students in learning not just English, but also how to “read between the lines...[and] shift from literal, to inferential, and more interpretive” analyses of texts in different cultural contexts (Gebhard, 2019). Textual meanings relate to the flow of ideas across extended discourse, including ways of weaving given and new information and using specific cohesive devices suited to the purpose and audience of a text.

From a critical social semiotic perspective, students’ available semiotic resources expand as they grow up and expand the range of functions they perform in different contexts—at home, in their communities, in different school content areas, and at work. As students participate in expanding social networks, they are apprenticed to different *genres* of communication and to a hierarchy of knowledge and participation in specialized activities that push on the nature of the semiotic resources available to them (Martin, 2009). Thus, as students’ grammatical repertoires expand, explicit grammatical knowledge can act as a social, cognitive, and political tool that can be used consciously to construct new ideas and experiences, enact a greater variety of social roles and relationships, and manage the coherent flow of communication in different kinds of oral, written, and multimodal texts. However, as students transition from primary to secondary

school, access to robust forms of academic apprenticeship becomes increasingly limited as schools offer a differentiated curriculum that breaks down along race, class, and gender lines (Evertson, 1982; Gamoran, 1989; Oakes, 1982). This differentiation recreates inequitable class structures and economic realities, particularly for students whose home and community language practices differ greatly from the language of schooling (e.g., Gebhard, 2005, 2019; Martin & Rose, 2008; Oakes, 2005; Trimble & Sinclair, 1987; Venezia & Kirst, 2005).

This perspective was first developed in Australia, where it resulted in an approach to curriculum and instruction known as the Teaching and Learning Cycle (TLC; Rose & Martin, 2012). This approach includes four main phases to apprentice students to reading and writing the types of genres and meanings they are likely to encounter across grade levels and in specific subject areas: (1) building students' background knowledge through hands-on, dialogic experiences to prepare for specific disciplinary reading and/or writing tasks; (2) deconstructing model texts using functional metalanguage to name genre moves and semiotic choices; (3) jointly constructing texts with students to make semiotic know-how highly visible and the nature of linguistic choices available to students open to critical discussion; and (4) gradually reducing scaffolding as students become more proficient readers, writers, and analysts of disciplinary discourses over time.

In the primary grades, the TLC builds on students' uses of everyday genres realized through a congruent grammar (e.g., recounting events using subject-verb-object grammatical structures and concrete, everyday lexis; see Accurso, Gebhard, & Selden, 2016; Aguirre-Muñoz, Chang, & Sanders, 2015; Brisk, 2014; Gibbons, 2003). In secondary grades, the focus shifts to disciplinary genres that realize meaning through an

increasingly dense grammar by simultaneously building students' abstract content knowledge and knowledge of genres used within specific fields (e.g., historical arguments, mathematical explanations, scientific descriptions; see Achugar & Carpenter, 2014; Christie & Derewianka, 2008; Derewianka & Jones, 2016; Humphrey & Macnaught, 2016; Rose, 2015; Schleppegrell, Greer, & Taylor, 2008). The goal of this type of language and literacy instruction is to apprentice all students to a critical understanding of disciplinary bodies of knowledge and the literacy practices that construct them.

1.3. Purpose of the Dissertation

Since the 1980s, when critical social semiotics was first applied to teacher education in Australia, this approach has gained some traction in other international contexts (e.g., de Oliveira & Iddings, 2014; Moore & Hart, 2007; Whittaker & Acevedo, 2016). However, this paradigm has really only reached U.S. teacher education in the last two decades, meaning less research is available on its application within this context, particularly at the secondary level. Therefore, the purpose of this dissertation is to analyze the influence of critical social semiotics on teacher education in the United States, with an empirical focus on secondary teachers' preparation in the context of rapidly changing social, economic, and political factors, as well as related school reforms. In taking this focus, I attempt to address not only the struggles I experienced as a teacher, but broader calls within the field for:

... studies from differing paradigmatic and epistemological perspectives that examine the links between and among teacher preparation contexts for learning, what teacher candidates actually learn, how their learning is played out in practice in K–12 schools and classrooms, and how this influences pupils' learning – all

within the context of varying resource allocation, schools, communities, and programs. (Cochran-Smith & Zeichner, 2005, p. 2)

1.4. Guiding Questions

To accomplish this purpose, this dissertation is guided by the following questions:

1. How has a critical social semiotic perspective on language, learning, and social change been taken up in coursework and professional development for K-12 teachers in the United States to date?
2. How have these efforts influenced teachers' knowledge, beliefs, and classroom practices?
3. How has teachers' implementation of pedagogy from this perspective influenced student learning?

1.5. Overview of Dissertation Chapters (Three Manuscripts)

These guiding questions are addressed in three article manuscripts, each of which explores a separate, but complementary aspect of the topic using varied research methods. Each manuscript has been prepared with the readership of a specific, peer-reviewed professional journal in mind to collectively encompass an audience with broad interests in teacher education, literacy teaching in the content areas, and applied linguistics. To orient readers of this dissertation to the imagined audience of each manuscript and provide relevant information about how the general dissertation topic was framed for that audience, each chapter begins with a brief preface before presenting a manuscript.

1.5.1. Paper #1: A systematic literature review

Chapter 2 is a systematic literature review prepared for the readership of a journal such as the *Review of Educational Research*. The manuscript addresses all three guiding questions of the dissertation as it explores how a critical social semiotic approach has been used in recent K-12 teacher education and professional development efforts across the United States in the years 2000–2018 and to what effect. To reach an audience across a broad range of education-related fields, this chapter presents critical social semiotic theory as it aligns with the work of the New London Group, a collective of prominent language, literacy, and education scholars who have promoted this theoretical perspective in their work as it relates to a “pedagogy of multiliteracies” (1996, p. 64). Based on a review of 99 articles and book chapters from the interdisciplinary fields of teacher education, literacy research, and applied linguistics, this manuscript indicates that, to date, the main vehicles for introducing teachers to critical social semiotic theory have been grant-funded university-school partnerships, university courses in teacher education programs, and self-contained professional development workshops. The manuscript presents five main findings regarding trends in how teacher educators across these contexts have packaged critical social semiotic theory for K-12 teachers (both ESL teachers and teachers of diverse learners in “mainstream” contexts), what teachers tended to take away from this approach, how teachers’ takeaways have influenced students’ literacy practices, and what supports and challenges seemed to most influence teacher and student learning.

First, most of these efforts focused on three aspects of critical social semiotic theory: introducing teachers to a functional metalanguage, or language for talking about

language; introducing literacy teaching and learning as a design process; and engaging teachers in critical text analysis. Second, with regard to teacher learning, virtually all of these efforts (>90%) influenced teachers' level of semiotic awareness and ability to design more focused disciplinary literacy instruction. Teachers' critical awareness, confidence for literacy instruction, and content knowledge were influenced to a lesser extent. Third, teachers' implementation of this knowledge supported students' level of semiotic awareness, which facilitated students' simultaneous development of disciplinary knowledge and associated literacy practices. Some students also experienced increased critical awareness and confidence for reading and writing in school. Fourth, more sustained investments in teacher professional development through university- school partnerships led to greater gains in teacher and student learning. In addition, these partnerships fostered teachers' and students' critical awareness of the relationship between disciplinary literacy practices and ideologies more effectively than individual university courses or workshops. Fifth, regarding challenges to teacher and student learning, all types of professional development efforts placed significant demands on the knowledge base of teachers and teacher educators, and had the potential to reproduce dominating language ideologies in schools.

To my knowledge, this manuscript is the first systematic review that addresses the application of a critical social semiotic perspective in U.S. teacher education. As such, it provides important context as interest in this theoretical perspective increases in the United States, especially among teacher educators. The subsequent two manuscripts are empirical studies that seek to build on and add to this landscape.

1.5.2. Paper #2: A mixed methods study of pre-service teachers' feedback practices

Chapter 3 addresses the first two guiding dissertation questions as it presents an empirical study of one aspect of disciplinary literacy instruction: evaluation and feedback on student writing. This manuscript was prepared for an audience of content area teachers and teacher educators who are interested in supporting the teaching of disciplinary literacies but may not have much background knowledge regarding theories of language and literacy. It has already been published for such an audience in the *International Journal of Mathematics Teaching and Learning* (Accurso, Gebhard, & Purington, 2017). Data collection took place in the context of a mandated one-semester course designed to prepare secondary pre-service teachers across content areas to better support the disciplinary literacy development of students designated as ELLs. Drawing on pre- and post-course survey data, this manuscript details changes in 55 secondary pre-service teachers' feedback practices after they were introduced to a critical social semiotic perspective. While quantitative data suggested that a critical social semiotic approach did not change how teachers' numerically rated student writing, an analysis of qualitative data revealed that it did influence the types of written feedback teachers' provided.

In particular, a critical social semiotic theory of language and learning appeared to support pre-service teachers in providing more cogent and precise written feedback, specifically regarding students' linguistic strengths, areas for improvement related to purpose and audience, and specific steps for revision. Pre-course feedback was characterized by four predominant types of feedback: (1) vocabulary-oriented feedback that encouraged the student to use specific disciplinary vocabulary to improve their response; (2) broad feedback that directed the student to "be more specific" or "give more

details” to improve their response; (3) general encouragement followed by a list of questions or broad, but non-directive feedback; and (4) prompts for oral feedback sessions. However, by the end of the course, instances of these four types of feedback generally decreased. In their place, many pre-service teachers shifted toward the use of purpose-oriented feedback and feedback that incorporated concepts and metalanguage from a critical social semiotic perspective to explicitly address disciplinary writing expectations and prompt students to consider the purpose of their writing and make semiotic choices effective for that purpose.

These findings demonstrate that as pre-service teachers studied critical social semiotic theory, many of them were able to explicitly recognize and begin to talk about the multiple semiotic systems at play in disciplinary classrooms (e.g., linguistic resources, symbolic representations, visual images). While this development was likely also impacted by factors external to the study (e.g., increased observation and student teaching time at their practicum sites over the course of the semester; other program coursework), the specific types of feedback that emerged in the post-course data suggest a relationship between the content of the course and pre-service teachers’ developing literacy teaching practices. This is a promising finding given that new standards require teachers be able to make their tacit understanding of the semiotic systems they use to make disciplinary meanings more explicit to students. However, this study took place entirely within the context of a pre-service course and does not present longitudinal data regarding participants’ literacy teaching practices in actual classrooms with diverse learners. Therefore, the third manuscript takes a more longitudinal view on these pre-service teachers’ development.

1.5.3. Paper #3: A longitudinal study of knowledge, beliefs, and literacy teaching practices

Chapter 4 presents an empirical study that takes a more longitudinal approach to studying professional learning in this same group of pre-service teachers, also addressing guiding questions 1 and 2 of this dissertation. This manuscript was prepared for an audience of applied linguists and teacher educators who do have some theoretical knowledge regarding language and learning, and are interested in further developing these theories and applying them to critical issues in education, such as readers of the journal *Linguistics and Education*. Therefore, this manuscript describes how one College of Education used a critical social semiotic approach to respond to a state policy intended to promote more equitable teaching for students labeled English language learners (ELLs). Critics have argued that when responses to such policies are rooted in formal linguistics and imply social change will result simply from teachers' development of knowledge about language, they ignore the complex social issues facing ELLs and their teachers in ways that can limit their impact. To explore an alternative approach, this study combines qualitative case studies of three participants with quantitative survey data from the larger group to more holistically explore changes in these teachers' knowledge, beliefs, and practices over two years as they experienced multiple and, at times, contradictory discourses about language, language learners, and literacy teaching and learning during their pre-service programming, student teaching experiences, and first year of in-service teaching.

Drawing on a mixed methods analysis of interviews, classroom observations, and survey data, the manuscript suggests that that discourses from within a critical social semiotic perspective influenced three trends in participants' learning over time: (1) movement toward increased language awareness, a finding consistent with those presented in Chapter 3; (2) between standard and more plural language ideologies; and (3) away from solely form-focused literacy teaching. Though participant learning trended in these directions over time, this manuscript also shows how such movement is not necessarily straightforward. Instead, it shows how participants moved back and forth along pathways of learning, drawing on a critical social semiotic perspective in different ways in different contexts over the course of the study. In other words, context matters and development is not linear. In addition, findings suggest that while a critical social semiotic perspective did influence some changes in participants' knowledge about language and beliefs about language teaching, learning, and ELLs, there was still a general underexamination of ideology within and beyond the course. This issue was compounded by a lack of theoretical coherence within and across participants' courses and a lack of sustained support.

The manuscript discusses the implications of these findings for theoretical development and the practice of preparing secondary teachers to enact equity agendas within the current sociopolitical context. First, teachers and teacher educators need a more clearly developed way to analyze and discuss ideology, especially racializing language ideologies (Flores & Rosa, 2015). Therefore, in regard to theory, the manuscript suggests advancing a critical social semiotic framework by drawing even more heavily on the contributions of social theorists working to address issues of ideology, inequity, and

power within a new critical paradigm. Second, with regard to the practice of teacher education, the manuscript argues that calls for more equitable education for ELLs are shallow unless new teachers have sustained support that supports critical reflection and revised pedagogies in the long-term. Third and finally, if teacher educators are to make such sustained investments in change, they must work together across academic fields to pursue the difficult work of understanding not just how teachers change, but why they change (or not). As education reforms continually narrow what it means to be a teacher (Cochran-Smith, 2005; Cochran-Smith, Keefe, & Carney, 2018; Little, 1993; Sleeter, 2008), it becomes increasingly important to work together to imagine what it could mean and how teachers can come to develop in such ways (e.g., Ladson-Billings, 2006).

1.5.4. Discussion and conclusion

This three-manuscript approach to the dissertation allowed me to distill findings from a rich and sizable body of data and practice framing the topic for different scholarly audiences. However, it also inevitably resulted in a lot getting left out. Therefore, Chapter 5 offers a brief discussion of what ended up on the proverbial cutting room floor, as well as some discussion between and across the three manuscripts, and implications for future work.

Together, the three manuscripts make a case for an approach to secondary teacher education in the United States that is built around critical social semiotic theories of language, learning, and social change. However, practically speaking, they also suggest that significant work lies ahead for teacher educators in making this approach accessible for teachers pressed by the demands of new standards, education reforms, and processes

of globalization. Further, with regard to theory, the manuscripts collectively suggest more work is needed in the area of ideology and power, as this is the least developed and applied aspect of a critical social semiotic perspective to date. As Chapters 2 and 4 point out, this is a crucial piece of teachers' development if teacher education is in any way meant to equip teachers to enact equity agendas within their roles as disciplinary literacy educators. Chapter 5 discusses these implications for theory and practice, charting a future research agenda intended to address these needs.

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CHAPTER 2

REVISITING THE NEW LONDON GROUP'S PEDAGOGY OF MULTILITERACIES IN THE UNITED STATES

2.1. Preface

In the United States, a critical social semiotic perspective on language, learning, and social change has most often been discussed in education circles with reference to a group of scholars known as the New London Group. In 1996, the New London Group released their highly influential vision for a “pedagogy of multiliteracies” in the new millennium, a pedagogy built on a critical social semiotic perspective of language, learning, and social change. Written for a broad education research audience, such as readers of the *Review of Educational Research*, this chapter adopts the prevalent language of “multiliteracies” to present a literature review that analyzes how this perspective has since been taken up in professional development for K-12 teachers in the United States and to what effect. First, it outlines a multiliteracies framework as it relates to a critical social semiotic perspective. Second, it presents literature review methods, which resulted in 99 articles and book chapters from the interdisciplinary fields of teacher education, literacy research, and applied linguistics over the last two decades. Third, it presents findings regarding how a multiliteracies framework has influenced pre- and in-service teachers’ professional development; teachers’ classroom practices; and students’ learning of disciplinary literacies. Finally, it discusses the affordances and limitations of different approaches to professional development related to implementing a pedagogy of

multiliteracies and chart a course forward for educational research, teacher education, and the practice of literacy pedagogy.

2.2. Introduction

Just over twenty years ago, the New London Group (1996) released their highly influential vision for the future of English literacy pedagogy. Citing the inadequacies of structural theories of language in the context of globalization, this group of prominent scholars called for a “pedagogy of multiliteracies” built on a sociocultural conception of language, learning, and social change (1996, p. 64). This call was a response to narrow definitions of literacy that focused mainly on official, standard forms of English and models of literacy pedagogy that focused mainly on teaching and learning formalized, monolingual, and monocultural forms of English. The New London Group argued that these restricted definitions did not account for cultural and linguistic diversity in society, a disregard that led to “vast disparities in life chances” (1996, p. 61) for minoritized students, and contributed to a growing anxiety among teachers regarding how to address difference in the classroom. In addition, they argued that such restricted definitions of literacy and literacy pedagogy hindered the fundamental purpose of public education – to support learning that allows *all* students to fully participate in public, community, and economic life – from being fulfilled.

Instead of conceptualizing literacy in relation to people’s use of standardized English forms, the New London Group (1996) proposed that literacy be conceptualized in relation to people’s ability to design meaning across different contexts, oftentimes using multilingual and multimodal resources. One of the New London Group’s central

commitments in proposing a multiliteracies framework was to broaden the field's understanding of literacy and literacy pedagogy to include an understanding of the ways people negotiate difference, with particular attention to how people negotiate multiple different discourses. They coined the term *multiliteracies* to emphasize this multiplicity of contexts and resources for making meanings in different contexts. In doing so, the New London Group (1996) argued for three specific areas of conceptual expansion: (1) that the idea and scope of literacy grow to account for increasing local cultural and linguistic diversity and global connectedness; (2) that conceptions of literacy grow to account for the rapidly growing variety of emerging discourses and multimodal text forms associated with new technologies (e.g., multimedia compositions, visual images interwoven with written words); and (3) that conceptions of literacy have embedded within them a critique of hierarchy and injustice.

Following the 1996 article, the New London Group met three more times to flesh out their initial “manifesto” (1996, p. 63) into a book length theorization of the ‘what’ and ‘how’ of a multiliteracies pedagogy (Cope & Kalantzis, 2000). In addition, different members of the group authored chapters describing examples of curricular practices that engaged the concept of multiliteracies: two higher education projects in South Africa (Bond, 2000; Newfield & Stein, 2000), one Boston elementary school, one California community college, and two Australian elementary and high schools (Cazden, 2000). Together, the article and book generated enormous interest, greater than even the New London Group scholars anticipated (Cope & Kalantzis, 2008). As one measure of the reach their work has had, a Google search in 2018 returned 247,000 web pages that mentioned ‘multiliteracies,’ and 112,000 web pages that mentioned ‘multiliteracies

pedagogy.’ This interest has resulted in numerous international efforts to renovate the content and form of K-12 literacy pedagogies, as well as teachers’ preparation for supporting students’ development of disciplinary literacies the new millennium.

For example, one effort to support teachers’ professional development (PD) is a model called *Learning by Design* (Kalantzis & Cope, 2005). This model was developed for use in Australia and Malaysia and piloted by approximately 100 teachers in 2003. The *Learning by Design* model introduced teachers to multiliteracies theory and practice to support them in designing instruction relevant for a changing world. First, teachers learned about the New London Group’s theory of language, learning and social change. Then, they were introduced to some flexible tools for designing, sharing, and reflecting on classroom choices and students’ resulting learning experiences. Finally, they were asked to design and pilot curricular materials based on their professional learning.

Several Australian and Malaysian teachers reported on the outcomes of their participation in *Learning by Design* (e.g., Cloonan, 2005; Pandian & Balraj, 2005; van Haren, 2005). For example, Rita van Haren (2005) described one instantiation of *Learning by Design* with 40 Australian K-12 teachers. In this project, teachers attempted to use the multiliteracies framework to revamp existing curricular units to take into account principles of multimodality and inclusivity. van Haren (2005) reported that this process was challenging for teachers because it was conceptually distant from their existing curriculum design practices. Further, teachers’ attempts to engage in a pedagogy of multiliteracies initially resulted in uneven literacy gains for students as measured by changes in students’ expository writing. However, over time, this group of teachers reframed the *Learning by Design* model to explain to other educators how it

complemented and extended existing district practices, and developed a common curricular planning tool that allowed for more fluid collaboration. van Haren's analysis of interview data from 15 of these teachers suggested the PD ultimately increased teachers' ability to plan, think about, and design inclusive learning environments for a range of learners with increasingly positive results for students (for more empirical studies of multiliteracies PD in Australia, Canada, Denmark, Malaysia, Portugal, Scotland, South Africa, Spain, and Sweden see Cullip, 2009; Gibbons, 2003; Humphrey & Macnaught, 2016a, 2016b; Macken-Horarik, Sandiford, Love, & Unsworth, 2015; Potts, 2018; Rose, 2015; Whitaker & Acevedo, 2016).

However, despite promising findings from international contexts, to date there have been few analyses focused on multiliteracies PD in the United States. Therefore, the goal of this chapter is to analyze how investments in multiliteracies PD for K-12 teachers in the United States (both ESL teachers and teachers of diverse learners in "mainstream" contexts) have influenced teachers' work and students' learning in the context of rapidly changing social, economic, and political factors, as well as related school reforms. This literature review is guided by three research questions:

- RQ1. How has a multiliteracies framework been taken up in K-12 teacher professional development in the United States?
- RQ2. How has multiliteracies professional development influenced teachers' knowledge and classroom practice?
- RQ3. How has teachers' implementation of a pedagogy of multiliteracies influenced student learning?

2.3. Theory: A Multiliteracies Framework

The New London Group's (1996) vision for a pedagogy of multiliteracies arose from three central beliefs: language is one dynamic set of available resources for designing meaning (Halliday, 1978); learning to design is a situated and social process of making meaning, influenced by complex systems of people, environments, technologies, ideologies, and texts (Vygotsky, 1986); and social change is a factor of the conditions in which meaning making occurs, leading to more or less reproductive or transformative outcomes (Fairclough, 1992a). They united these beliefs under the central concept of "design," intending to connect their conceptualizations of literacy to other contemporary trends in the ways people talk about modern life, including: design as a way of talking about workplace innovation, leadership, and school reform; design science as a way of engaging in educational research; design as a type of "creative intelligence" the best teachers exhibit in the moment-by-moment practice of teaching (1996, p. 73); and design as a way of talking about the organizational structure of a product. The sections that follow briefly outline how the New London Group used the central concept of design to define a multiliteracies framework for teaching and learning (see Figure 2.1).

2.3.1. Designing meaning: Language and literacy from a social semiotic perspective

The New London Group (1996) conceptualized language as one of six resources for designing meaning, alongside visual, audio, gestural, spatial, and multimodal resources. Historically, systems and structures of meaning have been defined using the term "grammar" rather than "design" (e.g., traditional grammar, universal grammar), and these grammars have tended to focus more heavily on linguistic resources than the other

Theoretical assumptions
<ul style="list-style-type: none"> • <i>Language</i> is a dynamic set of available resources for designing meaning; other design resources include visual, audio, gestural, spatial, and multimodal resources (Halliday, 1978, 1994; Kress & van Leeuwen, 1996) • <i>Learning</i> to design is a situated and social process of making meaning, influenced by complex systems of people, environments, technologies, ideologies, and texts (Vygotsky, 1978, 1986) • <i>Social change</i> is a factor of the conditions in which meaning making occurs, leading to more or less reproductive or transformative outcomes (Fairclough, 1992) • A functional <i>metalanguage</i> can support teachers and students in analyzing, discussing, and critiquing texts (whether oral, written, or multimodal) and designing social futures (e.g., <i>genre</i>, <i>discourse</i>)
Pedagogical recommendations
<ul style="list-style-type: none"> • <i>Situated practice</i>: connecting with students' meaning-making experiences, familiar and new • <i>Overt instruction</i>: using functional metalanguage to name and develop conscious awareness of meaning-making choices and their effects • <i>Critical framing</i>: analyzing texts in relation to the workings of history, society, culture, power, politics, and ideology • <i>Transformed practice</i>: creating ways for students to apply multiliteracies creatively and knowledgeably according to context and in a reflective manner

Figure 2.1: Multiliteracies framework (New London Group, 1996).

types. However, many teachers and students have negative associations with the term “grammar” based on their experiences with prescriptive English syntax influenced by structural linguistics and decontextualized drill and kill exercises influenced by behavioral psychology (Gebhard, Accurso, & Chen, 2019). Therefore, in choosing the term “design” rather than “grammar” to describe forms of meaning, the New London Group had two aims: to leave behind negative associations with the term “grammar;” and to shift the field’s focus from form to function and from language alone to multimodality in literacy teaching and learning.

In doing so, they drew heavily on a social semiotic perspective of meaning making (e.g., Halliday, 1978, 1994; Kress & van Leeuwen, 1996). From this perspective, meaning does not arise from form as structural theories of language have suggested (e.g., Chomsky, 1972). Rather meaning and form are dialectically related to one another and the social context in which meaning making is occurring (e.g., Byrnes, Maxim, & Norris, 2010). Further, all design choices are ideologically and politically inflected, and are influenced by the unequal distribution of semiotic resources in society (e.g., Halliday, 1985). In each communicative act, people creatively apply and combine their available resources according to their purpose and audience to create texts³ that accomplish social, cognitive, academic, and political work. Thus the process of designing is one in which people simultaneously draw on available design resources and transform them to create new meanings.

Within this framework, each act of designing accomplishes three functions: an ideational function, the purpose of which is to communicate about the environment; an interpersonal function, which seeks to act on others within the environment; and a textual function, which “breathes relevance into the other two” by organizing information according to the mode of communication (Halliday, 1985, p. xiii). All design choices – linguistic, visual, spatial, and so on – are organic configurations of these functions, and each choice can be interpreted as functional with respect to the whole. In sum, a social semiotic perspective is open-ended, flexible, functional, and seeks to describe meaning-making choices for representing knowledge, constructing social relationships, and

³ Following Fairclough (1989, p. 27), “text” refers to gestures, oral, written, and multimodal means of interacting.

managing flows of information across increasingly multimodal channels of communication (Cope & Kalantzis, 2005).

2.3.2. Discussing design: A metalanguage for talking about meaning-making interactions

In a multiliteracies framework, literacy teaching is not simply about having students identify parts of speech and memorize rules for combining these parts. Instead, it involves helping students develop critical language awareness, or an explicit understanding of how design resources are used to participate in social activity, and how the context of the social activity is simultaneously encapsulated in their design choices. To this end, teachers and students need a metalanguage, or a way to “say sensible and useful things about any text, spoken or written” (Halliday, 1985, p. xv). Echoing Halliday, the New London Group called for “an educationally accessible functional...metalanguage that describes meaning in various realms” (1996, p. 77).

Toward this end, they highlighted some salient terms from Halliday’s (1973, 1985) functional metalanguage, particularly the terms “genre” and “discourse” (New London Group, 1996, p. 78). “Genre” refers to recurrent purposes for design (e.g., recounting, joking, requesting, reporting) that lead to recurrent text types (e.g., recounts, jokes, restaurant orders, evening news reports). In K-12 settings, much work has gone into describing the purpose and structure of predominant genres associated with schooling (e.g., narratives, procedural recounts, explanations, expositions; see Schleppegrell, 2004) and supporting students to analyze, produce, and critique these genres (e.g., Derewianka & Jones, 2016). However, it is important to note that many

designs cannot be specified in terms of clearly defined and socially labeled genres. In daily life and work, people regularly mix genres or design hybrid genres (Gebhard, 2005; Gutiérrez, Baquedano-López, & Tejeda, 1999). Given that both convention and variation characterize the design process, critical comparison is the most important component of discussions around design and genre. Thus, a pedagogy of multiliteracies calls for teachers and students to use metalanguage to discuss how a text is similar to other texts used in comparable social contexts, the institutional location of a text, the social relations of author and audience, and the social practices within which they are embedded. In addition, a pedagogy of multiliteracies calls for teachers and students to discuss finer-grained differences within text types using the metalanguage of “discourse.”

“Discourse” refers to varieties of language that differ according to different situations or points of view.⁴ Discussions of discourse encompass the ideational, interpersonal, and textual functions of design, and draw attention to “the diversity of constructions (representations) of various domains of life and experience associated with different voices, positions, and interests (subjectivities)” across different modes of communication (New London Group, 1996, p. 78). As is the case with genre, there has been a great deal of work done to clearly demarcate, name, and teach conventional discourses (e.g., academic language; see Cummins, 1979; Solomon & Rhodes, 1995; Wong Fillmore & Snow, 2000). However, many critical scholars, including members of the New London Group, have pointed out that demarcating certain design choices in relation to certain identities is an ideological act and should be discussed as such (e.g., Alim, 2011; Luke, 2018; Flores & Rosa, 2015). Therefore, a pedagogy of multiliteracies

⁴ The New London Group’s metalanguage of “discourse” roughly corresponds to Halliday’s metalanguage of “register” (Halliday, McIntosh, & Stevens, 1964).

calls for critical classroom conversations that use the metalanguage of discourse to compare representations of ideas and relationships from different points of view, rather than focus on the reproduction of certain conventional discourses or design choices.

In addition to endorsing specific metalanguage such as “genre” and “discourse,” the New London Group (1996) offered the following criteria for any additional metalanguage to be developed for use in schools: (1) must be capable of supporting critical analysis of semiotic systems; (2) must not make unrealistic demands on teachers’ and students’ knowledge; (3) must not have existing associations with formalism; (4) must be flexible and open-ended so teachers and students can pick and choose from the tools offered; and (5) must be designed to identify and explain differences between texts and relate these differences to their contexts, not set standards, impose rules, or privilege certain discourses.

2.3.3. Learning to design: Pedagogy focused on situated practice and overt instruction

Parallel to their context-sensitive, sociocultural conceptualization of language and literacy, the New London Group (1996) also conceptualized the human mind and the development of knowledge as contextual and sociocultural phenomena. Following Vygotsky (1978, 1986), they argued that the mind is embodied, situated, and social. This conceptualization stands in contrast to prior cognitive theories that conceived of the mind as a sort of computer that processes general rules and decontextualized abstractions (e.g., Chomsky, 1972; Newell & Simon, 1972). From a sociocultural standpoint, the development of knowledge is a contextual process of learning how to mean in which

people design or make meaning in interaction with acculturated others, thereby expanding both their cognitive and meaning-making repertoires (Hasan, 2005a). Though language is just one semiotic resource, it has a central and unique role in learning (Vygotsky, 1986). As a semiotic tool, language is internalized and mediates mental activity as people interact with their worlds. This conceptualization of learning has clear implications for education, namely that students learn by participating in interactions with others, and that they learn language and other design resources at the same time they learn to *do* things with those resources. In other words, people learn through experience and the practice of recognizing and acting on contextual and sociocultural patterns. Therefore, a pedagogy of multiliteracies must engage students in authentic versions of “situated practice” where they engage with peers and teachers with varying backgrounds and levels of expertise across disciplines (New London Group, 1996, pp. 84–85; see Figure 2.1).

However, immersion in experience does not necessarily lead students to conscious control and awareness of what they know and do. Therefore, the New London Group (1996, p. 86) also called for “overt instruction” in which students shape for themselves an explicit metalanguage of design. Overt instruction does not imply that a teacher should simply tell students how to mean or what to design. Rather, overt instruction focuses students on important features of their experience. A teacher engaging in overt instruction would use functional metalanguage to draw attention to what their students already knew and had accomplished. During that process, students would have the opportunity to develop a conscious awareness of the teacher’s interpretation and representation of a task. Further, they would have the opportunity to reflect on the form,

content, and function of different discourses and genres to develop generalizations of their own.

2.3.4. Designing social futures: Critical framing and transformed practice

The New London Group (1996) argued that when students have critical awareness, they can become active and conscious participants in social change. Put another way, a multiliteracies framework is meant to support students in becoming conscious and reflective designers of social futures. Thus, a pedagogy of multiliteracies is meant to be critical in two senses: (1) students will develop critical understanding or conscious awareness and control over a wide range of multimodal design resources; and (2) students will develop an ability to locate, critique, create, and reflect on texts according to their historical, social, cultural, political, and ideological contexts. According to the New London Group (1996), the former is addressed by the pedagogical concepts of situated practice and overt instruction, while the latter is addressed by what they term “critical framing” and “transformed practice” (p. 87).

Critical framing refers to the process of interpreting the social context and purposes of a text so that students understand the dialogical relationship between text and context and the way that relationship is influenced by specific structurings of power and domination. This process of critical framing is meant to denaturalize genre and discourse practices that have been canonized in K-12 settings and prevent situated practice and overt instruction from being unconscious or uncritical. By analyzing what ideas, interests, and ideologies have been foregrounded and backgrounded in different texts, including those they design, students can “gain the necessary personal and theoretical distance from

what they have learned, constructively critique it, account for its cultural location, creatively extend and apply it, and eventually innovate on their own, within old communities and in new ones” (New London Group, 1996, p. 87).

The final plank of a pedagogy of multiliteracies is “transformed practice” (see Figure 2.1). Following the recursive processes of situated practice, overt instruction, and critical framing, students engage in a sort of re-practice or transformed practice in which they have the opportunity to design and reflect on a text in a way that connects with their own goals and values. In essence, students need situated opportunities to recontextualize their learning by applying and revising what they have learned. In this process, teachers have the opportunity to both evaluate the learning processes and environments they have designed and assess learners.

To summarize, in a multiliteracies framework, each instance of design reflects, or is the “expression form” of a social situation, culture, and set of ideologies. At the same time, design is a social action that works to construct, maintain, reproduce, resist, adapt, or transform social structures (New London Group, 1996; see also Halliday, 1978). This conceptual model, along with the associated metalanguage and pedagogical recommendations, provides a schema and explicit language for understanding and analyzing the dialectic relationship between text and context. Further, this critical sociocultural framework suggests a literacy pedagogy characterized by immersion in experience, explicit instruction, interpretation of the social and cultural context of texts, and opportunities for students to recontextualize their knowledge for the purposes of assessment and reflection. The goal of such pedagogy is to support students’ ability to act flexibly and adaptably in different contexts using language and other meaning making

resources; develop language awareness and control; and recognize and critique power, politics, and ideology. In other words, a pedagogy of multiliteracies is intended to support students in developing their capacities to “speak up, to negotiate, and to be able to engage critically with the conditions of their lives” as members in fast-changing and culturally diverse societies (New London Group, 1996, p. 67).

2.4. Literature Review Methods

This review was conducted following Cooper’s (2015) systematic review protocol for synthesizing research in the social sciences, which includes seven general stages: (1) formulating the problem; (2) searching the literature; (3) gathering information from the literature; (4) evaluating the quality of studies; (5) analyzing and integrating study outcomes; (6) interpreting the evidence; and (7) presenting the results. Next, the chapter describes the activities undertaken during each of these stages.

2.4.1. Stage 1: Formulating the problem

The goal of this review is to document specific changes in educational practice in the United States following the New London Group’s proposal of a multiliteracies framework. This interest in how theories of language and literacy inform models of teacher education stems from my former work as a teachers and current work as an applied linguist and teacher educator. Based on broad critiques that much education research does not trace connections between teacher preparation or professional development, teacher learning, and student learning (e.g., Cochran-Smith et al., 2005, 2012, 2015; Darling-Hammond, 2008, 2016; Grossman, 2008; Wilson, Foden, & Ferrini-Mundy, 2002; Zeichner, 2010a), this review was formulated around three research

questions that addressed those interrelated constructs. The central research question about teacher preparation assumes that teacher preparation will and should in some way influence what teachers do in the classroom and what opportunities students have for literacy development. The subsequent questions regarding outcomes of teacher preparation for both teachers and students test this assumption.

2.4.2. Stage 2: Searching the literature

Seven main search terms were used to locate published work related to the research questions (*multiliteracies, literacy pedagogy, professional development, teacher education, teacher preparation, teacher learning, student learning*) in three online databases (Google Scholar, Academic Search Premier, and ERIC). In addition, leading scholars in the fields of teacher education, literacy research, and applied linguistics contributed citations for their single-author publications, published work on which they collaborated with colleagues or students, and/or their students' own publications. These initial search strategies led to 9,920 results.

As Figure 2.2 illustrates, this body of literature was narrowed significantly by using the following inclusion criteria: (a) descriptive reports of PD efforts or empirical research; (b) published in peer-reviewed journals, books, edited volumes, or technical reports; (c) published after 1996 when the New London Group released their “programmatic manifesto” (1996, p. 63); (d) from K-12 settings; and (e) from the United States. The application of these inclusion criteria meant removing unpublished doctoral dissertations (e.g., Daniello, 2012; Gómez-Pereira, 2018; Moore, 2014; O’Hallaron, 2014; Patrick, 2009); papers published in conference proceedings (e.g., de Freitas &

Publications Located Using Combined Search Terms <ul style="list-style-type: none"> • Multiliteracies, literacy pedagogy, professional development, teacher education, teacher preparation, teacher learning, student learning 	9,920
Publications Narrowed Using Inclusion Criteria <ul style="list-style-type: none"> • Descriptive reports of professional development efforts • Empirical studies of professional development efforts (including technical reports from PD program evaluators) • Published in peer-reviewed journals, books, edited volumes, or technical reports • Published after 1996 • From K-12 settings • From the United States 	214
Publications Further Narrowed Using Exclusion Criteria <ul style="list-style-type: none"> • Conception of multiliteracies framework does not match New London Group's (i.e., critical social semiotic perspective of language, learning, and social change) • Multiliteracies framework used for data analysis, but not teacher professional development • Classroom study not clearly related to a specific professional development program • Empirical studies with weak methods (e.g., lacking detailed descriptions of research methods, qualitative or mixed method studies that did not include triangulation of data sources, quantitative or mixed studies that did not use reliable and valid measures) 	99

Figure 2.2: Summary of literature search and evaluation process.

Zolkower, 2010; Zolkower & de Freitas, 2010); publications from higher and adult education (e.g., Byrnes, 2012; Colombi, 2009; Ramirez, 2018; Shin & Cimasko, 2008); reports on PD efforts in international contexts (e.g., Hipkiss & Varga, 2018; Macken-Horarik & Unsworth, 2014; Macnaught, Maton, Martin, & Matruglio, 2013); and publications that outlined models or strategies for PD, but did not report on a specific PD that had been developed and delivered to teachers (e.g., Aguirre-Muñoz, 2014). By applying these inclusion criteria, the literature was narrowed to 214 publications.

2.4.3. Stages 3 and 4: Gathering information from and evaluating the literature

After narrowing the search results, the remaining 214 publications were indexed in an Excel file where the following information was recorded for each publication: year

of publication, type of publication (i.e., journal article, book chapter, descriptive report, empirical study), location of the PD program, research focus on teacher and/or student learning outcomes, grade level targeted, research methods, and key findings. During this process, the quality of the publications was evaluated and considered against their suitability to the research questions to define exclusion criteria (see Figure 2.2).

With regard to quality, empirical studies that lacked detailed descriptions of research methods, qualitative or mixed method studies that did not include triangulation of data sources, and quantitative or mixed method studies that did not use reliable or valid measures were excluded. With regard to suitability, three additional exclusion criteria were developed: (a) publications that invoked a multiliteracies framework, but did not share the same conception of this framework as the New London Group (1996); (b) empirical studies that used a multiliteracies framework for analysis but not for teachers' professional development (e.g., Ajayi, 2012); and (c) empirical studies of a pedagogy of multiliteracies in K-12 classroom contexts, but that were not clearly related to a particular teacher PD effort (e.g., Paugh & Moran, 2013). Regarding this final criteria, in cases where a study's connection to a structured PD was unclear, the author(s) were contacted to request further clarification.

Interestingly, many studies reporting on a pedagogy of multiliteracies did not address how classroom teachers were prepared to develop and implement this pedagogy, meaning they were not helpful for tracing clear connections between the New London Group's multiliteracies framework, PD programming, and teacher and student learning. For example, Paugh and Moran's (2013) article turned up in the initial literature search and met the inclusion criteria. However, the article was excluded at this stage because

Table 2.1: Designs implemented in empirical studies by type and frequency (n=82).

RESEARCH DESIGN	Number of empirical studies	Percent of empirical studies*	Total number of teachers studied	Total number of students studied
QUALITATIVE	65	79%	255	1,260
Case study	33	40%		
Ethnographic case study	22	27%		
Discourse analysis	20	25%		
Design-based research	11	14%		
Participatory action research	8	10%		
Action research	6	7%		
Constant comparative method	4	5%		
MIXED METHODS	14	17%	323	3,201
QUANTITATIVE	3	4%	68	3,250
Quasi-experimental	2	3%		
Cluster randomized experiment	1	1%		
TOTAL	81	100%	646	7,711

**Note: Bolded design categories account for 100% of empirical studies reviewed. However, some studies employed multiple methods (e.g., participatory action research, ethnographic methods, and discourse analysis), therefore percentages of research design subcategories do not total 100%.*

there was no mention of how the classroom teacher involved in the study came to be prepared to enact a pedagogy of multiliteracies. Instead, this study focused exclusively on the pedagogy itself and how students responded. Correspondence with the authors further revealed that the focal teacher came to develop a pedagogy of multiliteracies through self-study, rather than by participating in a structured PD.

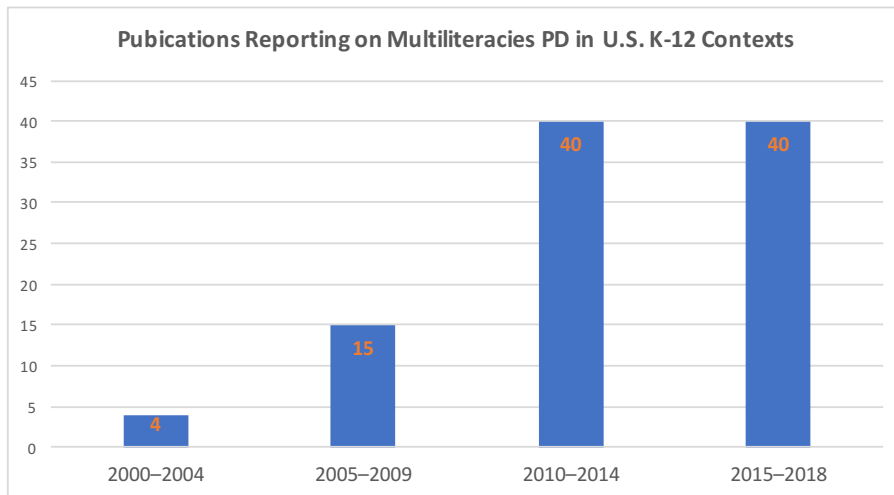


Figure 2.3: Frequency of multiliteracies PD publications in the United States by year.

By applying the exclusion criteria, the literature was further narrowed to 99 publications that report on 24 PD efforts.⁵ This literature spans the years 2000–2018 and includes descriptive reports of PD efforts in the United States that draw on a multiliteracies framework, studies of pre- and in-service teachers’ participation in multiliteracies PD, studies of teachers’ work following multiliteracies PD, and studies of change in students’ literacy practices over time as teachers implemented what they learned. Empirical studies collected represent a range of research methods, though the majority are qualitative in nature (Table 2.1). The literature cuts across grade levels, content areas, and geographic regions. Further, as Figure 2.3 illustrates, over 80% of this literature has been published since 2010, suggesting a marked increase in the mobilization of the multiliteracies framework in PD over the last 10 years.

⁵ Though this review followed rigorous and systematic literature review procedure, it is not exhaustive. Notably missing are professional development programs known to the author of this review, but not well represented in published literature (e.g., *Project CREATE* at St. Michael’s College; University of Pittsburgh’s *Expanding Students’ Language Repertoires*, see Accurso, 2017). Further, I acknowledge that my inclusion and exclusion criteria may have removed some studies for consideration that present important findings related to this topic of inquiry.

2.4.4. Stages 5 and 6: Analyzing, integrating, and interpreting study outcomes

Following data reduction, the 99 remaining publications were analyzed to determine what conclusions related to the research questions were warranted by this body of literature. Cooper (2015) advocates statistical meta-analysis during these stages; however, much of the literature collected for this review was qualitative in nature and had small sample sizes. Therefore, the 99 remaining publications were subjected to a four-step qualitative analysis procedure that was anchored in the theoretical framework and research questions (Creswell & Creswell, 2017). The goal of this analysis was to identify patterns across studies that would allow for making claims about the collective impact of multiliteracies PD on K-12 teachers and students.

The first step of analysis was close reading and open coding, a process that supported characterization of the different PD efforts and their outcomes. For example, because RQ1 is about how a multiliteracies framework has influenced the design of PD for K-12 teachers in the United States, some of the initial codes described the length and structure of each PD, as well as specific aspect(s) of the multiliteracies framework each PD appeared to be focusing on (e.g., multimodality, critical framing, metalanguage). Similarly, because RQ2 and RQ3 are about teacher and student learning, other initial codes described the different types of learning outcomes reported in each study's findings (e.g., types of learning, challenges that prevented learning). All preliminary codes were recorded in the Excel file.

Second, a refined set of closed codes was developed by reviewing all preliminary codes; supporting evidence for each code; and clarifying, expanding, enriching,

CODE	DEFINITION
PD Structure	Mechanism for delivering multiliteracies PD to teachers
University-school partnership	Ongoing, grant-funded professional development partnership between a university and school or district
University course	Semester-long course offered through a teacher education program
Self-contained workshop	Short-term PD ranging from 2 hours to one week, not offered through a university course or partnership
NLG Interests Represented in PD	Aspects of multiliteracies framework discussed in description of PD
Design	PD frames meaning-making as a dialogic design process
Metalanguage	PD makes use of a functional metalanguage for analyzing, discussing, and designing texts
Criticality	PD addresses the relationship between design and power, access, and ideology
Multimodality	PD addresses design resources beyond language (e.g., visual, gestural)
Affordances	Types of teacher/student learning achieved through multiliteracies PD
Semiotic awareness	Understanding of how language and other semiotic forms function to make meaning
Critical awareness	Understanding of the relationship between text, context, power, and ideology
Content knowledge	Understanding of disciplinary content (e.g., math, science, social studies, language arts)
Pedagogical knowledge	Ability to design curriculum, instruction, and/or assessment using pedagogical recommendation(s) from the multiliteracies framework
Disciplinary literacy practices	Ability to design texts that accomplish discipline-specific purposes
Confidence	Teachers' confidence for teaching disciplinary literacies and/or multilingual students; students' confidence for reading and writing in school
Challenges	Contextual factors that limit teacher/student learning
Intellectual demand	Framework places significant demands on knowledge base of teachers and teacher educators
Time	Need for adequate time to collaborate, design/adapt curriculum, and/or deliver effective instruction based on student needs
Professional support	Need for sustained professional collaboration and support from teacher educators/mentors
Institutional support	School climate does not support instructional change
Conflicting paradigms	Teachers take up principles from PD in ways that reproduce rather than challenge dominating ideologies

Figure 2.4: Refined codes related to literature review research questions.

contracting, or collapsing these codes. Figure 2.4 shows a list of refined codes related to the research questions. Third, all 99 publications were reviewed again to apply these refined codes and consider initial interpretations. Many studies illustrated multiple affordances and challenges. However, few studies investigated all the affordances and challenges represented across the literature. Therefore, absence of a code does not suggest an affordance or challenge was not found; rather, it may not have been part of the investigation. This second round of coding was documented in the Excel file, as well. Fourth, the literature was analyzed for salient trends using the qualitative codes as well as information gathered from each publication in Stage 3. During this process, the literature was grouped in different ways to identify patterns and better understand how these patterns might relate to one another and the three research questions. For example, the literature was grouped according to length of PD, grade level targeted, conceptual focus, program type, study outcomes, research methods, and sample size. However, as will go be discussed in the findings section, program type emerged as the most productive primary grouping for addressing RQ1 and for anchoring a discussion of RQ2 and RQ3.

The following section presents the findings from this analysis, thereby accomplish Stage 7 of Cooper's (2015) literature review protocol: "Presenting the Results."

2.5. Literature Review Findings

As Table 2.2 illustrates, the main vehicles for preparing teachers to engage in a pedagogy of multiliteracies were grant-funded university-school partnerships, university courses in teacher education programs, and self-contained PD workshops (RQ1). An analysis of the focus and outcomes from these PDs yielded five main findings. First, most PDs focused on three aspects of the multiliteracies framework: (a) introducing teachers to

Table 2.2: Characteristics of publications representing multiliteracies PD for K-12 teachers and students in the United States (2000–2018).

Type of PD	Grade Level(s)	Content Area(s)	State	PD Emphasis	Publications	Methods
University-School Partnerships						
<i>Professional Development Classroom</i> (PDC) project	Elementary	ELA History Science	FL	Design Metalanguage Criticality	Fang (2013); Florida’s Reading Best Practices Center (2000)	Quasi-experimental; descriptive report
<i>California History Project</i> (CHP)	Secondary	History	CA	Design Metalanguage Criticality	Achugar, Schleppegrell, & Oteíza (2007); Gargani (2009); Schleppegrell & Achugar (2003); Schleppegrell, Achugar, & Oteíza (2004); Schleppegrell & de Oliveira (2006); Schleppegrell, Greer, & Taylor (2008)	Qualitative (case study); design-based research; cluster-randomized experiment
<i>Access to Critical Content and Language Acquisition</i> (ACCELA)	Elementary/ Secondary	ELA History Math Science ESL	MA	Design Metalanguage Criticality Multimodality	Accurso, Gebhard, & Selden (2016); Austin, Willett, Gebhard, & Montes (2010); Gebhard, Chen, & Britton (2014); Gebhard, Demers, & Castillo-Rosenthal (2008); Gebhard, Habana Hafner, & Wright (2004); Gebhard, Harman, & Seger (2007); Gebhard, Shin, & Seger (2011); Gebhard & Willett (2008); Gebhard, Willett, Jimenez Caicedo, & Piedra (2011); Harman (2007, 2013); Harman & French (2011); Ramirez (2014); Schulze (2011, 2015, 2016a); Schulze & Ramirez (2007); Shin (2014); Shin, Gebhard, & Seger (2010); Shin & Seger (2016); Willett, Harman, Hogan, Lozano, & Rubeck (2017)	Qualitative (participatory action research, ethnographic case study, discourse analysis); descriptive report
<i>Teaching Academic Language in the Content Areas</i> (TALCA)	Elementary	ELA Science	MA	Design Metalanguage Criticality Multimodality	Brisk & de Rosa (2014); Brisk, Hodgson-Drysdale, & O’Connor (2010); Brisk, Homza, & Smith (2014); Brisk & Ossa Parra (2018); Brisk & Zisselsberger (2011); Daniello (2014); Daniello, Turgut, & Brisk (2014); Hodgson-Drysdale (2016); Pavlak (2013); Zisselsberger (2016)	Qualitative (case study, action research); mixed methods

Type of PD	Grade Level(s)	Content Area(s)	State	PD Emphasis	Publications	Methods
<i>Language and Meaning (L&M) project</i>	Elementary	ELA Science	MI	Design Metalanguage Criticality	Moore & Schleppegrell (2014); O'Hallaron (2014); O'Hallaron, Palincsar, & Schleppegrell (2015); Palincsar & Schleppegrell (2014); Schleppegrell (2010, 2013, 2016); Schleppegrell & Moore (2018); Schleppegrell, Moore, Al-Adeimi, O'Hallaron, Palincsar, & Symons (2014); Symons (2017); Symons, Palincsar, & Schleppegrell (2017)	Qualitative (case study, constant comparative method, discourse analysis); design- based research; descriptive report
<i>Teaching & Learning History in a Multilingual Classroom</i>	Secondary	History	PA	Design Metalanguage Criticality	Achugar (2009); Achugar & Carpenter (2012, 2014); Carpenter, Achugar, Walter, & Earhart (2015); Carpenter, Earhart, & Achugar (2014)	Qualitative (case study); mixed methods; design-based research Mixed methods
University of Northern Colorado teacher development project	Elementary/ Secondary	ELA History Math Science	CO	Design Metalanguage	Berg & Huang (2015); Huang, Berg, Romero, & Walker (2016); Huang, Berg, Siegrist, & Damsri (2017)	
<i>Language in Math (LiM) project</i>	Secondary	Math	FL	Design Metalanguage Criticality Multimodality	Avalos, Medina, & Secada (2015); Avalos, Zisselsberger, Langer-Osuna, & Secada (2015)	Descriptive report
University Education Courses (literacy methods, content area methods, sheltered English, discourse analysis in education)	Elementary	ELA	TX	Metalanguage	Aguirre- Muñoz, Chang, & Sanders (2015)	Mixed methods
		ELA Science	IN	Design Metalanguage Criticality Multimodality	de Oliveira (2008, 2015, 2016); de Oliveira & Dodds (2010); de Oliveira, Klassen, & Gilmetdinova (2014); de Oliveira & Lan (2014); de Oliveira, Lan, & Dodds (2014)	Qualitative (case study, constant comparative method); descriptive report
		Science	NY	Design Metalanguage Criticality Multimodality	Shin (2016, 2018)	Qualitative (case study, discourse analysis)

Type of PD	Grade Level(s)	Content Area(s)	State	PD Emphasis	Publications	Methods
University Education Courses (literacy methods, content area methods, sheltered English, discourse analysis in education) <i>cont'd</i>	Elementary/ Secondary	ELA History Math Science	FL	Design Metalanguage Criticality	Fang, Adams, Li, Gallingane, Jo, Fennessy, & Chapman (2017); Fang, Sun, Chiu, & Trutschel (2014)	Qualitative (constant comparative method)
	Secondary	ELA History Math Science	MA	Design Metalanguage Criticality Multimodality	Accurso, Gebhard, & Purington (2017); Gebhard, Chen, Graham, & Gunawan (2013); Gebhard & Graham (2018)	Qualitative (participatory action research, ethnographic case study, discourse analysis); mixed methods
	Secondary	ELA	PA	Design Metalanguage Criticality	Achugar & Carpenter (2018)	Descriptive report
	Secondary	ELA	GA	Design Metalanguage Criticality	Harman & Khote (2018); Harman & Simmons (2014); Khote (2018); Simmons (2016a, 2016b, 2018)	Qualitative (participatory action research, ethnographic case study, discourse analysis)
		History	MA	Design Metalanguage Criticality Multimodality	Schall-Leckrone (2017, 2018); Schall-Leckrone & Barron (2018); Schall-Leckrone, Barron, Konuk, & Kain (2018); Schall-Leckrone & McQuillan (2012, 2014)	Qualitative (action research, case study); mixed methods
			FL	Design Metalanguage Criticality	de Oliveira & Avalos (2018)	Descriptive report

Type of PD	Grade Level(s)	Content Area(s)	State	PD Emphasis	Publications	Methods
University Education Courses (literacy methods, content area methods, sheltered English, discourse analysis in education) <i>cont'd</i>		History	NV	Design Metalanguage Criticality	Schulze (2016b)	Mixed methods
		Math	NY	Metalanguage Criticality Multimodality	de Freitas & Zolkower (2009, 2011)	Qualitative (case study); descriptive report
Self-contained PD Workshops	Elementary/ Secondary	ELA	IA	Metalanguage	Slater & McCrocklin (2016)	Qualitative (case study)
	Secondary	ELA	CA	Metalanguage	Aguirre-Muñoz (2014); Aguirre-Muñoz, Park, Amabisca, & Boscardin (2008); Aguirre-Muñoz, Park, Benner, Amabisca, & Boscardin (2006)	Mixed methods
		History	PA	Design Metalanguage Criticality	Achugar, Schleppegrell, & Oteíza (2007); Achugar & Stainton (2010)	Descriptive report
		Spanish	WA	Design Metalanguage Criticality	Achugar, Schleppegrell, & Oteíza (2007)	Descriptive report

a functional metalanguage; (b) introducing literacy teaching and learning as a design process; and (c) engaging teachers in critical text analysis. Second, with regard to teacher learning, virtually all PDs (>90%) influenced teachers' level of semiotic awareness and ability to design more focused disciplinary literacy instruction (RQ2). Teachers' critical awareness, confidence for literacy instruction, and content knowledge were influenced to a lesser extent. Third, teachers' implementation of this knowledge supported students' level of semiotic awareness, which facilitated students' simultaneous development of disciplinary knowledge and associated literacy practices (RQ3). Some students also experienced increased critical awareness and confidence for reading and writing in school. Fourth, more sustained investments in teacher professional development through university- school partnerships led to greater gains in teacher and student learning. In addition, these partnerships more effectively fostered teachers' and students' critical awareness of the relationship between disciplinary literacy practices and ideologies more than individual university courses or PD workshops (RQ2, RQ3). Fifth, regarding challenges to teacher and student learning, all types of PD placed significant demands on the knowledge base of teachers and teacher educators, and had the potential to reproduce dominating language ideologies in schools (RQ2, RQ3). These findings will be further discussed in the following review of the literature.

2.5.1. Finding 1: PDs focus mainly on functional metalanguage, design, and criticality

The majority of PDs focused on introducing teachers to three aspects of the multiliteracies framework: (1) a functional metalanguage; (2) literacy teaching and

learning as an interactive design process; and (3) critical text analysis. Though PDs introduced teachers to different metalanguage depending on their length, content, and semiotic focus (e.g., metalanguage for talking about evaluation in science texts, metalanguage for naming different genres in language arts), all PDs introduced teachers to functional terms for noticing and naming genre and/or discourse level design resources. All but four PDs (two university courses and two self-contained workshops) appeared to anchor their introduction of metalanguage in a conception of meaning-making as a design process (e.g., Aguirre-Muñoz et al., 2008, 2015; de Freitas & Zolkower, 2009, 2011; Slater & McCrocklin, 2016).

Similarly, all but four PDs (one partnership, one university course, and two self-contained workshops) took up the New London Group's conception of criticality in encouraging teachers to integrate a functional metalanguage into their literacy pedagogy (e.g., Aguirre-Muñoz et al., 2008, 2015; Berg & Huang, 2015; Slater & McCrocklin, 2016). PDs that incorporated critical text analysis did so as a way for teachers and students to develop more critical understandings of text in context. However, it is important to recall that the New London Group (1996, p. 85) offered two definitions of "critical understanding" and PDs drew differently on these definitions. Some PDs used the first definition, which defines critical understanding as a more conscious awareness of the design resources and decisions that authors in different disciplinary contexts draw on and for what purposes (e.g., de Oliveira et al., 2010, 2014; Schleppegrell et al., 2004, 2008, 2017, 2018). These PDs explored meaning and design within specific disciplinary discourse communities. Other PDs used the second definition, which defines critical understanding as an ability to critique design resources and decisions based on the

workings of power, politics, and ideologies (e.g., de Freitas & Zolkower, 2009; Harman et al., 2014, 2018; Khote, 2018; Simmons, 2016a, 2016b, 2018). These PDs explored meaning and design as influenced by broader historical and sociopolitical contexts. A third group of PDs attempted to address both definitions of critical understanding. Notably, this third group included only more sustained PD models (e.g., Achugar & Carpenter, 2012, 2014; Brisk & Ossa Parra, 2018; Gebhard et al., 2007, 2008, 2014, 2018; Zisselsberger, 2016).

In addition to metalanguage, design, and criticality, a small subset of PDs (29%) addressed multimodality in the design process. Multimodality, or the use of language and other design resources to make meaning, is a key plank of the multiliteracies framework, yet most PDs focused solely on language. Interestingly, PDs that explicitly attended to multimodality tended to be those designed for math and science teachers (e.g., Avalos et al., 2015; de Freitas & Zolkower, 2011) or those that cut across disciplines and included math and science teachers (e.g., Accurso et al., 2017; Brisk et al., 2010; de Oliveira, 2015; Gebhard et al., 2014; Shin, 2016; Shin et al., 2010, 2016), with the exception of one PD designed specifically for secondary history teachers (Schall-Leckrone, 2018).

2.5.2. Finding 2: Teacher learning includes semiotic awareness, pedagogical knowledge, and confidence

As Table 2.3 illustrates, 77 of the 99 publications reviewed were empirical studies of teacher learning following multiliteracies PD with a total sample size of 646 pre- and in-service teachers. The three predominant learning outcomes for teachers in these studies were: (1) increased semiotic awareness, specifically a greater awareness of how language

Table 2.3: Frequencies of affordance codes in empirical studies of teacher learning (n=77).

Code	Frequency		Empirical Sources
	n	%	
Semiotic awareness	75	97%	Accurso et al. (2016, 2017); Achugar (2009); Achugar & Carpenter (2012); Aguirre-Muñoz (2014); Aguirre-Muñoz et al. (2006, 2008, 2015); Austin et al. (2010); Berg & Huang (2015); Brisk et al. (2010, 2011, 2014, 2018); Carpenter et al. (2014, 2015); Daniello (2014); Daniello et al. (2014); de Freitas & Zolkower (2011); de Oliveira (2008, 2016); de Oliveira et al. (2010, 2014); Fang et al. (2008, 2014, 2017); Florida's Reading Best Practices Center (2000); Gebhard et al. (2004, 2007, 2008, 2011, 2013, 2014); Harman (2007, 2013); Harman et al. (2011, 2014, 2018); Hodgson-Drysdale (2016); Huang et al. (2016, 2017); Khote (2018); Moore & Schleppegrell (2014); O'Hallaron (2014); O'Hallaron et al. (2015); Pavlak (2013); Ramirez (2014); Schall-Leckrone (2018); Schall-Leckrone et al. (2012, 2014, 2018); Schleppegrell (2010); Schleppegrell et al. (2008, 2018); Schulze (2015, 2016a, 2016b); Schulze & Ramirez (2007); Shin (2014, 2016, 2018); Shin et al. (2010, 2016); Simmons (2016a, 2016b, 2018); Slater & McCrocklin (2016); Symons (2017); Symons et al. (2017); Willett et al. (2017); Zisselsberger (2016)
Pedagogical knowledge	71	92%	Accurso et al. (2016, 2017); Achugar (2009); Achugar & Carpenter (2012); Aguirre-Muñoz (2014); Aguirre-Muñoz et al. (2006, 2008, 2015); Berg & Huang (2015); Brisk et al. (2010, 2011, 2014, 2018); Carpenter et al. (2014, 2015); Daniello (2014); Daniello et al. (2014); de Freitas & Zolkower (2011); de Oliveira (2008, 2016); de Oliveira et al. (2010, 2014); Fang et al. (2008, 2017); Florida's Reading Best Practices Center (2000); Gargani (2009); Gebhard et al. (2004, 2007, 2008, 2011, 2013, 2014); Harman (2007, 2013); Harman et al. (2014, 2018); Hodgson-Drysdale (2016); Huang et al. (2016, 2017); Khote (2018); Moore & Schleppegrell (2014); O'Hallaron (2014); O'Hallaron et al. (2015); Pavlak (2013); Ramirez (2014); Schall-Leckrone (2017, 2018); Schall-Leckrone et al. (2014, 2018); Schleppegrell (2010); Schleppegrell et al. (2008, 2018); Schulze (2015, 2016a); Shin (2014, 2016, 2018); Shin et al. (2010, 2016); Simmons (2016a, 2016b, 2018); Slater & McCrocklin (2016); Symons (2017); Symons et al. (2017); Willett et al. (2017); Zisselsberger (2016)
Critical awareness	35	45%	Achugar (2009); Achugar & Carpenter (2012); Austin et al. (2010); Brisk & Ossa Parra (2018); Carpenter et al. (2014, 2015); de Freitas & Zolkower (2011); de Oliveira et al. (2014); Florida's Reading Best Practices Center (2000); Gebhard et al. (2007, 2008, 2011, 2013, 2014); Harman (2007); Harman et al. (2011, 2014, 2018); Khote (2018); O'Hallaron et al. (2015); Ramirez (2014); Schall-Leckrone et al. (2018); Schleppegrell (2010); Schleppegrell et al. (2008, 2018); Schulze & Ramirez (2007); Shin (2014); Shin et al. (2010, 2016); Simmons (2016a, 2016b, 2018); Willett et al. (2017); Zisselsberger (2016)

(cont'd on next page)

Code	Frequency		Empirical Sources
	n	%	
Confidence	16	21%	Accurso et al., (2016, 2017); Aguirre-Muñoz et al. (2008); Brisk & Zisselsberger (2011); Daniello (2014); Fang (2013); Florida’s Reading Best Practices Center (2000); Gebhard et al. (2011, 2013); Huang et al., (2016, 2017); Schall-Leckrone & McQuillan (2012, 2014); Schall-Leckrone & Barron (2018); Schall-Leckrone et al. (2018); Schulze (2016b); Shin (2016)
Content knowledge	5	6%	Austin et al. (2010); Carpenter et al. (2014, 2015); Gebhard et al. (2004); Zisselsberger (2016)

works in the genres they routinely assign students to read and write in school (92% of teachers); (2) increased pedagogical knowledge, or the ability to design more effective language-focused curriculum, instruction, and assessments (88% of teachers); and (3) increased confidence for literacy teaching (46% of teachers).

Teachers’ semiotic awareness. All PD types were effective for increasing teachers’ semiotic awareness, which refers to teachers’ understanding of how language and other semiotic forms function to make meaning. For example, Fang and his colleagues used a constant comparative method to analyze 39 in-service elementary and secondary teachers’ written reflections on their learning during a 10-week PD structured as a university course (Fang, Sun, Chiu, & Trutschel, 2014). These authors reported that over 80% of teachers found their introduction to the multiliteracies framework “enlightening” regarding “the fact that the language in each subject area differs so much” (p. 62). Using similar qualitative research methods within the context of a three-year PD structured as a university-school partnership, O’Hallaron and her colleagues analyzed 23 in-service elementary teachers’ oral and written responses to the PD as well as observations of their teaching (O’Hallaron, Palincsar, & Schleppegrell, 2015). These authors reported on teacher learning relative to one module of the PD that focused on the

notion of author perspective in elementary science texts. During this module, teachers who had already been introduced broadly to a multiliteracies framework learned some functional metalanguage for identifying author attitude and participated in sample text analysis activities. The authors report that as a result, a majority of teachers in the PD came to see informational science texts as ideologically positioned, rather than simply declarative, and were able to identify specific language forms that functioned to indicate an author's perspective or attitude in an informational science text (e.g., interpersonal adjuncts, tokens of appraisal, first and second person pronouns, modal verbs, the use of questions and commands).

Across both studies, teachers developed a heightened awareness of school texts they routinely assigned (e.g., historical accounts, informational reports), the linguistic features of these texts, and the difficulties students may encounter when learning to read and write such texts. These findings are confirmed in a number of other case studies that focus on teachers' increased understanding of other school genres such as scientific explanations, procedural and descriptive reports, biographies, and primary source documents (e.g., Accurso et al., 2016; Brisk et al., 2010; Brisk & Zisselsberger, 2011; Gebhard et al., 2004, 2014; Achugar & Carpenter, 2012).

To a lesser degree, even short, self-contained PD workshops were successful at heightening teachers' semiotic awareness. For example, Slater and McCrocklin (2016) analyzed interview data from nine teachers who completed a 2-hour workshop focused on metalanguage for unpacking meaning in children's storybooks (e.g., discourse features such as *participants*, *processes*, and *circumstances*). The authors reported that teachers experienced increased awareness of how language functions to create characters, tell

stories, and inform, entertain, and engage readers. Further, teachers were surprised to find that the metalanguage supported them in recognizing patterns that offered evidence to support their intuitions about the storybooks. However, the authors note that they would encourage other teacher educators to offer longer workshops so teachers would have the opportunity to build more confidence in using metalanguage to analyze storybooks with their students. Nevertheless, this study illustrates that teachers can begin to develop a basic working knowledge of the multiliteracies framework in ways that allow them to describe how authors construct meaning.

Teachers' pedagogical knowledge. In addition to semiotic awareness, all PD types were effective for supporting teachers' increased pedagogical knowledge, though to varying degrees. In this review, pedagogical knowledge refers to teachers' ability to design literacy curriculum, instruction, and assessments in specific content areas. Findings regarding each aspect of pedagogical knowledge will be discussed separately. First, teachers made gains in curriculum design only through participation in sustained PD, most often delivered as part of a university-school partnership. This trend is best illustrated by a collection of ethnographic case studies that emerged from a partnership in Massachusetts called the ACCELA Alliance (Access to Critical Content and English Language Acquisition). This PD was designed as a participatory action professional development and research partnership. In collaboration with university faculty and doctoral students, 61 practicing teachers earned a master's degree in Education and a state license to teach English as an additional language. Over the course of the two-year program, teachers were introduced to the multiliteracies framework, practiced using functional metalanguage to analyze student writing, and designed curricular units

drawing on a pedagogy of multiliteracies and a complementary pedagogical cycle known as the Teaching and Learning Cycle (Derewianka & Jones, 2016). After implementing their curricular units, teachers analyzed changes in students' literacy practices to reflect on their practice, assess student learning, and inform subsequent instructional decisions.

Representative case studies describe a fifth-grade teacher's design of a unit on persuasive letter writing to support students in arguing for the reinstatement of recess at their school (Gebhard, Harman, & Seger, 2007); another fifth-grade teacher's design of a unit on personal narratives to support her students in building community by mentoring a class of second-grade students (Harman, 2013); and a second-grade teacher's design of a unit around blogging to support her students in effectively sharing work with family and community members and inviting their responses (Shin, 2014). In each of these studies, PD influenced the teachers' ability to design curriculum that coupled a locally responsive and authentic goal for literacy learning with a genre well-suited to accomplishing students' academic, social, and political goals. In the PD, teachers had an opportunity to practice analyzing the salient semiotic features of their target genre with respect to their meaning-making function and planned and implemented lessons that explicitly addressed the use of these features using model texts (e.g., textbook passages, published literature, teacher- or student-written models), overt instruction, and text deconstruction activities.

Findings from the ACCELA case studies are corroborated by 15 qualitative and mixed methods studies of other PD partnerships, which demonstrated that a majority of partnership teachers developed qualitative and statistically significant improvements in lesson and unit design (e.g., Berg & Huang, 2015; Brisk & Zisselsberger, 2011; Huang et al., 2016, 2017; Schleppegrell et al., 2008), as well as increased independence in

curriculum planning (e.g., Fang et al., 2008). In addition, descriptive reports of the *Language in Math* partnership in Florida suggest the PD was effective for supporting secondary math teachers to engage in purposeful planning to apprentice students into problem-solving and math discourse, as well as academic conversations, and making meaning from visual representations (e.g., Avalos et al., 2015).

Second, with regard to classroom practice, empirical evidence suggests all three types of PD supported changes in teachers' instruction. A predominant theme across studies was how teachers used functional metalanguage to guide students' literacy development (e.g., Achugar & Carpenter, 2012, 2014; Carpenter et al., 2014, 2015; Daniello, 2014; de Oliveira, 2008, 2016; Moore & Schleppegrell, 2104; Schulze, 2015; Shin, 2016, 2018; Simmons, 2016b, 2018; Symons, 2017; Symons et al., 2017). This focus reflects the New London Group's assumption that providing students with a metalanguage for analyzing how semiotic choices differ according to context might give students greater purchase on how disciplinary language constructs meaning within specific content domains.

However, this review suggests many teachers find functional metalanguage initially intimidating and challenging (e.g., Aguirre-Muñoz et al., 2008; Carpenter et al., 2015; Fang et al., 2014; Gebhard et al., 2013; Schall-Leckrone & McQuillan, 2012). Short, self-contained PD workshops were most effective for supporting teachers in learning and using small amounts of metalanguage as it applied to a single genre, such as ideational meaning in children's storybooks (Slater & McCrocklin, 2016) or cohesion in literary analysis texts (Aguirre-Muñoz et al., 2006). Teachers in these PDs routinely expressed that they would need further support after the PD (e.g., coaching, further PD)

to better understand the metalanguage and gain confidence using it with students. Perhaps unsurprisingly then, more sustained PD was shown to be more effective for supporting teachers in: learning more metalanguage (e.g., de Oliveira & Lan, 2014; Gebhard & Graham, 2018; Gebhard et al., 2014; Symons et al., 2017); learning to use metalanguage across different genres and discourses (e.g., Gebhard et al., 2014; Symons et al., 2017); developing strategies for using metalanguage to talk about semiotic patterns with students (e.g., Schleppegrell et al., 2008; Shin, 2016); developing their own functional metalanguage together with students (e.g., Gebhard & Graham, 2018); and increasing confidence to use metalanguage even if they were initially resistant (e.g., Harman, 2013; Simmons, 2016b).

Teachers who integrated a functional metalanguage into their literacy pedagogy demonstrated an increased ability to lead more in-depth class discussions (e.g., Gebhard et al., 2014; Moore & Schleppegrell, 2014; O'Hallaron, et al., 2015; Palincsar & Schleppegrell, 2014; Schleppegrell & de Oliveira, 2006). Further, these teachers felt the use of metalanguage to explore meaning in context helped them accomplish their content teaching goals (e.g., Schleppegrell, 2013, 2016) and found it to be an improvement over formulaic reading and writing guides they had been taught to use in other PDs (e.g., Accurso et al., 2016; Schleppegrell, 2010). Moreover, Carpenter and his colleagues showed that even inconsistent use of functional metalanguage supported one history teacher in developing a more critical stance toward disciplinary texts, which in turn influenced his teaching of them (Carpenter et al., 2014, 2015).

Last, with regard to assessment, empirical evidence suggests all three types of PD supported changes in teachers' ability to assess students' disciplinary writing. For

example, Aguirre-Muñoz and her colleagues used mixed methods to analyze changes in 33 in-service teachers' feedback practices following their participation in a week-long self-contained PD workshop. These authors reported statistically significant increases in teachers' ability to identify strengths and weaknesses in sixth-grade students' writing related to meaning, rather than strictly focusing their feedback on what they perceived as errors in students' use of linguistic forms (Aguirre-Muñoz et al., 2006, 2008). Similarly, Accurso and her colleagues used mixed methods to analyze changes in 55 pre-service teachers' feedback following a semester-long PD (Accurso et al., 2017). This study reported positive changes in pre-service teachers' abilities to identify students' strengths and weaknesses; diagnose learner needs beyond spelling, punctuation, and vocabulary problems; and give purpose-oriented feedback related to multimodal genre and discourse expectations (see also Achugar et al., 2007; Brisk & Zisselsberger, 2011). These findings are relevant because K-12 teachers are increasingly required to evaluate how students are attempting to make disciplinary meaning through their text organization, wording, and use of graphic representations (e.g., Mohan, Leung, & Slater, 2010; O'Hallaron & Schleppegrell, 2016). Therefore, teachers' abilities to identify students' strengths and needs can help focus their teaching on expanding students' semiotic choices in ways that deepen meaning in specific types of texts (Schleppegrell & Go, 2007).

Teachers' confidence for literacy instruction. Across studies, 46% of teachers who completed multiliteracies PD reported increased confidence for literacy teaching. Increased confidence always correlated with increased semiotic awareness. However, increased confidence did not always correlate to new pedagogical knowledge, particularly among pre-service teachers (e.g., Accurso, 2018; Schulze, 2016b). For

example, Schall-Leckrone and McQuillan (2012) used mixed methods to analyze 55 pre-service history teachers' development of semiotic awareness, pedagogical knowledge, and confidence for literacy teaching following their participation in three PD modules embedded in a university teaching methods course. The authors found that pre-service teachers recognized a specialized language of history (i.e., increased semiotic awareness), but struggled to articulate how they could use this knowledge to incorporate a pedagogy of multiliteracies into the history content classroom (i.e., no new pedagogical knowledge). Nevertheless, the authors found a statistically significant increase in pre-service teachers' confidence that they were adequately prepared to do so. In the second year of the study, pre-service teachers showed even bigger increases in confidence, but they were also able to articulate specific activities and strategies they could use in the classroom.

Summary of teacher learning. In sum, 77 studies of teacher learning (total $n=646$) suggest multiliteracies PD is effective for supporting teachers' increased semiotic awareness, pedagogical knowledge, and confidence for literacy teaching. These trends are promising in light of claims that prior approaches to PD have been insufficient for building teachers' confidence and ability to explicitly and systematically teach texts in ways that support students' disciplinary literacy development (e.g., Borg, 2015). Educational linguists have increasingly argued that teachers need a more explicit awareness of how language and other semiotic choices function at the level of genre and discourse to make discipline-specific meanings. This review suggests multiliteracies PD grounded in a social semiotic theory of language may provide a useful foundation for developing this type of semiotic awareness (e.g., Aguirre-Muñoz et al., 2008; Carpenter

et al., 2015), as well as associated pedagogical knowledge, and to a lesser degree, confidence for engaging in a pedagogy of multiliteracies.

2.5.3. Finding 3: Student learning includes disciplinary literacies, content knowledge, and semiotic awareness

As Table 2.4 illustrates, 54 of the 99 publications reviewed were empirical studies of student learning following multiliteracies PD. Of these studies, 49 explored both teacher and student learning, meaning there is significant overlap in the sources listed in Tables 2.3 and 2.4. These studies represent students at all grade levels K-12 (Table 2.5). However, it is important to note that these 54 studies represent student learning related to only 16 of the 24 PD programs discussed in this review. This review did not turn up empirical data regarding student learning from one PD partnership (Avalos et al., 2015), four university course PDs (e.g., Achugar & Carpenter, 2018, de Oliveira & Avalos, 2018; de Freitas & Zolkower, 2009, 20011; Schulze, 2016b), and three self-contained PD workshops (e.g., Achugar & Stainton, 2010; Achugar et al., 2007; Slater & McCrocklin, 2016). The three predominant learning outcomes for students whose teachers participated in one of the remaining 16 PDs and implemented a pedagogy of multiliteracies were: (1) simultaneous, though uneven, gains in disciplinary knowledge and associated literacy practices, meaning the ability to more deeply engage in reading, writing, and discussing grade-level texts about disciplinary concepts (100% of students); (2) increased semiotic awareness, meaning an understanding of how language and other semiotic forms function to make meaning (98% of students); and (3) increased confidence for participating in literacy instruction (7% of students).

Table 2.4: Frequencies of affordance codes in empirical studies of student learning (n=54).

Code	Frequency		Empirical Sources
	n	%	
Disciplinary literacy practices	54	100%	Accurso et al. (2016); Achugar & Carpenter (2012, 2014); Aguirre-Muñoz (2014); Aguirre-Muñoz et al. (2008, 2015); Brisk et al. (2010, 2011, 2014, 2018); Carpenter et al. (2014); Daniello et al. (2014); de Oliveira (2016); de Oliveira & Lan (2014); Fang et al. (2008, 2010); Florida's Reading Best Practices Center (2000); Gargani (2009); Gebhard et al. (2004, 2007, 2011, 2014, 2018); Harman (2013); Harman et al. (2014, 2018); Huang et al. (2016, 2017); Khote (2018); Moore & Schleppegrell (2014); O'Hallaron (2014); Pavlak (2013); Ramirez (2014); Schall-Leckrone et al. (2018); Schleppegrell (2010); Schleppegrell et al. (2008, 2018); Schulze (2011, 2015, 2016a); Shin (2014, 2016, 2018); Shin et al. (2010, 2016); Simmons (2016a, 2016b, 2018); Symons (2017); Symons et al. (2017); Willett et al. (2017); Zisselsberger (2016)
Semiotic awareness	44	81%	Accurso et al. (2016); Achugar & Carpenter (2012, 2014); Aguirre-Muñoz et al. (2008, 2015); Brisk et al. (2010, 2011); Carpenter et al. (2014); de Oliveira & Lan (2014); Gebhard et al. (2004, 2007, 2011, 2014, 2018); Harman (2013); Harman et al. (2014, 2018); Khote (2018); Moore & Schleppegrell (2014); O'Hallaron (2014); O'Hallaron et al. (2015); Pavlak (2013); Ramirez (2014); Schall-Leckrone et al. (2018); Schleppegrell (2010); Schleppegrell et al. (2008, 2018); Schulze (2011, 2015, 2016a); Shin (2014, 2016, 2018); Shin et al. (2016); Simmons (2016a, 2016b, 2018); Symons (2017); Symons et al. (2017); Willett et al. (2017); Zisselsberger (2016)
Content knowledge	20	37%	Accurso et al. (2016); Achugar & Carpenter (2012, 2014); Brisk et al. (2010, 2011); Carpenter et al. (2014); Fang et al. (2008, 2010); Gargani (2009); Gebhard et al. (2004); Moore & Schleppegrell (2014); Ramirez (2014); Schall-Leckrone et al. (2018); Schleppegrell (2010); Schleppegrell et al. (2008); Schulze (2011); Shin (2016); Simmons (2016a); Symons (2017); Zisselsberger (2016)
Critical awareness	19	35%	Achugar & Carpenter (2012, 2014); Carpenter et al. (2014); Gebhard et al. (2007, 2011, 2018); Harman et al. (2014, 2018); Khote (2018); O'Hallaron et al. (2015); Schleppegrell et al. (2008, 2018); Shin (2014); Shin & Seger (2016); Simmons (2016a, 2016b, 2018); Willett et al. (2017); Zisselsberger (2016)
Confidence	11	20%	Accurso et al. (2016); Aguirre-Muñoz et al. (2015); Florida's Reading Best Practices Center (2000); Gebhard et al. (2004, 2018); Harman (2013); Pavlak (2013); Schleppegrell et al. (2008); Shin (2014); Shin et al. (2010, 2016)

Table 2.5: Number of empirical studies of student learning by grade level (n=54*).

K	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	11th	12th
7	6	10	10	14	13	8	11	10	5	7	9	9

*Note: some studies cover multiple grades, therefore studies appear to total greater than 54

Students' disciplinary knowledge and literacy practices. All 54 studies of student learning focused on changes in students' disciplinary knowledge and literacy practices, with a collective sampling of over 7,700 K-12 students. Together, these studies indicated that a pedagogy of multiliteracies supported students in six aspects of disciplinary knowledge and literacy practices: (a) reading disciplinary texts for meaning (e.g., Moore & Schleppegrell, 2014; Ramirez, 2014; Schulze, 2015, 2016a; Schall-Leckrone & Barron, 2018; Simmons, 2016b, 2018; Symons, 2017); (b) discussing and critiquing authors' semiotic choices (e.g., Brisk & Ossa Parra, 2018; de Oliveira, 2016; Gebhard & Graham, 2018; Harman & Khote, 2018; O'Hallaron et al., 2015); (c) making conscious decisions about their own semiotic choices (e.g., Daniello et al., 2014; Simmons, 2014, 2018); (d) writing longer texts (e.g., O'Hallaron, 2014); (e) writing in a wider range of genres (e.g., Brisk & de Rosa, 2014; Brisk & Zisselsberger, 2011); and (f) moving from using English in highly contextualized, here-and-now ways (e.g., *I liked the book*) toward using denser grammatical structures to read, write, and discuss more abstract disciplinary concepts (e.g., *In 'Just Listen,' the author connects with young readers by addressing issues familiar to middle schoolers, such as younger siblings, peer pressure, eating disorders, and sexual abuse*) (e.g., Achugar & Carpenter, 2014; de Oliveira & Lan, 2014; Huang et al., 2016, 2017; Schleppegrell, 2010). These types of

student learning were clearly demonstrated with different research methods across grade levels, content areas, geographic regions, and types of investigations. However, studies indicated that students made gains at different rates based on their previous schooling experiences and the degree of support they received for making sense of dense oral, written, and multimodal texts (e.g., lectures, textbooks, graphs).

For example, Aguirre-Muñoz, Chang, and Sanders (2015) used quantitative and qualitative methods to analyze changes in 24 fourth-grade students' writing of scientific descriptions. According to the authors, students made statistically significant gains in clause complexity over four months of their teacher's implementation of multiliteracies pedagogy (e.g., increased use of embedded clauses, relative clause structures, adjectivals, expanded noun and verb groups). de Oliveira and Lan (2014) also documented fourth-grade students' gains in science writing. These authors found students showed an increased ability to be more precise in writing procedural recounts (e.g., use of more technical terms and temporal connectors). Additional case studies from a range of policy contexts have shown similar findings in terms of students' increased abilities to read and write discipline-specific genres. For example, at the elementary level, a number of qualitative case studies have documented students' abilities to use nominalizations to coherently represent their disciplinary knowledge in writing different types of reports and explanations (e.g., Accurso et al., 2016; Brisk et al., 2011; Gebhard et al., 2014; Shin, 2016). At the secondary level, Achugar and Carpenter (2012, 2014) conducted mixed methods analyses of how 94 high school history students developed an ability to construct more authoritative academic voices in arguments about slavery and immigration.

These findings from small qualitative and mixed methods studies regarding the benefits of multiliteracies pedagogy have been substantiated by larger-scale analyses of classroom data (e.g., Aguirre-Muñoz, 2014; Aguirre-Muñoz et al., 2008). For example, Schleppegrell and her colleagues presented compelling evidence from a large-scale study of literacy gains made in secondary history classrooms in California (e.g., Gargani, 2009; Schleppegrell & de Oliveira, 2006; Schleppegrell, Greer, & Taylor, 2008). These authors describe a cluster-randomized experiment in which students from treatment and control groups (the treatment being their teacher's participation in a PD partnership) were asked to take a multiple-choice reading test and write an argument essay about a curriculum topic such as the causes of the American Civil War. These essays were designed to assess students' knowledge of history and their ability to write about historical topics. Students' essays were scored on a scaled writing rubric with six criteria: thesis, claims, historical evidence, analysis, essay structure, and conventions. Controlling for students' prior achievement and demographic variables, the authors reported a statistically significant treatment effect. Students in the treatment group scored higher on all the rubric elements, with particular gains in the thesis, claims, and evidence categories. Further, students in the treatment group showed statistically significant gains in both content knowledge and reading comprehension. According to the authors, these results indicate that students whose teachers studied and implemented a pedagogy of multiliteracies learned more history and were able to present their knowledge more effectively in essays (for similar findings among elementary and secondary science students, see Fang et al, 2008; Fang & Wei, 2010; Florida's Reading Best Practices Center, 2000). Quantitative findings across studies consistently showed that students in treatment groups consistently outperformed

their peers, students of all ability levels made gains, and that these gains were most substantial in “high implementation” classes, or those where the teachers put into practice principles from their PD with more fidelity. Further, supplementary test data suggests these gains often translated into greater gains on mandatory content, literacy, and English proficiency assessments (e.g., Brisk & Ossa Parra, 2018; Gebhard, Chen, & Britton, 2014).

Students’ semiotic awareness. Fewer empirical studies focused on students’ development of semiotic awareness (44 studies with a collective sample size of 2,229 students). Of these studies, 41 indicated that as teachers used functional metalanguage to engage students in reading, writing, and discussing disciplinary texts, nearly all students developed some level of increased semiotic awareness (98%). However, it is important to note that all but one of these studies had small sample sizes (<100) and relied on qualitative data; the search yielded no large-scale experimental studies of students’ developing semiotic awareness. Nevertheless, many of the findings are compelling. For example, Carpenter, Achugar, and Earhart (2014) explored how students in five secondary history classrooms engaged in close readings of historical texts and discussions about the authors’ semiotic choices and the meanings they construct. Students in these classrooms used a functional metalanguage to explore ideational and interpersonal meanings in primary source documents (i.e., “what is said and not said”), compared authors’ choices across texts, and wrote about how authors’ semiotic choices revealed their points of view. Whereas these students had previously struggled to access historical meanings in assigned readings, these authors argued that students’ analytical talk and writing were evidence of their developing semiotic awareness (for other

discussions of semiotic awareness in history, see Gebhard et al., 2014; Schall-Leckrone & Barron, 2018; Schleppegrell et al., 2008).

Other studies suggest students were able to retain the semiotic awareness they developed and apply it to other contexts. For example, in a longitudinal study of 10 elementary language arts students, Symons and her colleagues (2017) found that even a year after students experienced a multiliteracies pedagogy, all students showed declarative knowledge of functional metalanguage (e.g., “A process is like when something happens and participant is like the people who participate”) (p. 106). Likewise, Simmons (2016b, 2018) demonstrated that 67 high school language arts students were able to apply their developing semiotic awareness to subsequent curricular units and to situations outside school. Simmons argued that students’ understanding of how semiotic choices construct meaning allowed them to “see, name, and question coercive language [within literary texts and their own social contexts], empowering them to speak out against such abuses, however subtle, and even change their own language practices” (2016b, p. 205). The New London Group advocated for pedagogy that supports students in being socially “responsible makers of meaning” (1996, p. 89). Findings from these 44 studies suggest a pedagogy of multiliteracies may, in fact, support students in becoming more conscious meaning-makers.

Students’ confidence for participating in literacy instruction. Confidence was not the main focus of any empirical studies of student learning, yet 20% of studies reported increased confidence for reading and writing in school as a by-product of students’ increased semiotic awareness, content knowledge, and disciplinary literacy skills (e.g., Accurso et al., 2016; Aguirre-Muñoz et al., 2015; de Oliveira & Avalos,

2018; Florida's Reading Best Practices Center, 2000; Pavlak, 2013; Shin et al., 2010, 2016).

Summary of student learning. In sum, findings from 54 studies of K-12 student learning (total n=7,711 students) following their teachers' participation in multiliteracies PD suggest such PD may be a catalyst for gains in students' content knowledge, disciplinary literacy, and semiotic awareness, which may, in turn, positively influence students' confidence for reading and writing in school. These findings applied to students at all grade levels and in all major demographic categories (e.g., race, ethnicity, gender, socioeconomic status, language status, reading level). These findings are significant when set against the backdrop of reports that, as of 2015, U.S. elementary and secondary students read and write no better than they did a generation ago, performance gaps between dominant and minoritized students have widened, and fewer than 25% of students labeled English learners have even "basic" disciplinary literacy skills (*Nation's Report Card*, 2011, 2013, 2015). Given the gatekeeping role disciplinary literacies play in economic, social, and civic life (Hasan, 2003; New London Group, 1996), these studies suggest multiliteracies PD may play a role in addressing K-12 teachers' struggle to more equitably support diverse students' disciplinary literacy development.

2.5.4. Finding 4: Sustained PD leads to greatest gains, including critical awareness

Though empirical findings suggest all three types of PD effectively influenced teacher and student learning to some degree, analysis indicates sustained PD and mentoring relationships led to greater gains for both teachers and students. While the length of the PD appeared to have no influence on teachers' opinion of the multiliteracies

framework itself, it did appear to influence teachers' level of semiotic awareness and pedagogical knowledge, their likelihood for implementing a pedagogy of multiliteracies, and their level of confidence for doing so. Accordingly, teacher learning outcomes from short, self-contained PD workshops were more limited than those from university course and partnership PDs that met over a semester, school year, or multiple school years (Table 2.2). Though sustained professional development was most often planned for and funded through university-school partnerships, analysis also revealed similar teacher and student learning outcomes resulted from sustained mentoring relationships between university faculty and teachers who completed multiliteracies PD in the form of a university course. In fact, 15 empirical studies reported fruitful results from such ongoing professional development relationships following a university course (e.g., de Oliveira, Lan, & Dodds, 2014; Schall-Leckrone & Barron, 2018), including a number of collaborations where the classroom teacher was pursuing doctoral studies (e.g., Gebhard & Graham, 2018; Harman & Khote, 2018; Harman & Simmons, 2014; Simmons, 2016a, 2016b, 2018). These studies were most often co-authored by the teachers themselves. This is important to note for two reasons: 1) to point out that in a number of studies sustained PD occurred spontaneously based on the mutual interests and investments of university faculty and teachers; and 2) to note that the outcomes of these studies may have been influenced by the level of interest these particular teachers had in the subject of the PD. The results of these studies may not be typical of all teachers who participate in PDs structured as university courses. Despite that limitation, analysis revealed a finding that was unique to sustained PD - teachers' and students' development of critical awareness.

Teachers' and students' critical awareness. As Tables 2.3 and 2.4 indicate, 37 empirical studies reported that teachers and/or students developed some level of critical awareness following their experience with multiliteracies PD (e.g., Austin et al., 2010; Brisk & Ossa Parra, 2018; de Oliveira et al., 2014; Harman & French, 2011; Schall-Leckrone et al., 2018; Shin, 2014). Critical awareness refers to an understanding of “how [semiotic] practices are shaped by, and shape, social relationships of power” (Clark, Fairclough, Ivanic, & Martin-Jones, 1990, p. 249). PDs that focused on supporting teachers and students to become “text questioners” (e.g., O’Hallaron et al., 2015, p. 56) and included “explicit reflections about the role of language and culture in the object of study and the education experience” (e.g., Achugar, 2009, p. 42) appeared to be most effective for developing this type of awareness. These PDs attempted to position teachers and students, even very young ones, as critical text analysts by providing tools to better understand how semiotic choices construct subjectivities and ideologies in the texts they encounter in schools. Analysis of these 37 studies revealed three types of learning outcomes related to critical awareness: (1) teachers and students saw disciplinary texts differently, (2) teachers saw their students differently, and (3) students saw themselves differently in relation to disciplinary texts and their broader social worlds. Yet regardless of the specific learning outcome, teachers’ and students’ development of critical awareness always correlated with their increased semiotic awareness, as well as increased pedagogical knowledge for teachers and disciplinary literacy gains for students.

A first group of studies presented findings related to the development of critical awareness in particular disciplinary contexts, particularly in history (e.g., Achugar et al., 2007; Achugar & Carpenter, 2012, 2104; Carpenter et al., 2014, 2015; Gebhard et al.,

2014; Schleppegrell et al., 2008) and science (e.g., O'Hallaron et al., 2015; Ramirez, 2014). Teachers in these studies were supported in using functional metalanguage to help students question and engage in dialogue with texts presented to them as factual. In becoming text questioners, these teachers and students began to denaturalize dominant assumptions about language use in schools (e.g., that informational texts are facts devoid of author attitude, opinion, or perspective). However, while teachers and students developed an awareness that history and science texts construct the authors' subjectivities, these studies did not demonstrate that these lines of critical questioning extended beyond individual sets of disciplinary texts. Thus, I argue for PD that supports teachers and students in examining ideologies that influence semiotic choices across texts, contexts, or at the sociopolitical level.

A second group of studies presented findings related to the development of critical awareness regarding prevailing language ideologies and the relationship between school reforms and minoritized students' literacy development, which in turn provided insights for the kinds of instruction these students need (e.g., Accurso et al., 2016; Gebhard et al., 2007). For example, Gebhard, Demers, and Castillo-Rosenthal (2008) documented two first-grade teachers' experience analyzing text-context dynamics in this way. These teachers chose to analyze the work of one first-grade bilingual student who had been characterized on a formal assessment as "mixing Spanish and English" in ways that might "interfere" with her academic progress (p. 280). However, by analyzing this student's writing with an eye toward understanding the influence of historical, political, and economic aspects of the context in which it was produced, the teachers were able to see how school reforms shaped this student's opportunities for disciplinary literacy

development. Further, they were able to see how she drew on a wide variety of semiotic resources to accomplish her assignments. As the authors summarized:

the institutional perspective assisted [teachers] in literally seeing and re-seeing how a second language learner produced and interpreted assigned texts in a first grade mainstream classroom. This critical perspective also helped them to see and re-see how local school reforms supported and constrained the literacy development of bilingual students. As a result, both [teachers] reported having a deeper understanding of the varied resources that emergent bilingual students bring to school literacy practices—resources that many educators often overlook or misinterpret as causing learning difficulties (e.g., use of students’ home language in school). (Gebhard et al., 2008, p. 286)

Similarly, Harman (2007) documented how one eighth-grade teacher experienced a personal perspective shift over the course of her PD experience from a deficit orientation toward students labeled English learners to “affording them multiple literate identities” (p. 31). Before PD, the focal teacher openly admitted to seeing some of her students and their work as problematic because they speak Spanish (i.e., having cognitive and motivational differences from her “mainstream” students). However, as this teacher analyzed these students’ work in relation to her own teaching practices and school policies, she began to notice and question her own monolingual orientation and look for new ways to support these students instead of seeing them as problems. By the end of the PD, the teacher had developed a new sense of students and her own role in the classroom. She began to look for common topics of interest around which to plan her instruction, and began to refer to herself and these students communally as *we* and *our* instead of dividing herself from them.

A third group of studies presented findings that suggest secondary students in particular experienced a growing critical awareness led them to see themselves differently in relation to disciplinary texts, their semiotic choices, and their larger social

worlds (e.g., Gebhard & Graham, 2018; Harman & Khote, 2017; Khote, 2018; Simmons, 2016b, 2018). For example, Khote (2018) analyzed how Latinx tenth-graders attending a rural high school used a functional metalanguage in conjunction with their home language and the language of schooling to analyze immigration policies and media pieces. This author reported that students learned to realize and critically evaluate the authoritative tone of arguments and other expository genres on the topic of immigration policy. Further, students analyzed how texts positioned them as readers and as immigrants in the community, and became empowered to consciously appropriate dominant linguistic resources to “name, analyze, and shape critiques about the exploitation, racism, and classism that affected their communities” (p. 9).

Collectively, these studies provide examples of researchers, teacher educators, teachers, and students drawing on a multiliteracies framework to address unproductive power dynamics that constrain the construction of knowledge and the development of disciplinary literacies in K-12 schools – places where linguistically and racially minoritized students are often constructed as passive receivers of language and culture or as defective communicators (Alim, 2007; Flores & Rosa, 2015). Therefore, one of the main contributions of this small but growing body of research is how the authors placed the work of minoritized students, their teachers, and teacher educators at the center of the complex semiotic mediation that takes place in modernist institutions such as public schools to promote a social justice agenda in local classroom practices. This process of institutional mediation is enhanced when students and teachers develop a critical awareness by learning to use a functional metalanguage that allows them to make explicit connections between text/context dynamics (e.g., Achugar & Carpenter, 2018; de

Oliveira & Avalos, 2018; Schleppegrell & Moore, 2018). Further, these studies make clear that discriminating, de-professionalizing, and alienating institutional discourses circulating in schools are not totalizing. Rather, collaboratively, students, teachers, and researchers can enact counter-discourses using a critical social semiotic perspective of language and learning, particular when supported by sustained PD relationships that offer opportunities and tools for recognition, reflection, and the confrontation of dominating ideologies.

2.5.5. Finding 5: Issues and challenges include intellectual demand, time, and conflicting paradigms

Despite a number of promising findings, Table 2.6 illustrates five interrelated issues and challenges that may have been limiting factors in PD effectiveness: (1) the significant demands operationalizing a multiliteracies framework places on the knowledge base of both teacher educators and teachers; (2) time; (3) teachers' need for sustained professional support to learn and implement a pedagogy of multiliteracies; (4) unsupportive school environments; and (5) conflicting paradigms that lead teacher educators and/or teachers to take up the multiliteracies framework in limited or uncritical ways that contribute to the reproduction of dominating ideologies. This section mainly discusses the first and last of these challenges given the degree to which many other leaders in teacher education have explored the issues of time and teachers' need for sustained professional development (e.g., Darling-Hammond, 2005; Darling-Hammond & McLaughlin, 2011; Zeichner, 2010b).

Table 2.6: Frequencies of challenge codes in publications reviewed (n=99).

Code	Frequency		Sources
	n	%	
Intellectual demand	45	45%	Accurso et al. (2016); Achugar & Carpenter (2018); Aguirre-Muñoz et al. (2006, 2008); Avalos et al. (2015); Brisk et al. (2010, 2011); Carpenter et al. (2014, 2015); Daniello (2014); Daniello et al. (2014); de Freitas & Zolkower (2011); de Oliveira et al. (2014, 2018); Fang et al. (2008, 2014); Gargani (2009); Gebhard et al. (2008, 2011, 2013, 2018); Harman et al. (2011, 2014, 2018); Huang et al. (2016); Khote (2018); Moore & Schleppegrell (2014); O'Hallaron et al. (2015); Ramirez (2014); Schall-Leckrone (2017, 2018); Schall-Leckrone et al. (2012, 2014, 2018); Schleppegrell et al. (2004, 2014, 2018); Schulze (2011, 2015, 2016a, 2016b); Shin et al. (2010); Slater & McCrocklin (2016); Symons (2017); Zisselsberger (2016)
Time	37	37%	Accurso et al. (2016); Achugar & Carpenter (2018); Austin et al. (2010); Avalos et al. (2015); Brisk et al. (2011, 2014); Carpenter et al. (2014, 2015); Daniello (2014); Daniello et al. (2014); de Freitas & Zolkower (2011); de Oliveira (2016); de Oliveira et al. (2014, 2018); Fang et al. (2008, 2014); Gargani (2009); Gebhard et al. (2007, 2008, 2011); Harman et al. (2011, 2014, 2018); Hodgson-Drysdale (2016); Khote (2018); Schall-Leckrone (2018); Schall-Leckrone et al. (2012, 2014, 2018); Schleppegrell et al. (2004, 2014); Schulze (2016b); Shin et al. (2010); Simmons (2016a); Symons (2017); Willett et al. (2017); Zisselsberger (2016)
Professional support	24	24%	Aguirre-Muñoz et al. (2008); Brisk & Zisselsberger (2011); Carpenter et al. (2014, 2015); Daniello (2014); de Oliveira (2008); de Oliveira et al. (2014, 2018); Fang et al. (2008, 2010, 2014); Gargani (2009); Gebhard et al. (2007, 2011); Harman (2007); Hodgson-Drysdale (2016); Khote (2018); Schall-Leckrone (2017); Schall-Leckrone et al. (2012, 2018); Slater & McCrocklin (2016); Symons (2017); Willett et al. (2017); Zisselsberger (2016)
Institutional support	21	21%	Accurso et al. (2016); Aguirre-Muñoz et al. (2008); Austin et al. (2010); Avalos et al. (2015); Brisk et al. (2014); de Oliveira & Avalos (2018); Fang et al. (2008); Gebhard et al. (2007, 2008); Harman (2007, 2013); Harman & Khote (2018); Khote (2018); Ramirez (2014); Schall-Leckrone (2018); Schall-Leckrone & McQuillan (2012, 2014); Shin & Seger (2016); Symons (2017); Zisselsberger (2016)
Conflicting paradigms	19	19%	Achugar et al. (2007); Austin et al. (2010); Avalos et al. (2015); Brisk & Zisselsberger (2011); Fang (2013); Gebhard et al. (2011); Harman (2007, 2013); Moore & Schleppegrell (2014); O'Hallaron et al. (2015); Ramirez (2014); Schall-Leckrone (2017, 2018); Schall-Leckrone & McQuillan (2012, 2014); Schleppegrell (2016); Schleppegrell & Moore (2018); Schulze (2016b); Shin & Seger (2016)

As this chapter's discussion of the New London Group's theoretical foundations makes clear, the multiliteracies framework draws heavily on Halliday's systemic functional linguistics (SFL), the associated metalanguage, and pedagogical practices. Since its inception in the 1980s, SFL theory and practice have received mixed reactions from literacy scholars around the world for two main reasons: their potential to reproduce dominating language ideologies in schools and the demands they place on the knowledge base of teachers and teacher educators. Therefore, not only is it not surprising that these same critiques have turned up in this review, but the findings suggest these tensions have not been resolved in the last two decades as the theory has been mobilized in multiliteracies PD for K-12 teachers in the United States. For example, some studies provide evidence of teachers taking up a pedagogy of multiliteracies relatively quickly, sometimes with great enthusiasm (e.g., Brisk, 2014; Gebhard et al., 2014). In contrast, other studies demonstrate the degree to which teachers struggle to implement multiliteracies instruction in ways that are commensurate with a social semiotic perspective of grammar and disciplinary literacy development (e.g., Brisk et al., 2010; Fang et al., 2014). These studies suggest that without sustained PD and ongoing institutional support, teachers are apt to revert to drilling and practicing prescribed genre structures and discourse features without attending to crucial aspects of purpose, audience, and power that always shape text production and interpretation practices (e.g., Fairclough, 1989; Gebhard, Chen, Graham, & Gunawan, 2013). This more form-focused, as opposed to meaning-oriented, instantiation of a multiliteracies pedagogy have been sharply critiqued by scholars who maintain that drilling, practicing, and testing school-based genres will likely result in the reproduction of dominant discursive practices and

dominating language ideologies and raciolinguistic ideologies and therefore play a role in further legitimating inequities rooted in race, class, gender, and ethnic differences (e.g., Flores & Rosa, 2015; Luke, 1996).

When considering this important critique, it should be noted that the drift toward behaviorism is not a surprise given the degree to which teachers in the United States have been socialized to think of language as formal bits and pieces (e.g., word endings) and literacy learning as the memorization of vocabulary and sentence level grammatical rules (e.g., Borg, 2015). In addition, it is important to take into account the degree to which past and current school reforms in the United States have favored behavioral approaches to teaching and learning to achieve efficiency goals rather than furthering an equity agenda in public schools serving diverse learners (e.g., Gebhard, 2019). This push for efficiency has further intensified teachers' work through the use of standardization and accountability systems that track their ability to improve their students' test scores; the adoption of neoliberal educational policies that work to underfund public education; and persistent weak investments in teachers' professional development that limit teachers' access to expertise and meaningful forms of sustained collaboration (e.g., Adamson, Åstrand, & Darling Hammond, 2016). Therefore, it is not surprising that following PD some teachers tended to "pour old wine into new bottles" (Gebhard, Gunawan, & Chen, 2014, p. 8), meaning they were apt to reinscribe old behavioral ideologies into their uses of a new multiliteracies framework. However, some teachers did this knowingly and with regret because of the time pressures they felt to support students in passing high stakes exams (Gebhard et al., 2013).

Other scholars have suggested that inasmuch as the multiliteracies framework relies on SFL, it may be too theoretical to inform the knowledge base of teaching (e.g., Bourke, 2005; Ferris, 2011). This critique is important to consider given that many monolingual English-speaking teachers have had limited opportunities to formally study language or other semiotic systems given that grammar instruction of any kind, traditional or otherwise, has been largely removed from the curriculum in the United States (Gebhard, Accurso, & Chen, 2019). As a result, many teachers lack an awareness of how language and other semiotic systems work, especially in disciplinary contexts (e.g., Turkan, de Oliveira, Lee, & Phelps, 2014). To counter this problem, a number of scholars have argued that literacy teaching today requires an integration of pedagogy and declarative grammatical content knowledge (e.g., Bartels, 2005; Myhill, 2018; Myhill, Jones & Watson, 2013). Multiliteracies scholars have further argued that SFL offers teachers this kind of an integrated perspective because it was designed to teach language and content simultaneously (e.g., Cope & Kalantzis, 2000, 2016; Fairclough, 1992b).

Last, though several authors noted the intellectual demand the multiliteracies framework presents, this analysis suggests the theory and practices are not *too* complex for teachers, nor are they too complex for K-12 students, even those labeled “struggling” readers or writers (e.g., Gebhard & Graham, 2018; Schleppegrell & Moore, 2018; Schall-Leckrone & Barron, 2018). Therefore, problems related to implementing the multiliteracies framework in teacher education may have more to do with weak commitments to authentic forms of PD in the context of educational reform movements than with the rigors of recontextualizing SFL theory for the purposes of teaching and learning purposes.

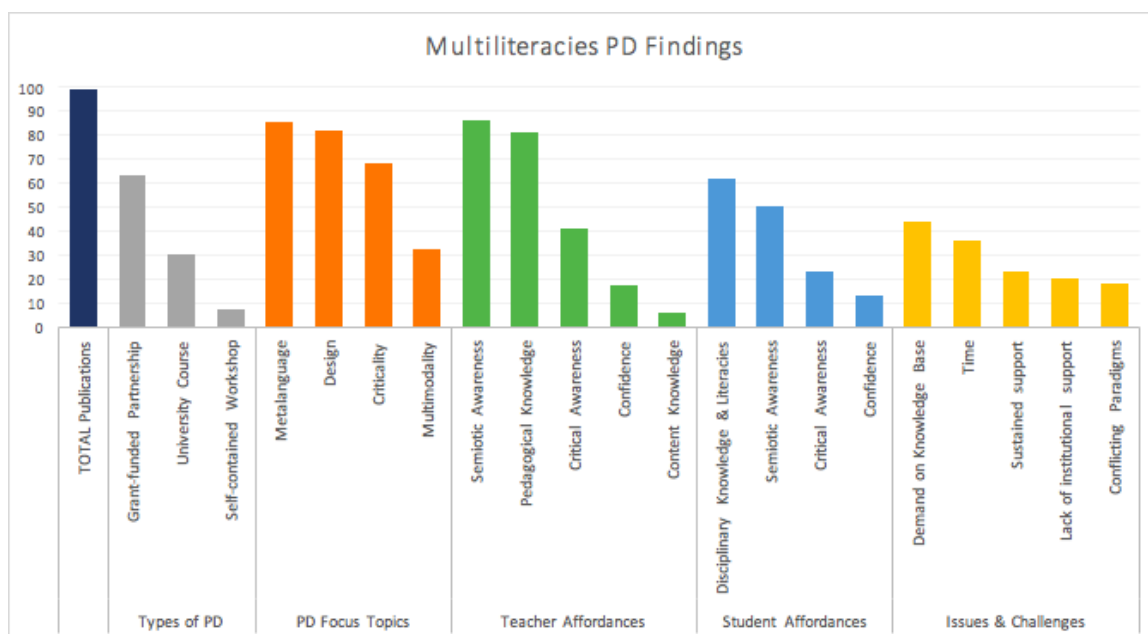


Figure 2.5: Number of publications coded for each literature review finding.

2.6. Discussion

The New London Group's multiliteracies framework has been mobilized in professional development for K-12 teachers in the United States in different ways since its publication in 1996. Figure 2.5 summarizes the findings from this review of 99 publications related to this work. In sum, I found that university-school partnerships, university courses, and self-contained PD workshops have been the primary vehicles for delivering multiliteracies PD. These efforts have largely focused on introducing teachers to a functional metalanguage, a conception of literacy teaching and learning as an interactive design process, and criticality. Fewer PDs have focused on multimodality. Empirical studies of teacher learning have shown gains in teachers' semiotic awareness, pedagogical knowledge, and confidence for literacy teaching. Empirical studies of student learning have shown significant, though uneven gains in students' disciplinary

knowledge and associated literacy practices, as well as their semiotic awareness. Sustained PD efforts were the most effective for influencing teacher and student learning. In addition to the types of teacher and student learning listed above, sustained PDs influenced the development of critical awareness in both groups. Together, these findings signal a clear potential for the multiliteracies framework to be used in service of contemporary teacher education and student literacy development goals. However, this review also reveals problems such as: persistent weak investments in teachers' professional development; teachers' limited access to expertise and meaningful forms of sustained collaboration; conflicting paradigms that lead teachers to take up a pedagogy of multiliteracies in ways that are not consistent with the way language, learning, and social change are conceptualized in a multiliteracies framework; and the need for additional research regarding the findings of this review.

2.7. Future Directions

The findings of this review provide a number of possible avenues for future research, such as: continued study of the phenomena in question using a range of research methods; increased use of design-based research to inform the implementation of a multiliteracies framework in ways that are responsive to local contexts; the impact of increased support for teachers and students in learning how to analyze and discuss the relationship between literacy practices, ideologies, and social change; longitudinal studies of teachers' learning as they make sense of and enact theories of language, learning, and social change; additional large scale studies of students' disciplinary literacy

development to substantiate qualitative case study and small scale mixed methods research findings.

However, this chapter concludes by focusing briefly on four topics: how the fields of language and literacy education conceptualize meaning; how metalanguage is used in classroom instruction; the importance of multimodality; and how collaboration in teacher education can be fostered. First, there is a need for greater clarity in how scholars, teacher educators, and practitioners conceptualize “meaning,” “grammar,” “literacy,” and “literacy teaching” given paradigmatic shifts between behavioral, psycholinguistic, and social semiotic theories in the field of literacy studies (Gebhard, 2019). It is clear there has been “a social turn” in regard to conceptualizing language and literacy development from a sociocultural perspective (Gee, 1996), as evidenced by contributions of scholars drawing on the work of Vygotsky (e.g., Lee & Smagorinsky, 2000; Moll, 1992). However, there has been much less engagement throughout the field of literacy studies with sociocultural conceptions of grammar as articulated by Halliday and his colleagues. In part, this lack of engagement may stem from diminished interest in the term following intense “grammar wars” in the 1960s and 1970s (Locke, 2010). While the New London Group attempted to rebrand “grammar” as “design” to re-engage the field in conceptual and practical discussions around noticing and talking about patterns of representation in school and society, this review suggests that effectively mobilizing the multiliteracies framework in schools requires teacher educators to have substantial familiarity with a Hallidayan grammar of meaning. However, this review also suggests this work was fruitful. Thus, given that Halliday’s theory was designed, in part, to address pressing issues in education related to language, there is a need to expand conceptions of grammar

in the field of language and literacy studies to also include a social semiotic perspective, especially in the domain of teacher education.

Second, there is the issue of metalanguage and what kind of metalanguage will best serve students in developing disciplinary literacies, semiotic awareness, and critical awareness. Nearly a decade ago, Macken-Horarik (2008) argued that functional metalanguage could provide teachers and students with “a powerful navigational toolkit” for talking about language and reflecting on how language and other semiotic resources function in the texts students encounter in school. According to Macken-Horarik, functional metalanguage could enable teachers “to engage with complex social-semiotic practices, to diagnose strengths and weaknesses in students’ texts, relating them in a principled way to the relevant meaning potentials on which they draw” (p. 46). This review has discussed a growing number of studies conducted in a wide variety of contexts have supported Macken-Horarik’s assertion. However, the variety in these studies points to a lack of research regarding the scope and sequence of specific uses of metalanguage and what kind of metalanguage is most useful for classroom practice. Australian literacy scholars have suggested the use of a “bridging metalanguage” (Humphrey & Macnaught, 2016a, p. 799), which they suggest links “technical terminology (SFL based or otherwise) with instances of language patterns in texts and acknowledges the value of everyday terminology for explaining how structures and functions of language relate to their context of use.” Others, such as Schleppegrell and Moore (2018), have created more student-oriented metalinguistic terms for use in classroom discussions with very young multilingual learners (e.g., use of appraisal resources to “turn up” or “turn down” the force of an emotion, evaluation, or judgments

in children's literature). Other still have emphasized the importance of a metalanguage that "can be shared with colleagues who are not expert in linguistics but need ways of articulating literacy demands for their students" (Macken-Horarik, Devereux, Trimmingham-Jack, & Wilson, 2006, p. 255). Given the increased interest in metalanguage following the New London Group's manifesto, it would be beneficial to develop a line of inquiry to determine what kind of metalanguage is apt to be most useful to teachers in designing curriculum, instruction, assessments. Relatedly, classroom based multiliteracies research would benefit from the design of more large-scale, mixed methods analyses using corpus tools to test more fully the potential of a pedagogy of multiliteracies. This line of inquiry could inform the development of policies, teacher education practices, and curricular materials for use in a wide variety of K-12 classrooms.

Third, there is a need for greater attention to multimodality in PD and multiliteracies research. While literacy scholars have advocated a broad conceptual shift from print literacy toward multiliteracies for some time now (Jewitt, 2008), this review suggests the incorporation of multimodality into PD and research focused on teacher and student learning has been somewhat belated. In this review, only a third of overall publications even mentioned multimodality in the context of multiliteracies PD. Similarly, only a third of empirical studies took up the concept, which perhaps points to the limitations of research methods that have overly focused on language and print as the primary modes of learning (e.g., discourse analysis). Nevertheless, those studies that investigated multimodality offered important insights into this review yielded important insights into students' multimodal practices and research methods appropriate for observing pedagogy and text production across modalities. For example, Shin (2018)

explored how an eleven-year old multilingual Laotian student engaged with multimodal digital literacies in the context of a pedagogy of multiliteracies. This student, referred to as “Sonny,” drew on text, image, color, and sound to produce a multimodal ensemble appropriate for his purposes and audiences while meeting the demands of the CCSS. However, this study, and others like it, offered little description of how the teacher learned to engage students’ in conscious analysis and discussion of other multimodal texts. On the other hand, de Freitas and Zolkower (2011) offered a clear report on preparing secondary math teachers to understand and explore multimodality with students. These authors described a series of lesson studies that supported teachers in designing multimodal problem-solving lessons, but presented no empirical findings on the student learning outcomes of these lessons. Therefore, there is a need for further research of both types to address the need for clear descriptions of PD content and teachers’ curricular design with regard to multimodality, as well as studies that connect these designs to student learning. This work will be particularly important as national standards in the United States increasingly recognize the importance of multiliteracies and multimodality (e.g., *Common Core State Standards*; see Dalton, 2012).

Last, there is the issue of collaboration (e.g., Levine, 2006; Sleeter, 2008). Over twenty years ago, in describing the contextual, situated nature of language and literacy teaching, Freeman wrote:

For teacher education, time and place are unexamined issues. Aside from the structural distinctions between pre- and in-service education, ‘front loading’ persists as the dominant format in teacher education so that a single, sustained professional input early on in teachers’ careers is assumed to equip recipients for a lifetime of professional work. (1994, p. 3)

Despite advances in conceptualizing teachers' work from a sociocultural perspective (e.g., Moje, Ciechanowski, Kramer, Ellis, Carrillo, & Collazo, 2004) and a wealth of studies regarding the social nature of powerful forms of professional development, many teachers continue to work in isolation from other professionals, have very little access to expertise, and have few opportunities for meaningful collaboration focused on student learning. However, a review of current research suggests that multiliteracies scholarship is attempting to address this long-standing problem. For example, a number of scholars included in this review have designed studies that include students, teachers, and teacher educators through their use of research methods that allow them to analyze semiotic practices in classrooms over time, develop and test conceptual models of disciplinary literacy development, and contribute to the professional development of teachers. For example, scholars have used design based research methods to design and implement interventions, collect and analyze qualitative and quantitative data, and support the work of the teachers with whom they collaborate (e.g., Achugar & Carpenter, 2012, 2014; Symons et al., 2017). Likewise, other scholars have designed action research professional development partnerships to analyze how teachers make sense of a multiliteracies framework and pedagogy and how the literacy practices of their students change over time and in what ways (e.g., Brisk & Ossa Parra, 2018; Gebhard, Chen, & Britton, 2014; Shin, 2016). Still other scholars have engaged in youth participatory action research as a way of using a pedagogy of multiliteracies to support a strong social justice agenda (Harman & Khote, 2017; Khote & Tian, 2019). Finally, this review turned up studies where teachers and university researchers engaged in self-study of the multiliteracies framework outside of formal PD contexts to respond to needs they saw in their own

school contexts (e.g., Paugh & Moran, 2013). While these studies were not included in this review, they illustrate the steadfast investment of teachers in being change agents even when effective PD is not available to them (Nieto, 2005). Collectively, this groundswell of research that engages with the day-to-day lives of students, teachers, and teacher educators is a promising trend that speaks to the benefits of establishing lines of inquiry that necessitate collaborative engagement in K-12 classrooms to support students' expanded literacy practices.

2.8. Conclusion

Just over twenty years ago, the New London Group (1996) made an influential contribution to the conversation regarding what teachers need to know when it comes to understanding and teaching language and other semiotic systems. Their vision of a multiliteracies framework and a pedagogy of multiliteracies has played a role in reshaping how teachers are prepared to engage students in literacy teaching and learning in the twenty-first century. This review both documents these shifts in the professional development landscape and demonstrates that teachers *can* and are taking up the multiliteracies framework in creative, interesting, and productive ways despite significant issues and challenges. In that respect, this review is intended to speak to concerns about the limitations of broad sociocultural perspectives for shifting actual teaching practice (e.g., Byrnes, Maxim, Norris, 2010) and contribute to continued literacy-focused conversations in teacher education, research, and policy contexts (Mueller & Walqui, 2018). Alongside the work taking place in communities, classrooms, and universities nationwide, my hope is that this synthesis will contribute to the realization of a pathway

in public education toward a “new, vigorous, and equitable public realm” (New London Group, 1996, p. 69).

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CHAPTER 3

**ANALYZING DIVERSE LEARNERS' WRITING IN MATHEMATICS:
SYSTEMIC FUNCTIONAL LINGUISTICS IN SECONDARY PRE-SERVICE
TEACHER EDUCATION⁶**

3.1. Preface

This chapter presents one empirical study from the body of literature described in Chapter 2, previously published in an international peer-reviewed journal for content area teachers and teacher educators. It describes how a critical social semiotic perspective was used in one mandated course designed to prepare secondary pre-service teachers across content areas to better support the disciplinary literacy development of students designated as ELLs. The chapter draws on pre- and post-course survey data to explore changes in 55 secondary pre-service teachers' (PSTs) literacy teaching practices after they were introduced to a critical social semiotic perspective, specifically how they gave feedback on disciplinary writing. The chapter begins with a brief description of a social semiotic theory of language and learning with particular reference to the semiotic demands of mathematics. While participants were not all math teachers, they all practiced giving feedback on math writing because of its multimodal nature, an area of great interest in contemporary conceptualizations of literacy, as described in Chapter 2. Next, the chapter provides a description of the course and the mixed methods research design

⁶ This chapter appeared as a co-authored article in the 2017 *International Journal of Mathematics Teaching and Learning*, 18 (1), 84–108. Kathryn Accurso is the lead and primary author; second author Meg Gebhard served as faculty advisor for the project, and Stephanie Purington provided statistical support. Reprinted with permission.

used to analyze changes in PSTs' pre- and post-course responses to a student writing sample about linear equations. Third, it discusses findings that suggest PSTs' emerging understanding of the linguistic and multimodal demands of mathematical explanations, supported them in providing more cogent and precise written feedback. The chapter concludes by discussing the potential of conceptual and pedagogical tools within a critical social semiotic paradigm for supporting PSTs' professional development as literacy educators in the context of globalization.

Note that because this chapter is reprinted from a co-authored publication, it uses “we” and “our” rather than the first person singular, as other chapters in this dissertation do. In addition, it adheres to the spelling conventions of the journal in which it was first published, which may differ from those used in other chapters. The only changes made to the original publication relate to the numbering of headings, figures, and tables.

3.2. Introduction

My discipline is math...it used to be that math didn't include any writing outside of calculations, but now the expectation is that students will write at some length using math language or they won't graduate. That said, I don't know how to make sure that all my students have access to the resources necessary to learn written math language.

– “Ruth Barrett,” pre-service secondary math teacher

The work of secondary math teachers is changing rapidly as the forces of globalization and related school reforms place new demands on teachers and their students, especially in schools attended by large numbers of language learners and speakers of minoritized varieties of world languages. These forces include rapid demographic changes, the replacement of manufacturing jobs with service ones, the use

of new technologies, and the rise of standardization and accountability systems imported from the private sector (e.g., Adamson, Arstran, & Darling Hammond, 2016; Blommaert, 2010; Council of Chief State School Officers [CCSSO], 2010). Therefore, teachers of mathematics must develop a greater capacity to teach a changing student population in the context of rapidly shifting social, economic, and political forces (e.g., Gorgorió & Planas, 2001). This task is particularly daunting for pre-service teachers (PSTs) because teacher education programs, especially at the secondary level, do not typically include course-work in language learning and disciplinary literacy development (e.g., Gebhard & Harman, 2011; Lucas & Villegas, 2011; Turkan, de Oliveira, Lee, & Phelps, 2014; Zeichner, 2005).

An analysis of the development and implementation of the Common Core State Standards (CCSS) in the United States provides an example of a policy initiative designed to respond to the changing nature of teaching and learning in the context of globalization (CCSSO, 2010). These default national standards are part of a federal educational reform movement designed to prepare all students to be “college and career ready” in the twenty-first century (CCSSO, 2010, p. 4). In the domain of mathematics, the CCSS call for greater focus, rigor, and coherence as a way of ensuring students develop “conceptual understanding of key concepts” and an ability to apply “math in situations that require mathematical knowledge of algebra, functions, geometry, statistics, and probability through talk, print, and multimodal representation systems” (p. 6). According to the CCSS, mathematically proficient students should be able to apply the mathematics they know to solve problems arising in everyday life, society, and the workplace through the use of equations, graphs, computer tools, reading, and writing.

Therefore, to meet these new standards, students must demonstrate mathematical content knowledge and critical thinking abilities through their ability to comprehend and produce longer and more complex multimodal texts, such as explanations and arguments involving mathematical concepts (e.g., Turkan & Schramm-Possinger, 2014).

As a number of educational researchers have remarked, the CCSS mean mathematics can no longer be conceived of and taught as a set of discrete skills. Rather, the CCSS require teachers in all content areas to know how to teach all students how to read, write, and critically discuss the types of extended texts students are routinely required to read and write in school as a way of developing students' content knowledge and disciplinary literacies. The CCSS also require teachers to develop the ability to apprentice all students to be able to use talk, print, and other meaning-making systems such as equations, graphs, maps, charts, diagrams, and computer-mediated tools to construct content knowledge specific to the subject area and grade level they teach. Moreover, teaching "all students" means that teachers are required to take responsibility for ensuring students, including language learners and minoritized⁷ speakers of world languages and varieties of languages, move along an academic pathway that prepares them to participate more equitably in a rapidly changing and increasingly multilingual, multicultural, and computer-mediated world (CCSSO, 2010).

This emphasis on disciplinary writing is new for many secondary math teachers and their students (Shanahan & Shanahan, 2012). Studies indicate that math teachers tend to view their primary responsibility as content teaching and often pay little attention to

⁷ Following Flores & Rosa (2015), this paper uses the term *minoritized* in place of terms such as *minority*, *non-dominant*, *non-standard*, and so on to highlight the social processes by which some students' linguistic practices come to be valued less than others. They note "many so-called minority linguistic practices are actually quite normative and/or prevalent in [their respective] contexts" (p. 169).

language, particularly writing instruction (Arkoudis, 2005; Kosko, 2016; Tan, 2011). In response, a number of educational researchers have cautioned that the writing demands associated with the CCSS may present significant challenges for students, especially language learners, because most of their teachers have not been prepared to teach the literacy practices associated with their discipline in a developmental way (Bunch, Kibler, & Pimentel, 2012; Gebhard & Harman, 2011; Lee, Quinn, & Valdés, 2013; van Lier & Walqui, 2012). This lack of support for language learners is especially acute because many states require all students to demonstrate they have met either state or CCSS standards or they may not be able to graduate from high school (e.g., Menken, 2008; Nichols & Berliner, 2007). As a result, teachers' inability to support linguistically diverse learners can have long-lasting effects on these students' social, academic, and economic futures (August & Shanahan, 2006; Gebhard & Harman, 2011; Scarcella, 2003).

To counter unintended consequences of current school reforms, educational linguists argue that all teachers need to develop *disciplinary linguistic knowledge* to support students in analyzing how language and other meaning-making tools construct disciplinary knowledge in their content area (Turkan et al., 2014, p. 3). Moreover, teachers need to be able to design curriculum, instruction, and assessments to apprentice students to these disciplinary literacy practices in ways that simultaneously develop students' content knowledge and the literacy practices that construct these new ways of knowing over time (e.g., Christie & Derewianka, 2008). These scholars maintain that the ability to teach the meaning-making system of mathematics allows teachers to support students' simultaneous development of mathematical thinking *and* disciplinary ways of

reading, writing, and discussing mathematical concepts that are fundamentally different from everyday ways of making sense of numeracy.

To take action on this call for a change in the knowledge base of teaching, some states, such as Massachusetts, have mandated that all pre- and in-service teachers must complete a professional development course to prepare them to teach disciplinary literacies to the growing number of students designated as “English language learners” (ELLs) in their classes if they wish to earn or retain their state teaching licenses.⁸ This regulation was put into effect in 2013 because a previous state mandate in 2002 eliminated support for bilingual education. As a result, language learners in Massachusetts are often: (1) pushed into mainstream content classes, where they have inadequate instructional supports, or (2) tracked into English as a second language (ESL) programs, where they do not have access to grade-level content instruction (e.g., Harklau, 1994, 2000).

In response to these reforms, several colleges of education in Massachusetts have turned to a sociocultural perspective of language and learning grounded in Halliday’s theory of systemic functional linguistics (SFL) (Brisk, 2015; Gebhard, Chen, Graham, & Gunawan, 2013) and with reference to math (Gebhard, Habana-Hafner, & Wright, 2004). Broadly defined, SFL attempts to explain how language users expand the nature of

⁸ Massachusetts requires teachers to complete a course in “sheltered English instruction” (SEI) as part of a mandate known as Rethinking Equity in the Teaching of English Language Learners (RETELL). SEI is often vaguely defined as a teaching strategy that uses language and content to make academic subject matter more comprehensible to ELLs. However, explanations of the phrase “sheltered English instruction” rarely provide specifics regarding what ELLs should be “sheltered” from or how to make dense texts comprehensible when ELLs are immersed in the academic reading and writing demands of high-stakes school reforms (e.g., CCSS). Therefore, the SEI course described in this study was designed using systemic functional linguistics (SFL) and the findings from SFL studies of students’ disciplinary literacy development (e.g., Accurso, Gebhard, & Selden, 2016; Achugar & Carpenter, 2014; de Oliveira & Silva, 2013; Gebhard et al., 2013; Schulze, 2016).

meaning-making resources available to them as they mature and expand their functional uses of languages and the contexts in which they interact—first within their homes, then in their communities, then in different content areas in school, and later in the world of work (Martin & Rose, 2008). This social semiotic perspective of teaching and learning disciplinary literacies, first developed in Australia (e.g., Rose & Martin, 2012), has gained traction in teacher education programs in the United States (e.g., de Oliveira, & Iddings, 2014), within the European Union through the Content and Language Integrated Learning Project (CLIL) (e.g., Llinares, Morton, & Whittaker, 2012), and in many college-level world language departments based on impressive results from empirical studies conducted at Georgetown University (e.g., Byrnes, Maxim, & Norris, 2010). To contribute to scholarship regarding the potential of Halliday’s SFL to inform teacher education, the purpose of this study is to analyse the experiences of 55 secondary PSTs enrolled in a 14-week, mandated professional development (PD) course that introduced SFL theory and pedagogical practices to support PSTs’ development of disciplinary linguistic knowledge for working with linguistically diverse students in the United States. Of specific interest is how participation in the PD influenced the manner in which PSTs responded to a student’s attempt at writing a mathematical explanation. We begin with a brief description of Halliday’s theory of language and learning with particular reference to semiotic demands of mathematics. Next, we provide a description of the PD and our mixed methods approach to data collection and analysis. Third, we present the findings and discuss data displays regarding changes in PSTs’ abilities to respond to a student writing sample about linear equations before and after their participation in the PD. We conclude with a discussion of the implications this study has for PST professional

development and the application of SFL theory in PST education in the context of globalization.

3.3. Conceptual Framework: A Social Theory of Meaning Making in Mathematics

A review of the literature regarding the role of language in mathematics education reveals that it has been treated reductively as belonging to the domain of teaching vocabulary and improving students' ability to write formally correct sentences (e.g., Cavanagh, 2005; Moschkovich, 2012). In contrast, educational linguists have argued for a more expansive and functional view of mathematical language (e.g., Barwell, Leung, Morgan, & Street, 2005; Crowhurst, 1994; Gorgorió & Planas, 2001; Herbel-Eisenmann & Otten, 2011; Morgan, 2006; Moschkovich, 2007; Pimm & Keynes, 1994; Schleppegrell, 2007). These scholars maintain that language in the mathematics classroom should be understood as a unique register characterized by particular discursive practices and patterns that operate at the word, sentence, and discourse semantic levels. In this article, we adopt this view by drawing on Halliday's theory of SFL (1975, 1993). Halliday argues that language is a functional meaning-making system that is flexible, adaptive, and context-sensitive. In addition, it cannot be reduced to a fixed set of technical vocabulary items or prescriptive grammar rules (e.g., never use *I*, split an infinitive, or end a sentence with a preposition). Rather, language and other semiotic systems are best understood as a dynamic set of resources for thinking mathematically, participating in mathematical discourse with others, and making mathematical meanings coherent when constructing extended oral, written, and multimodal texts in different situations.

3.3.1. Halliday's systemic functional linguistics

Halliday's functional perspective of grammar attempts to explain how people use language and other meaning-making resources to accomplish cognitive, social, and textual activities (Halliday & Matthiessen, 2004; Martin & Rose, 2008). This conceptualization of language as a social semiotic is built on the assumption that "language is not realized in the abstract; it is realized as the activity of people in situations" (Halliday, McIntosh, & Stevens, 1964, p. 89). Depending on the culture of a specific situation in which people are using language, they make functional choices from a system of choices at the sound, word, sentence, and discourse levels. As outlined in Schleppegrell (2004), when people use language, they consciously and unconsciously choose certain ways of pronouncing or graphically rendering words, making grammatical constructions, and creating coherence across extended discourse depending on: (1) the *field*, or content they are attempting to construct (e.g., an everyday experience versus a more discipline-specific one), (2) the *tenor*, or relationships they are attempting to construct or maintain with others (e.g., social distance and authority), and (3) the *mode*, or how they manage the flow of information in either oral, written, or computer-mediated communication. These terms—*field*, *tenor*, *mode*—are part of a functional metalanguage that allows for an analysis of the resources an individual and a language have for constructing disciplinary knowledge, enacting social relationships, and managing the flow of information over stretches of multimodal discourse. The broader term *register* encompasses field, tenor, and mode, and is used to distinguish varieties of language that differ in relationship to the different contexts in which they are used (Halliday et al., 1964). In secondary schools, students are likely to encounter registers needed to make

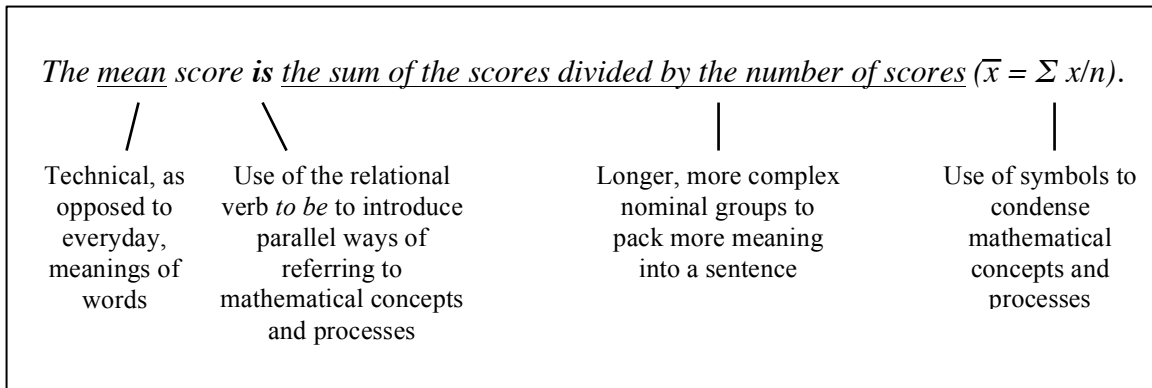


Figure 3.1: Features of the register of mathematics (adapted from Schleppegrell, 2004; Veel, 1999).

sense of literary, historical, scientific, and mathematical discourses (Schleppegrell, 2004).

Mathematical registers in school. Register choices used to construct mathematical knowledge in school include technical words and phrases packed into dense nominal phrases and relational clauses as shown in Figure 3.1. Schleppegrell (2004, p. 138) explains how these register choices function within the context of the math classroom in specific ways. She writes:

Technical lexis realized in grammatical metaphor creates quantifiable entities for the purposes of calculation (e.g., *it changes often* can be re-construed as a nominal group *the amount of change*; Veel, 1999, p. 194). Relational clauses are important for taxonomizing (e.g., *A square is a quadrilateral*), for introducing technical terms (e.g., *The mean, or average, score is the sum of the scores divided by the number of scores*); or for providing parallel ways of talking about algebraic formulas (e.g., *the mean score is the sum of the scores divided by the number of scores* is a way of talking about the formula $\bar{x} = \Sigma x/n$; Veel, 1999, p. 196).

These linguistic resources are often combined with meaning-making resources from other multimodal semiotic systems (e.g., graphs, equations, drawings) in ways that make the register used to make mathematic meanings at the secondary level unique and very distant from the way language is used to construct more everyday meanings in daily interactions (Morgan, 1996; O'Halloran, 2003).

3.3.2. Martin's genre theory and genre pedagogy

Halliday's notion of register has been expanded by Martin (e.g., 1992), who proposed the notion of *genre* for analysing recurrent language patterns people encounter within social contexts. Martin defined genres as “staged, goal-oriented social process[es]” (1992, p. 505), emphasizing that goals coordinate field, tenor, and mode resources into recurrent patterns of language use. Within the context of secondary mathematics classrooms, these goals may include the recounting of problem-solving procedures, describing a mathematical property, explaining a mathematical solution, or arguing a mathematical proof (Schleppegrell, 2004). Martin's conception of genre captures how learning disciplinary knowledge reflects and constructs cultural ways of knowing, being, and doing through the use of reoccurring semiotic patterns (Gee, 2009; Martin & Rose, 2008). For example, research has demonstrated that canonical explanations of mathematical problem-solving procedures in English have a set of expected genre stages including: identification of the mathematical concept that will be explained, definition of key terms, and an explanatory sequence that presents problem-solving steps and why they happened in that order (Moschkovich, 2010; O'Halloran, 2008). However, individual texts vary depending on the local context or situation in which they are constructed. This variation is reflected in grammatical choices that are made depending on the purpose, the audience, and the channel through which the explanation unfolds. For instance, a procedural explanation a student provides to a peer in face-to-face group work is apt to be grammatically different from one a student writes on a unit test for a teacher.

With regard to SFL pedagogy, Rose and Martin's (2012, pp. 64–67) genre-based instruction gives considerable attention to the importance of scaffolding students' disciplinary language development through the implementation of a six-part instructional cycle known as the "teaching and learning cycle." Part one prepares students for a challenging reading or writing task by activating students' prior knowledge/language resources and building a shared experience of a new disciplinary concept through collaborative participation in an activity. Second, teachers focus students' attention on key features of the task to support students' development of a specific disciplinary concept and an explicit understanding of how language and other meaning-making resources work in particular ways to construct this concept. Third, teachers guide or "co-construct" students' engagement in completing tasks using new concepts and literacy practices. Fourth, teachers give students feedback on their work and ability to use new disciplinary literacies as they evolve. Fifth, teachers elaborate and expand on students' contributions to actively scaffold more expert disciplinary language and practices over time. Last, teachers reflect on student learning and their teaching practices to support the design of future curriculum, instruction, and assessment practices.

Of particular interest in this article is how PSTs provided written feedback on one student's attempt at writing a mathematical explanation. While research on written feedback suggests it can be a valuable pedagogical tool and that secondary students tend to improve written drafts after receiving clear and detailed feedback (Beason, 1993; Ferris, 1997, 2002; Zamel, 1985), significant concerns remain regarding many teachers' inability to provide this type of feedback on student writing (e.g., Ferris, 2014; Keh, 1990).

3.3.3. SFL, genre theory, and sociocultural perspectives of teacher learning

Drawing on Halliday's SFL and Martin's genre theory as frames for theorizing the development of disciplinary linguistic knowledge (e.g., Gebhard et al., 2013), we maintain that as PSTs participate in expanding social networks, they expand their uses of different genres and registers at home, in school, at work, and through online communication. Through this expansion of contexts and associated literacy practices, PSTs are socialized into new ways of knowing, being, and doing, and they develop an increasingly diverse set of meaning-making resources for participating in these different educational contexts, first as students and then as teachers (e.g., Borg, 2003; Johnson, 2009; Lortie, 1975). However, this process of socialization does not take place through simple exposure to different genres and registers alone. Rather, it happens through an explicit, critical, and sustained apprenticeship in which PSTs gain a critical awareness of how language and other semiotic resources work in their disciplines. For example, most secondary PSTs have had a long apprenticeship in valued ways of using language in the math classroom over the course of their K-12 and post-secondary education (e.g., Lortie, 1975). They also have, to varying degrees, developed mathematical concepts and the semiotic resources needed to construct these concepts through their routine use of mathematical genres and registers in school. However, this linguistic knowledge tends to be tacit and therefore difficult to teach in any systematic and functional way to novices, especially ELLs or those who struggle with meaning-making systems used in math classes.

To respond to this difficulty, the goal of the PD described in this study was to support PSTs to close the opportunity gap between dominant and minoritized students by making disciplinary literacy practices less tacit, more explicit, and more open to critical reflection through carefully designed instructional tasks that explicitly scaffold disciplinary literacy practices and conceptual understandings. In addition, the PD fulfilled a state requirement established to support the capacity of teachers to work with the growing number of ELLs assigned to their content area classes. To this end, PSTs were introduced to SFL as a framework for developing disciplinary linguistic knowledge. In sum, the course aimed to capitalize on PSTs' existing linguistic repertoires while simultaneously providing them with metalinguistic awareness and pedagogic tools required for: (1) analysing the demands of disciplinary curricular materials; (2) designing tasks that target and scaffold specific content and language goals simultaneously; and (3) providing all students, including ELLs and other language-minoritized students, with explicit linguistic feedback to support their ability to produce more expert disciplinary texts. As part of a larger project investigating SFL-based teacher education, the following research question guided this study:

To what extent does instruction in SFL theory and practice influence the manner in which secondary pre-service teachers respond to a student's attempt to write a mathematical explanation?

3.4. Methods

A qualitatively-driven mixed methods approach was used to investigate this research question (Creswell, 2014). Fifty-five content area PSTs enrolled in a 14-week,

SFL-based professional development course required by the state were asked to numerically score and provide written feedback on a sample of student math writing at the beginning and end of the professional development. We analysed PSTs' written feedback from an interpretive perspective (Glesne, 2016), while descriptive quantitative results provided additional context for understanding the emergent qualitative themes and changes in the nature of PSTs' feedback on student writing in mathematics. In addition, we used Wilcoxon's signed-rank test to identify any statistically significant change in PSTs' numeric feedback (Gravetter & Wallnau, 2013). The multiple and complementary data sources and types allowed for triangulation and the potential for convergence of results (Greene, Caracelli, & Graham, 1989).

3.4.1. Participants

Participants in this study were 55 PSTs pursuing a Master of Education degree and secondary content area licensure at a large, public university in the Northeast United States. While over 70 PSTs were enrolled in the course, those who did not submit feedback on student writing samples or whose feedback could not be matched from the beginning and end of the PD were removed from consideration for this study. The final group of participants included 10 PSTs pursuing math teaching careers, 12 PSTs pursuing science teaching careers, 15 PSTs pursuing social studies teaching careers, and 18 PSTs pursuing English language arts careers. At the time of the study (September to December, 2015), all participants were completing pre-practicum observations in public rural, suburban, or urban secondary schools. While PSTs began the school year observing the

teaching of their cooperating teachers and learning about their students, by December, most were preparing lessons, teaching classes, and grading papers.

3.4.2. Professional development content and structure

The PD was organized into three modules. Module 1 introduced PSTs to sociocultural conceptions of language, teaching, and learning drawing on Vygotsky and Halliday's complementary perspectives of language and development (e.g., Gibbons, 2015). Module 2 asked PSTs to use the tools of SFL to analyse authentic classroom texts and develop recommendations for practice using principles of genre pedagogy and the SFL teaching and learning cycle (Rose & Martin, 2012). Module 3 required PSTs to use insights from Modules 1 and 2 to outline curricular units of study to support diverse students in meeting specific disciplinary standards. Each of the modules explored pedagogical applications of SFL and genre theory, while the second and third modules also introduced PSTs to the concept of Understanding by Design and backwards design (Wiggins & McTighe, 2005). Table 3.1 summarizes the content of each module.

Within each module, class sessions lasted 90 minutes and began with a structured free-write related to the content being presented that day to activate PSTs' thinking and elicit their existing knowledge on each week's topic. This task was followed by whole-class lecture and discussion. Following the presentation of theoretical concepts and classroom examples, PSTs separated into 60-minute discipline-specific workshop sessions led by doctoral student teaching assistants. In these workshop sessions, PSTs focused on the application of theoretical concepts through small group tasks they completed and

Table 3.1: Summary of SFL-based PD content by module.

Summary of PD content	
Module 1 (3 weeks)	<ul style="list-style-type: none"> • Introduction to the new knowledge base of teaching and the need for disciplinary linguistic knowledge • Introduction to theories of language and language learning (e.g., behaviorism, innatism, sociocultural theory)
Module 2 (6 weeks)	<ul style="list-style-type: none"> • Introduction to SFL and genre theory as an approach to developing disciplinary linguistic knowledge <ul style="list-style-type: none"> ◦ Language use varies according to context, purpose, and audience ◦ Introduction to the SFL teaching and learning cycle • Introduction to SFL metalanguage <ul style="list-style-type: none"> ◦ <i>Genre</i> ◦ <i>Register</i> <ul style="list-style-type: none"> ▪ <i>field, tenor, mode</i> • Analysis of model disciplinary texts to highlight genre and register-level expectations (e.g., features of effective math explanations) <ul style="list-style-type: none"> ◦ Organizational stages for writing an effective explanation ◦ Technical and/or dense noun phrases to construct field of content ◦ Relational verbs (e.g., <i>is</i>) to define terms ◦ Declarative mood to establish authority/construct a knowledgeable self ◦ Logical cohesive devices to create flow and explain reasoning (e.g., <i>because</i>) ◦ Temporal cohesive devices to create flow and sequentially recount problem-solving steps (e.g., <i>first, next</i>) ◦ Multimodal representations (e.g., graphs, symbols) • Analysis of student writing samples to identify strengths, areas for growth, and teachable disciplinary linguistic features
Module 3 (5 weeks)	<ul style="list-style-type: none"> • Introduction to SFL-based pedagogy and Understanding by Design (Wiggins & McTighe, 2005) <ul style="list-style-type: none"> ◦ Writing content and language objectives ◦ Connecting objectives to students' lives ◦ Designing classroom tasks to support diverse students' simultaneous development of disciplinary content knowledge and literacy practices ◦ Creating genre-based rubrics • Content-area unit design drawing on SFL and Understanding by Design

presented to their peers (e.g., literacy demands of new content area standards, analysis of disciplinary texts, instructional ideas for explicitly scaffolding disciplinary language).

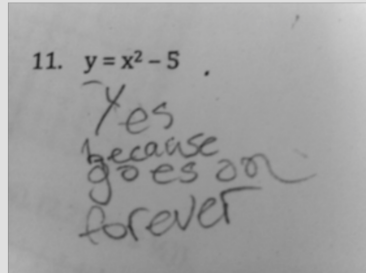
3.4.3. Data sources and analysis

Pre- and post-tests were administered to better understand PSTs' development of disciplinary linguistic knowledge, particularly how they were applying this knowledge to the practice of giving feedback on student writing samples. In these tests, PSTs were asked to respond to one 8th-grade student's written response to an algebra assignment (Figure 3.2) by giving written feedback and assigning a numeric score on a scale of 1 to 3 (e.g., a score of 1 approaches expectations, 2 meets expectations, and 3 exceeds expectations). PSTs were also asked to provide some reasons for their numeric score. Pre- and post- tests were identical and administered twelve weeks apart during the second and final class sessions as free-writes. PSTs submitted their responses electronically. Quantitative and qualitative data from the tests were then analysed to determine the degree of change in how PSTs evaluated and responded to an authentic student writing sample in mathematics.

It is important to note that not all 55 participants were aspiring math teachers. Nonetheless, this writing sample was selected because it represents a struggling student's attempt to write a staged response to a challenging task and it includes the types of formal errors language learners often make (e.g., missing subject in "because goes on forever"). Moreover, it was selected for this activity because successful completion of the prompt required the student to produce a multimodal explanation, a genre common across math and science and frequently called for on high-stakes state exams.⁹ While we were aware that many PSTs did not have the background knowledge to assess the student's writing

⁹ PSTs practiced giving written feedback on additional student writing samples in their respective content areas during discipline-specific workshop sessions in Module 2. However, due to limited class time, pre-

An 8th grader who was struggling in math class was given the following prompt in Algebra class. "Give the domain and range of the relationship. Then tell whether the relation is a function. Explain your answer."



11. $y = x^2 - 5$.
Yes
because
goes on
forever

Figure 3.2: Pre- and post-test prompt and student math writing sample.

for demonstration of mathematical knowledge, we did expect all participants to have had sufficient exposure to the genre of explanation to assess whether or not the student fulfilled the expectations of this type of writing.

Quantitative data from the pre- and post-tests were first compared to assess the degree to which the numeric scores participants assigned the student writing sample as part of their pre- and post-test feedback differed. 38% of PSTs assigned different numeric scores to the writing sample in their pre- and post-test feedback. Therefore, the data were further analysed using the Wilcoxon signed-rank test (Gravetter & Wallnau, 2013), a non-parametric test that compared PSTs' matched numeric scores of the writing sample to assess whether, as a group, PSTs' numeric scores were significantly different at the beginning and end of the PD. This test generated a p-value of .9442, indicating that the

and post-test data were only collected from all PSTs on the single student writing sample shown in Figure 3.2.

change in PSTs' numeric scores was not statistically significant. As a result, subsequent analysis focused largely on qualitative data sources.

Qualitative data from the pre- and post-tests (PSTs' written feedback to the student writing sample) were analysed using a constant comparative method that was inductive, data driven, and iterative (Creswell, 2014). First, each author independently coded the pre-tests from this qualitative data set to identify emerging patterns. In this 'open coding' stage, we each read through PSTs' pre-test feedback to gain an overall impression and characterized the feedback by recording a concise summary and analytical comments to generate preliminary codes for each PST. We then compiled the preliminary codes and discussed supporting evidence from the data set for each code identified. Next, we compared the results from our initial coding by collectively rereading the data set and discussing how our preliminary codes could be reconciled, enriched, expanded, contracted, or collapsed. This procedure allowed us to develop more refined codes that corresponded to the data. We then reviewed PSTs' pre-test feedback a third time to apply the refined codes and look across participants to identify recurring patterns and themes that characterized PSTs' feedback practices on student math writing. Four major themes emerged from this analysis. The analytical process was then replicated on the post-test data set. The same four themes emerged from the post-test data, as well as two new themes.

3.4.4. Limitations

There are several limitations regarding the methods of this study. First, we recognize that the data were collected within the confines of a state-mandated PD that

required participants to earn a minimum threshold grade before applying for licensure. Therefore, there is the potential for a social bias effect. We attempted to minimize these effects by keeping the pre- and post-test activities ungraded, waiting to analyse the data until final grades for the PD were submitted, and then doing so anonymously. Second, we recognize the self-reported nature of the data. PSTs' feedback in the context of the PD was hypothetical and directed toward an imagined student they did not know, rather than given in the context of actual classroom practice to a student with whom they shared an instructional history. However, at the time of the study, PSTs had no actual extended classroom practice. Therefore, self-reported data is an appropriate way to gain insight into PSTs' thinking and the practices they anticipate putting into place in their future work in classrooms (Shavelson, Webb, & Burstein, 1986).

3.5. Findings

Results of the pre- and post-test analysis reveal a shift in PSTs' use of disciplinary linguistic knowledge to assess student math writing, specifically in the nature of written feedback they provided the student regarding linguistic strengths, areas for improvement related to purpose and audience, and specific steps for revision. As Table 3.2 shows, PSTs' pre-test feedback can be characterized by four predominant types of feedback: (1) vocabulary-oriented feedback that encouraged the student to use specific disciplinary vocabulary to improve their response (e.g., *domain*, *range*, *function*), (2) broad feedback that directed the student to "be more specific" or "give more details" to improve their response, (3) general encouragement followed by a list of questions or broad, but non-directive feedback (e.g., *good try*, *but...*), and (4) prompts for oral feedback sessions

Table 3.2: Types of PST feedback on student math writing before and after SFL-based PD.

Type of Feedback	PRE-TEST (Sept. 2015)		POST-TEST (Dec. 2015)	
	Number of PSTs (n=55)	Percentage of Participants	Number of PSTs (n=55)	Percentage of Participants
Vocabulary-oriented	23	42%	4	7%
Broad prompt for more detail	13	24%	9	16%
General encouragement with caveats	15	27%	17	31%
Prompt for oral feedback session	12	22%	6	11%
Purpose-oriented	0	0%	20	36%
Genre-oriented	0	0%	16	29%
Register-level advice				
• Field/content resources			15	27%
• Tenor/voice resources			3	5%
• Mode/flow resources			3	5%
• Use of graphic elements			9	16%

(e.g., *Let's talk after class*). We found these types of feedback were not mutually exclusive; rather, some PSTs combined multiple feedback techniques in their responses to the student (e.g., *You're right, but you need to include the domain and range*).

Following twelve weeks of PD, in which PSTs developed disciplinary linguistic knowledge through the study of SFL and genre pedagogy, instances of the four types of feedback provided on pre-tests generally decreased. In their place, as shown in Table 3.2, many PSTs shifted toward the use of purpose-oriented feedback and feedback that incorporated SFL concepts and metalanguage to explicitly address the genre and/or register expectations for a written mathematical explanation. Of particular interest given the purposes of the PD were PSTs' shifts away from vocabulary-oriented feedback (42%

of PSTs used this type of feedback on pre-tests, while 7% of PSTs on post-tests) and vague prompts to “add details” (24% pre- to 16% post-test). Interestingly, the number of PSTs who used of prompts for oral feedback meetings (e.g., “*Let’s talk after class*”) also decreased from 22% pre- to 11% post-test. In addition, post-test results show that PSTs began prompting the student to consider the purpose of their writing and use genre stages that would support a more coherent and well developed mathematical explanation that included specific vocabulary items. For example, the percentage of PSTs who used purpose-oriented feedback increased from 0% pre- to 36% post-test, and those who used genre-oriented feedback increased from 0% to 29%. These types of feedback and PSTs’ use of them will be further described in the following analysis of pre- and post-test results.

3.5.1. Pre-test feedback on student math writing

“**Use vocabulary.**” The main type of feedback PSTs gave on the writing sample at the beginning of the PD was vocabulary-oriented or word-level feedback (42% of PSTs). Feedback in this category either: (1) identified “words” or “terms” as the problem and encouraged the use of math vocabulary or “math language” as a means of fixing the student’s writing, or (2) identified specific vocabulary items the student needed to use to earn a higher score. For example, one participant diagnosed the student’s work directly, stating, “*I can see you’re having trouble finding the right words to communicate [your math understanding] in writing.*” Another participant agreed, writing, “[*You’re*] *missing math vocabulary.*” Meanwhile, other PSTs offered the student solutions to an implied word-level problem, such as those who wrote, “*Include vocabulary that we use in class*”

and *“You want to use more technical vocabulary.”* A third subset of PSTs whose feedback fell into this category prompted the student to include specific “math terms” in their writing. Some participants conceived of math terms broadly as numbers, such as one PST who responded: *“To meet the expectations, I would tell the student that the answer needs to be in math language; the answer must include numbers.”* However, other PSTs identified specific vocabulary items they thought of as essential for writing an effective response to the prompt. For example, a number of participants directed the student to *“use the words ‘domain’ and ‘range’ to specify the domain and range of the function,” “define function,” “use terminology (function, relation, etc.),”* or simply *“use the vocabulary words used in the question.”* The predominance of this type of feedback is not surprising given that prior research shows many teachers think of disciplinary language as a specific set of vocabulary items that will allow a student to comprehend a textbook and write specific explanations of the mathematical concepts and/or procedures associated with those vocabulary (e.g., Cavanagh, 2005; Draper, 2002; Moschkovich, 2012).

“Add more details.” A second type of feedback PSTs provided at the beginning of the PD was the general prompt for more “detail” in the student’s response (24% of PSTs). In contrast with PSTs whose vocabulary-oriented feedback included explicit reference to words they expected the student to use to increase specificity in their mathematical explanation, PSTs whose feedback fell in this category made broad and rather vague comments about the need for specificity. For example, one PST supposed he would *“tell the student to be more specific with answering the questions [in the prompt],”* as another PST did in directing the student to *“please be more specific.”* In fact, the

phrase “*be more specific*” was used by 18% of PSTs in pre-test feedback, the majority of those whose feedback fell into this category. Other responses to student writing that fell into this category included those that vaguely diagnosed the problem as a “*lack of detail*” or prompted the student to “*provide more detail*.” This type of feedback is common on student writing across disciplines (Ferris, 2003). However, this type of feedback is overly general, requesting specificity from the student without providing specific suggestions, and rests on the underlying assumption that student writers have the requisite conceptual knowledge and linguistic repertoires to meet expectations for writing in a particular discipline and genre. As Schleppegrell (2004) notes, literacy instruction built on this assumption privileges students who have been socialized into more disciplinary ways of using language through school and home encounters and marginalizes students who have not.

Praise: “Good attempt.” A third type of feedback PSTs gave at the beginning of the PD was general praise or encouragement, at times followed by criticism, questions, or other caveats related to praise (27% of PSTs). One PST’s response that exemplifies this approach to feedback was: “*Good attempt, I’m proud of you. [You get a] 1 for effort and trying your best, but the answer wasn’t enough. You could do better, and I expect more.*” Another PST wrote: “*Great! Almost...but I need to see your work. How did you know if the relation was/wasn’t a function? What steps did you take to reach this answer?*” In a number of cases, this type of feedback was combined with vocabulary-oriented feedback or general prompts for detail, as in these PST responses: “*You are off to a good start in understanding how the function is continuous, but when trying to answer a question like*

this, you need to understand how to properly answer using the terms ‘domain’ and ‘range,’” and “Good attempt, but you need to be more specific.”

Ferris (2014) explains this phenomenon as the result of teachers’ goals in giving written feedback, reporting that many teachers are less focused on improving students’ disciplinary writing and more focused on encouraging students, building confidence, and softening the blow of direct criticism. Therefore, they tend to frontload positive evaluation in feedback on student writing. This supports the perception that teachers have a care orientation that dominates their responses to students (Pajares & Graham, 1998). New teachers in particular (<3 years of experience) tend to be non-directive “idealists” in giving written feedback (Ferris, 2014). However, this feedback strategy can mislead students to believe their work is essentially correct, and their content knowledge and disciplinary writing skills are adequate for the task, as many students process the feedback as generally positive and do not read or reflect on the rest of the assessment of their work (Hyland & Hyland, 2001). Other students have reported that they understand this type of feedback is meant to serve as positive reinforcement for their efforts at engaging with a disciplinary writing assignment, but they find it unhelpful and insincere (Hyland, 1998). Further, students may be especially suspicious of positive feedback that comes with very low scores. In sum, while teachers may feel that they are being supportive and encouraging, students may feel misled or confused by this kind of positive feedback.

“Let’s talk after class.” A fourth type of feedback that frequently occurred in PSTs’ pre-test responses was the prompt for oral feedback sessions (22% of PSTs). Feedback that fell in this category was most often brief. It hinted at the inadequacy of the

response, but did not provide feedback on the writing itself. It also directed the student to arrange an in-person meeting with the teacher. For example, *“Clearly you are having trouble understanding the material. Meet me for extra help when you have some time.”* Some PSTs refrained from including negative written feedback, but combined low numeric scores with prompts to meet after class, as in these two responses which were paired with scores of 0 and 1, respectively: *“Let’s talk after class so I can hear more about your answer;”* and *“Let’s talk about this kind of problem after class.”* A small subset of responses in this category combined calls for in-person meetings with other types of feedback, such as requests for more detail: *“Please be more specific. If you do not understand the problem, please talk to me at the end of class so we can arrange a time to meet and discuss it.”* Generally, oral feedback sessions can allow for effective individualized instruction (e.g., providing clarity and scaffolding to meet particular students’ needs). However, teachers should have a clear approach for oral feedback sessions to scaffold the writing process most effectively for their students (Ferris, 2014). PST responses in this category offer little insight into the type of oral feedback they would provide if the student elected to arrange a meeting. Further, this type of response to student writing can delay feedback and might result in no feedback unless follow-up meetings are required by the teacher (Perrine, 1999).

3.5.2. Post-test feedback on student math writing

After twelve weeks and PSTs’ completion of the three PD modules, PSTs’ use of three of the four types of feedback described in Table 3.2 shifted notably. Specifically, PSTs’ use of vague calls for more vocabulary and added details, as well as prompts for

face-to-face feedback sessions, decreased markedly. Responses that began with general encouragement increased slightly. Moreover, it appeared that as PSTs' disciplinary linguistic knowledge developed, their feedback on student math writing became more purpose-oriented and they exhibited an ability to use SFL concepts to explicitly address the genre and/or register features expected in a well written mathematical explanation.

A decrease in calls for more vocabulary. The decrease in PSTs' use of vocabulary-oriented feedback (42% → 7%) is interesting because there was a dramatic shift from giving broad advice (e.g., *use vocabulary from class*) and decontextualized lists of terms to an embedding of word-level advice in feedback specifically related to the purpose and audience the mathematical writing task at hand. This is not to say that PSTs were no longer focused on the specific mathematical vocabulary they expected students to use, but as will be further discussed in a subsequent section, post-test feedback shifted toward being goal-oriented, meaning word-level advice was explicitly linked to an awareness that authors make vocabulary choices to construct certain content for a certain audience to accomplish the social goals associated with a particular genre—in this case, the genre of written math explanations. As one PST remarked in the score rationale that accompanied her post-test feedback, *“It’s not just that [the student] needs to use the word ‘function,’ but they need to define the word and then explain why or why not this is a function because you can’t assume the reader knows the material.”*

Greater linguistic precision regarding “Add details.” Similarly, there was a decrease in PSTs' post-test use of vague calls for more detail (24% → 16%). For example, as PSTs developed the ability to be more linguistically precise about the kinds of “details” they expected to see in effective math explanations, we found fewer instances

of PSTs prompting the student to simply “*be more specific.*” Instead, post-test feedback showed more elaboration on how the student could increase mathematical specificity through the use of more precise linguistic choices. For example, one math PST who wrote “*explain more of what you mean*” in his pre-test feedback was able to articulate more precise expectations in his post-test response: “[*Your answer*] *needs to be taken further. Be more specific with what is going on forever, and why that shows this is a function or not. You can explain through both sentences and showing your work.*”

Slight increase in praise. The slight increase in encouraging feedback in post-tests (27% → 31%) could be attributed to the idealist novice teacher profile described by Ferris (2014). However, it may also be a by-product of the PD’s emphasis on using disciplinary linguistic knowledge to explicitly identify students’ linguistic strengths as well as areas for growth. In other words, while PSTs were explicitly discouraged in the PD from giving vague feedback such as “add details” and “be more specific,” they were encouraged to practice using SFL concepts and metalanguage to provide positive feedback regarding students’ uses of disciplinary language. For example, one math PST wrote, “*You have a strong start here, using ‘because’ to explain your understanding of this topic. But your response is not complete. Here are some suggestions to think about when re-writing your response...*”

Fewer instances of “Let’s talk after class.” Post-test results show half as many prompts for a face-to-face meeting to discuss the student’s response in one-on-one setting (22% → 11%). In interpreting these results, it may be that this “see me” response was less necessary as PSTs developed new ways of responding with greater precision to student writing, as illustrated in Table 3.3. In other words, because PSTs were able to

provide more clear and concrete feedback to the student, the somewhat default and expedient response “see me” may have been less necessary. This interpretation, however, is highly speculative.

A new type of feedback: Focus on purpose. One new type of feedback that emerged in PSTs’ responses by the end of the PD was general purpose-oriented feedback (36% of PSTs). Feedback in this category addressed the appropriateness of the student’s writing to the request of the specific writing prompt (Figure 3.2), but did not explicitly name the genre the student was expected to produce. In the pre-test data, no PSTs explicitly connected their feedback to the purpose for which the student was writing. However, after the PD, which emphasized linguistic choices as a function of context, purpose, and audience, more than a third of PSTs framed their feedback in this way. For example, one PST, whose pre-test feedback was “*I suspect at this point that the student doesn’t know the terms,*” addressed the student directly in his post-test feedback, and connected his expectations explicitly to the prompt: “*Start by reading the prompt and noticing what it is asking you to do - explain your thinking and show your ‘evidence’ or ‘proof.’ In this case, the prompt is asking you two questions and you probably want to tackle them one at a time.*” SFL scholars have argued that one role of the classroom teacher is to make their implicit knowledge of text types explicit by showing students how all texts are “produced in response to, and out of, particular social situations and their specific structures” (Kress & Knapp, 1992, p. 5). The emergence of this type of feedback in post-test responses suggests some PSTs developed an ability to recognize a recurring type of text that has been conventionalized in secondary math classrooms and has a distinct purpose (e.g., to demonstrate knowledge of key concepts and explain how

and why a conclusion was arrived at on an exam). PSTs whose post-test feedback fell into this category attempted to make this purpose explicit to the student in their written feedback.

A second new type of feedback: Focus on genre expectations. The second new type of feedback that emerged in post-test feedback was genre-oriented feedback (29% of PSTs). This category refers to feedback that named the genre students were expected to produce in response to the prompt (i.e., math explanation) and explicitly outlined the expected stages for accomplishing the purpose of this genre (i.e., general statement identifying the mathematical concept to be explained, definition of key terms, explanatory sequence; see Moschkovich, 2010; O'Halloran, 2008). This feedback category is distinct from the purpose-oriented feedback because PSTs in this category explicitly attempted to address the purpose *and* linguistic features needed to realize this specific purpose in their feedback. In one particularly dramatic shift in feedback from pre-test to post-test, a PST who had initially invited the student to “*talk after class*” gave the genre-oriented post-test feedback illustrated in Table 3.3. This feedback, and other instances like it, suggests that some PSTs enrolled in the PD were able to develop sufficient disciplinary linguistic knowledge in 12 weeks to give explicit genre-based feedback on student math writing regardless of whether or not math was their discipline. This feedback explicitly attended to the steps a student could follow to produce a math explanation that meets expectations and effectively communicates content knowledge. As such, genre-oriented feedback can serve to support students in negotiating the demands on high-stakes exams. This trend is a notable shift given findings from other studies that

suggest only 1–2% of teachers report providing students with written feedback on the organization of their texts (Ferris, 2014).

Of the PSTs whose post-test feedback was genre-oriented, some also included explicit register-level advice, meaning they attended to particular aspects of field, tenor, or mode at the sentence level in their written feedback. The most common register-level advice PSTs gave emphasized field resources (27% of PSTs), or language choices the student could make to more effectively construct the content of their response. This type of feedback most often included contextualized vocabulary advice, such as that in Table 3.3: *“You can explain your answer better by showing that you understand what a function is. This would be a good place to write the definition of a function using terminology we learned in class.”* This type of feedback differs from that categorized as vocabulary-oriented in that it talks about vocabulary use in relation to the purpose of the text and the expectations of a specific genre. For example, another PST who gave register-level advice focused on field resources wrote: *“You have the beginning of a math explanation, but you’ve failed to give the domain and range. Your explanation should use content-specific nouns and verbs to show that you have knowledge of the field.”* Both of these feedback examples demonstrate PSTs’ developing understanding that the kinds of meaning made in the discipline and discourse of math require particular ways of using grammatical resources (e.g., mathematical definitions require content-specific nouns and relational verbs). The data suggest that the emergence of this type of feedback may have contributed to the post-test decrease in vocabulary-oriented feedback.

In addition to register-level advice focused on field resources, PSTs’ post-test feedback also included a few examples of advice focused on tenor and mode resources

Table 3.3: Examples of functional feedback on student writing in mathematics following SFL-based PD.

Genre-Oriented Feedback	Feedback on the Use of Mode/Flow Resources	Feedback on the Use of Graphic Elements
<p><i>There are a few steps you can follow to make sure you answer this question clearly and thoroughly with a math explanation. Try following the following steps:</i></p> <p><i>Define the domain and range. In order to do this, you should write in full sentences and use relational verbs (is/are).</i></p> <p><i>The domain IS _____. The range IS _____.</i></p> <p><i>Tell whether the relationship is a function. In order to do this, you should write in full sentences.</i></p> <p><i>The relationship is a function because _____. OR The relationship is not a function because _____.</i></p> <p><i>Explain your answer: after the word “because,” you can explain your answer better by showing that you understand what a function is. This would be a good place to write the definition of a function using terminology we learned in class.</i></p> <p><i>For an even more amazing response, you can even draw an arrow to the graph, or otherwise graphically represent what you meant in your explanation.</i></p>	<p><i>In order to decide if this is a function, you must first define function.</i></p> <p><i>Next, you must explain your thought process step by step to prove that the relationship is or is not a function. In the explanation, you must include vocabulary that we use in class and transition words that provide flow and sequence to your explanation.</i></p>	<p><i>- You can enhance your response by including words like “relation,” “domain,” “range,” and “function.” You can also enhance your response by using math symbols. Using symbols will show your knowledge about the topic. They also keep your solutions organized and accurate.</i></p> <p><i>- Draw visuals: drawing a visual, like a graph or table, to represent this relation will enhance your response and also be helpful in generating a precise and accurate solution.</i></p>

(10% of PSTs collectively). Tenor refers to the language choices an author makes to construct the social roles between themselves and their audience, and is one aspect of language few teachers emphasize in disciplinary literacy instruction (Aguirre-Muñoz, Park, Amabisca, & Boscardin, 2008). Nevertheless, three PSTs attempted to inform the student's use of tenor resources, such as one PST who encouraged the student to use a more authoritative voice by positioning him as a mathematical thinker and writer: "*As mathematicians we always want to be sure to explain how we come to our conclusions. How did you know for sure that this goes on forever?*" Three PSTs also gave feedback regarding the use of mode resources, or those language resources that would enable the student to control the flow of information in their explanation. For example, as exhibited in Table 3.3, one PST pursuing a career in math teaching encouraged the student to use sequential organization and transition words to create flow in their response.

A final type of register-level advice that emerged in PSTs' post-test feedback focused on the use of a graph or mathematical symbols as meaning-making resources (16% of PSTs). This feedback was categorized separately from other register-level advice because PSTs encouraged the use of these graphic elements in the student's response in different ways: as a means of constructing content (field), constructing themselves as a mathematical expert (tenor), and/or as a means of building up information needed by their reader to follow their response (mode). Thus, though this feedback was categorized separately from other aspects of register, the following examples illustrate that the different register resources are always working simultaneously. For example, one PST focused on the graph as a means of making it clear to the reader what is being talked about: "*Include vocabulary words and a graph (that we have learned in class) to explain*

your response.” Another PST gave relatively similar advice but framed the use of particular vocabulary and a graph as a means of constructing an authoritative self: “*State the range and domain and then use a graph to ‘show’ you understand it.*” A third PST, who was pursuing a career in math teaching, made connections between the use of graphic elements and content, field, tenor, and mode goals in her feedback (see Table 3.3).

Collectively, the post-test feedback data demonstrate that as PSTs studied SFL and genre theory, many of them were able to recognize explicitly and begin to talk about the multiple semiotic systems that comprise register in the math classroom (e.g., linguistic resources, symbolic representations, visual images). While this development was likely also impacted by factors external to the study (e.g., increased observation and student teaching time at practicum sites over the course of the semester; other program coursework), the specific types of feedback that emerged in the post-test data suggest a relationship between the Module 2 content of the PD and PSTs’ developing disciplinary linguistic knowledge as evidenced in their changed feedback practices.

3.6. Implications

PSTs’ ability to explicitly scaffold disciplinary writing and respond to students’ disciplinary texts with greater expertise and specificity is a pressing educational priority for a number of reasons related to the rapidly changing nature of schooling in the context of globalization (e.g., Canagarajah, 2013). First, population flows and demographic changes worldwide have resulted in calls for educators at all institutional levels to know how to teach linguistically diverse students how to read and write more powerfully and

critically in their disciplines (e.g., Gebhard & Willett, 2015). Second, reforms such as CCSS are mandating K-12 schools and colleges of education do a much better job of preparing all students and teachers to be “college and career ready” in a rapidly changing social, economic, and political world—a world that values and rewards multilinguals who are able to apply mathematical thinking to solving real world problems creatively through their use of “*talk, print, and multimodal representation systems*” (CCSSO, 2010, p. 6, italics added). These reforms, and the high-stakes accountability systems associated with them, necessitate that teachers be able to make their tacit understanding of the semiotic systems they use to make mathematical meanings more explicit to students. This ability will allow teachers to better apprentice students to learning how to use technical language, signs, and multimodal representations more expertly over time.

Central to this type of apprenticeship is a teacher’s ability to design curriculum, instruction, and assessments that support students in writing specific high-stakes genres more expertly (e.g., procedures, descriptions, explanations, arguments). However, past reforms regarding academic writing instruction in the United States have largely failed (O’Brien, Stewart, & Moje, 1995). In the recent past, writing instruction has been characterized by a disconnect between teachers’ intentions and students’ experiences (Applebee, 1984; Zamel, 1985). This disconnect has been attributed in part to teachers’ lack of knowledge and pedagogical skills (National Commission on Teaching America’s Future, 1996), as well as professional development efforts that “fall short of [their] objectives and rarely improve professional practice” (Calvert, 2016, p. 2). While this study does not present longitudinal findings regarding whether or how PSTs operationalized disciplinary linguistic knowledge in their actual classroom practices with

diverse secondary students, the data suggests PSTs were able to incorporate disciplinary linguistic knowledge into writing instruction within their pre-service coursework. Moreover, the data suggest that PSTs were able to make sense of SFL tools in ways that have the potential to support their emerging pedagogical practices in the future, specifically their ability to reflect on student learning and provide more concrete feedback.

As SFL scholars have argued, explicit genre and register-level feedback can “enhance the knowledge co-construction between teacher and student...and bring to the foreground the preferred linguistic choices in a given context, as well as reinforce instructional points discussed during whole-class instruction” (Aguirre-Muñoz et al., 2008, p. 316). Further, functional written feedback has been shown to support emergent student writers in developing their own metalinguistic awareness of disciplinary literacy practices, which in turn helps them gain command of these practices (Gebhard, Chen & Britton, 2014; Patthey-Chávez, Matsumura, & Valdés, 2004; Schleppegrell, 2013). Last, international math education scholars have recently argued that effectively incorporating writing into math instruction can support students in thinking more deeply and clearly about mathematical content, improve student attitudes towards mathematics, and serve as an invaluable assessment tool of student learning (e.g., Adu-Gyamfi, Bossé, & Faulconer, 2010; Burns, 2004; Morgan, 2001; Pugalee, 2001). The arguments of these scholars, coupled with the findings from this small-scale study, suggest that SFL theory and practice can play a productive role in preparing future teachers.

As a coda to this article, approximately one month after the PD ended, as participants began their student teaching experiences in earnest, one PST reflected on the

usefulness of the PD for building disciplinary linguistic knowledge and operationalizing that knowledge in his classroom practice. He said:

Knowing more about the language of my discipline, I think I was better able to convey my expectations to students. At the end of [the PD] I felt like that anyway. And there were things that—like learning to talk about my discipline language—I didn't know before. I didn't have any strategies to do that specifically before. But now I think I have a little bit better grip on that and some more strategies as far as talking about specific types of writing.

As this PST indicates, knowledge of disciplinary literacy practices allowed him to be clearer in his expectations for student work. This clarity is key to designing instructional tasks, assessing students' learning, and reflecting on one's teaching.

Of course, the challenges of mathematics teaching in the United States and around the globe extend well beyond the issue of disciplinary writing described in this article. Nevertheless, the professional expectations of secondary teachers in the United States and many international contexts increasingly include the design and implementation of curriculum that supports students in developing advanced disciplinary literacies (e.g., Gleeson, 2015; Gorgorió & Planas, 2001; Love, 2010; Morgan, 2001, regarding international contexts). Therefore, PSTs need professional development that explicitly targets their development of disciplinary linguistic knowledge to support students in constructing knowledge about mathematics in ways that are seen as successful (Thwaite, 2015). This means PSTs must develop an understanding of and ability to operationalize an awareness of how language constructs knowledge in their disciplines. Though PSTs will necessarily have differing levels of disciplinary knowledge as a basis for building disciplinary linguistic knowledge, findings from this study suggest that PD structured around building knowledge of particular high-stakes genres can help prepare new

teachers for work in the context of new standards. Further, findings from this study suggest SFL provides a promising theoretical basis for this type of PD. The findings reported above add to the growing body of evidence that SFL-based PD can support PSTs' development of disciplinary linguistic knowledge in ways that influence their ability to provide specific and functional feedback on student writing (e.g., Aguirre-Muñoz et al., 2008; Fang & Wang, 2011; O'Hallaron & Schleppegrell, 2016). We recommend further research in this area to explore PSTs' responses to a range of student writing samples across disciplinary genres, longitudinal development of PSTs' disciplinary linguistic knowledge to see how this knowledge becomes incorporated into classroom practice (or not), and students' interactions with SFL-informed feedback to track the impact of this feedback on their development of valued disciplinary literacy practices.

3.7. References

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CHAPTER 4

EXPLORING A CRITICAL SOCIAL SEMIOTIC APPROACH TO SECONDARY TEACHER EDUCATION

4.1. Preface

Like Chapter 3, this chapter explores how one College of Education used a critical social semiotic approach to respond to a state policy intended to promote more equitable teaching for students labeled English language learners (ELLs). However, this chapter was written with an audience of linguists in mind, such as readers of *Linguistics and Education*, to contribute to lively discussions taking place within the field regarding the limits of formal linguistics for addressing the complex social issues facing ELLs and their teachers in U.S. public schools today, and the problem of unstated conceptions of language in social justice literature. Moreover, while Chapter 3 relies on survey data to analyze relatively short-term changes in the nature of pre-service teachers' feedback on disciplinary writing, this chapter takes a more longitudinal view of changes among this same group of PSTs. It combines qualitative case study and quantitative survey methods to more holistically explore what kinds of knowledge, beliefs, and practices these PSTs developed over time as they experienced multiple and, at times, contradictory discourses about language, language learners, and literacy teaching and learning during their pre-service programming, student teaching experiences, and first year of in-service teaching. Mixed methods analysis of interviews, classroom observations, and survey data indicated that discourses from within a critical social semiotic perspective influenced three trends in participants' learning over time: movement toward increased language awareness,

between standard and more plural language ideologies, and away from solely form-focused literacy teaching. In addition to these possibilities, the article discusses constraints of this approach within its context, and what implications these findings have for theory, research, and practice in teacher education.

4.2. Introduction

In 2011, students institutionally designated as English language learners (ELLs) represented 7% of the K-12 student population in Massachusetts, an increase of over 50% since 2001 (MA DESE, 2018a).¹⁰ However, only about half of these students graduated from high school, an indication that the promises of public education were not being fulfilled. The U.S. Department of Justice ruled this violation of students' civil rights to be an issue of teachers' professional knowledge, specifically their "inadequate training...to take appropriate action to overcome ELL students' language barriers" (US DOJ, 2011). As a result, in 2013, Massachusetts unrolled a policy initiative called Rethinking Equity in the Teaching of English Language Learners (RETELL). This policy was predicated on the assumption that if teachers knew enough about language, it would lead to more equitable experiences and outcomes for ELLs. Thus, the initiative specified a set of language-focused professional learning standards and mandated all pre- and in-service teachers meet them through coursework or professional development in order to earn or retain their teaching license, implying that social change is a byproduct of discrete training.

¹⁰ Many scholars have noted ideological problems with the term "ELL" (e.g., García, 2009; Menken, 2013). Though in agreement with these critiques, this article uses the term to discuss policies that aim to prepare new teachers for working with students bearing this institutional label.

Teacher educators across the United States are currently grappling with similar equity gap policies meant to address differential educational outcomes for ELLs resulting from longstanding processes of minoritization and marginalization along lines of language, race, and class (e.g., Darling-Hammond, 2015). As in Massachusetts, such policies in Arizona, California, Florida, New York, and Pennsylvania have resulted in mandated courses that can generally be described as “Linguistics for Teachers” (Samson & Collins, 2012). Such courses have been shown to have some impact on teachers and students, influencing, for example, teachers’ attitudes toward the job of teaching ELLs (Olson & Jimenez-Silva, 2008), their feelings of preparedness for teaching ELLs (Coady, Harper, & de Jong, 2011), their ability to give more precise feedback on student writing (Accurso, Gebhard, & Purington, 2017), and some ELLs’ scores on tests of academic English proficiency (Imeh, 2018).

However, two major critiques have challenged teacher educators working at the intersection of language, learning, and social change to explore new ways of responding to these policies. First is a social justice critique that many of these policies and the courses they give rise to ignore histories of racial, economic, and linguistic prejudice (e.g., Darling-Hammond, 1995, 2015) that have influenced not only ELLs’ access to equitable education, but also who is teaching them, and how and what these educators learn to teach (e.g., Ingersoll, 2005). Critics argue that reducing such complex social problems to issues of teachers’ knowledge about language obscures the ideological nature of the policies themselves and leads to an underexamination of raciolinguistic ideologies and ideologies of standard that are not only alive and well in schools today, but are manufactured in schools, including through so-called equity policies (e.g., Flores & Rosa,

2015; Leider, 2018; Rosa, 2016). These critics point out that many issues ELLs and their teachers are grappling with are not solely linguistic; thus, linguistic interventions like the mandated courses can be misguided (e.g., Corson, 1998; Rosa & Flores, 2017a). Second is a critique of the linguistic paradigm put to use in many of these courses. While few courses explicitly state their theoretical underpinnings, critics have noted that language education courses across states seems to default to a psycholinguistic theory of language with a nod to sociocultural perspectives of learning and no articulated theory of social change (e.g., Gebhard, 2019; Harper & de Jong, 2009). These critics have argued that a linguistics that does not address ideology, inequity, or social change cannot ultimately serve the stated goals of equity policies.

These critiques combined with the professional knowledge requirements of equity gap policies make the proposition of designing and implementing a theoretically sound and impactful language education course for teachers challenging to say the least. Therefore, the purpose of this article is to explore how one Massachusetts College of Education engaged with these challenges using a critical social semiotic perspective of language, learning, and social change that accounts for ideology and inequity (Fairclough, 1991; Halliday, 1993; Martin, 1992), and how this approach influenced 55 secondary pre-service teachers (PSTs) over time. Specifically, this article explores the following questions: (1) To what extent did PSTs develop new knowledge about language and new beliefs about language learners? (2) How did PSTs enact these knowledge and beliefs in their practice of teaching disciplinary literacies to diverse student populations, first as pre-service teachers and then as in-service professionals?

To address these questions, this article first describes the main tenets of a critical social semiotic perspective as they were enacted in a semester-long course designed to meet the state's RETELL requirements. Next, it outlines a longitudinal mixed methods research design, as well as the program and policy context in which this study took place. Third, findings suggest three trends in participants' learning: movement toward increased language awareness, between standard and more plural language ideologies, and away from solely form-focused literacy teaching. Finally, it concludes with a discussion of the possibilities and constraints of this approach within its context, and what implications this has for theory, research, and practice in teacher education

4.3. Conceptual Framework: Critical Social Semiotics

The critical social semiotic approach to teacher education this study explores is grounded in systemic functional linguistics (SFL), critical discourse analysis (CDA), and sociocultural theory. Broadly defined, this approach is meant to be a critical, poststructural response to teacher education practices rooted in psycholinguistic theories of language that over-emphasize linguistic form while ignoring contexts of language use, and thinly articulated theories of learning and social change that have been criticized as lacking clear pedagogical applications (e.g., Gebhard, 2019). This section briefly outlines how language, learning, and social change are conceptualized differently in a critical social semiotic paradigm, as well as how these conceptualizations were applied in one RETELL course for secondary PSTs in Massachusetts.

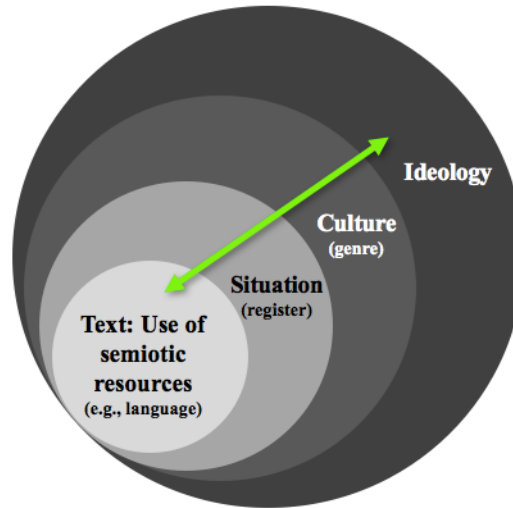


Figure 4.1: Stratified model of text/context dynamics (adapted from Halliday, 1978; Martin, 1992).

4.3.1. Conceptualizing language as a social semiotic system

SFL is a linguistic tradition with roots in anthropology and an ethnographic perspective that attempts to explain the evolution and use of language and other meaning-making systems in relation to society (Halliday & Hasan, 1985). As Figure 4.1 illustrates, SFL theorizes a dialectical relationship between language and society, and thus focuses on how semiotic systems such as language, gestures, and images function to accomplish social, political, academic, and ideological work in different contexts (for other text/context illustrations see Gebhard, 2019; Halliday, 1978; Halliday & Hasan, 1985).¹¹

To this end, Halliday (1973) developed a theory and accompanying metalanguage, or

¹¹ The placement of *genre* in models of text/context dynamics is controversial among SFL scholars. In Halliday's account, *genre* is a textual feature (a mode resource), while in Martin's account, *genre* corresponds to culture as shown in Figure 4.1. Halliday never adopted Martin's conception, and other SFL scholars such as Hasan (1995) argued against it. This paper does not intend to downplay these theoretical disagreements or promote the common misconception that Martin's so-called Sydney School model and Halliday's model are the same. By citing both Halliday and Martin in Figure 4.1, I merely mean to acknowledge the historical throughlines in my understanding of text/context dynamics, which grew out of and have origins in both Halliday's and Martin's models. See Lukin, Moore, Herke, Wegener, and Wu (2011) for a review of the meaningful differences in the positioning of *genre* in different communities of SFL scholarship.

language for talking about language, that includes terms for discussing “the nature of [people’s] social action (the *field* of discourse), their social relations to each other (the *tenor* of discourse) and their modes of contact (the *mode* of discourse)” (Hasan, 2005, p. 68). The broader term *register* encompasses field, tenor, and mode, and has been used to distinguish varieties of language that differ according to different situations (e.g., Eggins & Slade, 2005; Schleppegrell, 2004). This term has proved helpful in recognizing and talking about the ways semiotic forms get constructed as registers, as well as regularities and variations in these registers (e.g., Halliday & Hasan, 1985). Beyond register lies *genre*, a contextual level that represents recurrent patterns of language use to accomplish specific cultural goals (e.g., academic argument, scientific explanation, entertainment through storytelling). This level has inspired many efforts to describe the genres associated with various institutions and contexts (e.g., Martin, 1985).

In addition, SFL recognizes all registers and genres as ideologically and politically inflected, thus, beyond the level of genre, lies *ideology* (Martin, 1992). However, SFL theorists have long debated how to best represent the relationship between language and ideology, as well as the unequal distribution of semiotic resources in society (e.g., Hasan, 1986; Martin, 2010). Therefore, the course described in this study draws on the complementary framework of CDA (Fairclough, 1989, 1991), which is chiefly concerned with the discursive reproduction of dominant ideologies and how this sustains unequal power relations. Within a CDA framework, analyzing institutional discourse is key for understanding how dominant ideologies are “constantly and cumulatively impose[d]” on individuals, influencing both their language production and interpretation (Fairclough, 1989, p. 83). Explorations of ideology informed by SFL and

CDA focus on discourses manifested across a range of texts to address social structures that differentially support or constrain access to robust forms of linguistic apprenticeship (e.g., Janks, 2010; Young & Fitzgerald, 2006). Martin and Rose (2008), for example, explore the way language ideologies recreate class structures and economic realities, particularly for students whose community language practices are minoritized in relation to language practices associated with valued institutions (e.g., schools, governments, see also Cazden, John, & Hymes, 1972; Cope & Kalantzis, 1993; Christie & Martin, 2005).

This perspective differs significantly from the Chomskyan perspective of language silently assumed in many RETELL and RETELL-like courses. Instead of conceptualizing language as a collection of linguistic forms and a finite set of rules for combining these forms into sentences, a critical social semiotic perspective sees language as a flexible, adaptive, and context-sensitive system for functional meaning-making in which meaning, form, and the social context in which language is used are inextricably related (Hasan, 2005).

4.3.2. Conceptualizing learning as a context-dependent semiotic process

With regard to a theory of learning, a critical social semiotic perspective as defined in this study unites SFL with sociocultural theories of learning. Within SFL, learning is understood as a contextual process of learning how to mean in which people create language in interaction with acculturated others, thereby expanding both their cognitive and linguistic repertoires (Halliday, 1993; Hasan, 2005). This conceptualization is complemented by a Vygotskian understanding of language as a semiotic tool that is internalized and mediates mental activity as people interact with their worlds (for further

discussion of the centrality of mediation to learning, see Moll, 2000; Vygotsky, 1986; Wells, 1999). Thus, a critical social semiotic perspective of learning entails that language and context are central elements in the development of knowledge, beliefs, and social practices and that learning occurs through dialogic interaction and is co-constructed through language (e.g., Wells, 1994). From this perspective, teachers learn just as their students do: by participating in interactions with others, learning language at the same time they learn to do things with language (e.g., Borg, 2015; Johnson, 2009; Putnam & Borko; Richardson, 2005). Because this process of discursive formation necessarily involves negotiation, within this paradigm, learning is best understood as taking place over time along a multi-directional pathway rather than following a unidirectional trajectory with a fixed destination. In addition, movement along such pathways reflects the constraints and affordances of the contexts in which learning takes place (van Lier, 2004) and is influenced by specific structurings of power and domination that impact learners' orientations and degrees of access to particular configurations of meaning (Accurso, 2015; Hodge & Kress, 1993). This perspective contrasts more behavioral and cognitive perspectives that de-emphasize the situated and social nature of learning and rely on a fixed "building blocks" conceptualization of development.

Though language-focused educational policies like RETELL are chiefly concerned with teachers' professional development, few of the courses associated with these policies explicitly articulate a theory of development or learning. Some allude to broad sociocultural perspectives (e.g., Bacon, 2018), but do little to account for critiques that while SCT claims language is a tool for learning, it does not specify what language is (e.g., Byrnes, Maxim, & Norris, 2010). Some pair SCT with perspectives of language that

are at odds with language development standards used in most states (e.g., WIDA, see Gebhard, 2019). And some draw on multiple theories of learning in ways that can result in teachers coming to misleading conclusions about teaching and learning themselves (e.g., van Lier, 2004). These issues are not unique to RETELL, but are reflective of thinly articulated conceptions of learning and the influence of historical constructions of knowledge throughout teacher education as the field experiences a paradigmatic shift toward more “contemporary pedagogical discourses” that are increasingly interested in the relationship between “knowledge, power, and problems of social inclusion/exclusion” (Popkewitz, 1998, p. 536). In response, the course described in this study attempted to clearly articulate a theory of learning that accounts for language, social interaction, power and inequity in secondary schools.

4.3.3. Conceptualizing social change as a linguistic process

Finally, in regard to a theory of change, the course described in this study draws on CDA to conceptualize social change as, in part, a linguistic process (e.g., Fairclough, 1992). From this perspective, conscious intervention in discourse practices is an important factor in bringing about social change. Such intervention is a process of denaturalizing and problematizing dominant ideologies as manifested in language, particularly in institutional discourses. According to Fairclough (1992, p. 216), teachers are well-positioned to affect social change, but to do so they need not just knowledge about language, but an ability to anticipate and analyze the social effects of linguistic choices in different local and institutional contexts given the influence of unequal power distributions. Within an SFL framework, this requires teachers to develop an

understanding of *tenor*, or interpersonal meanings, and an ability to think strategically about how to use language to achieve different social effects and talk with students about the same. For example, teacher educators desiring to work toward social change in language-focused courses might try to prepare teachers to explore “the historical, political, and ideological aspects of the texts they encounter in school as a way of critiquing these texts, innovating future work, and transforming existing discursive practice” (Gebhard & Harman, 2011). In addition, they might promote consciousness about ideologies of standard and how the imagined boundaries between standard and non-standard varieties of language that have been “a major feature of modern society” (Fairclough, 1992, p. 223) work to position ELLs as certain types of learners.

Such critical consciousness is quite different from the types of professional knowledge described in equity gap policies such as RETELL. Yet increasingly it has become an explicit goal of equity-minded teacher educators working within a critical social semiotic paradigm to respond to RETELL-like policies where social change is an implied goal, but one not explicitly addressed in the competencies listed in resulting professional standards (e.g., Brisk, 2014; Gebhard, 2019; Harman, 2018; Schleppegrell, 2004).

4.3.4. A critical social semiotic approach to RETELL at “Public State University”¹²

To summarize, a critical social semiotic theory of language, learning, and social change is built around a stratified model of text/context dynamics in which each instance

¹² Though the name of the state in which this study takes place is explicitly identified, pseudonyms are used for all other identifying characteristics of participants (e.g., pre-service teachers, schools, school districts).

of language use reflects, or is the “expression form” of a social situation, culture, and set of ideologies (Halliday, 1978, p. 122, see Figure 4.1). At the same time, language is a social action that works to construct knowledge (i.e., mediate learning) and maintain, reproduce, resist, adapt, or transform social structures (i.e., contribute to social continuity or change).

In the RETELL policy context, this model and the associated metalanguage were used by “Dr. O’Connell,” a professor of applied linguistics and teacher education at Public State University, to meet the state’s professional standards by supporting pre-service teachers in understanding and analyzing the dialectic relationship between text, context, and ideology (see Table 4.1). Of specific interest in this study, which began in the early years of the RETELL initiative, is how this approach influenced secondary PSTs’ knowledge, beliefs, and teaching practices. From within a critical social semiotic paradigm, the course defined knowledge about “the basic structure and functions of language” (MA DESE, 2018b, standard 1) as PSTs’ awareness of how language is used to participate in social activity, particularly within their respective disciplines, and how the context of that social activity is simultaneously realized through language and other semiotic means (e.g., equations, graphs, diagrams, images). In addition, the course aimed to support PSTs in learning to notice “social-cultural” and “political” factors in ELL education (standard 3) such as dominant language ideologies as manifested in local and institutional discourses and PSTs’ own beliefs about language teaching and learning.¹³ Finally, the course interpreted “theory, research, and practice of reading and writing for

¹³ Scholars often interchangeably use the terms “beliefs,” “attitudes,” “values,” and “ideologies.” In this article, the term “beliefs” refers to beliefs reported or exhibited by individuals, while “ideologies” refers to broader systems of beliefs (for further discussion see Kroskrity, 2004; Rosa & Burdick, 2016).

Table 4.1: Summary of critical social semiotic RETELL course content.

Summary of Course Content	
Module 1 (3 weeks)	<ul style="list-style-type: none"> • Introduction to language variation, U.S. school reforms, and the new knowledge base of teaching • Introduction to theories of language and literacy (e.g., behavioral, psycholinguistic, critical social semiotic perspectives)
Module 2 (6 weeks)	<ul style="list-style-type: none"> • Text/context analysis - understanding language use in U.S. public schools from a critical social semiotic perspective <ul style="list-style-type: none"> ◦ Introduction to stratified model of text/context dynamics (e.g., language is the expression form of a social situation, culture, and set of ideologies) ◦ Analysis of language policy in school contexts ◦ Introduction to SFL metalanguage (e.g., <i>genre</i>, <i>register</i>, <i>field</i>, <i>tenor</i>, <i>mode</i>) ◦ Analysis of disciplinary texts to highlight genre and register-level expectations ◦ Analysis of student writing samples to identify strengths, areas for growth, and teachable semiotic resources
Module 3 (5 weeks)	<ul style="list-style-type: none"> • Introduction to a critical social semiotic teaching and learning cycle (Gebhard, 2019) and principles of backwards design (Wiggins & McTighe, 2005) • Content-area unit and lesson design drawing on a critical social semiotic perspective <ul style="list-style-type: none"> ◦ Writing complementary content and language objectives ◦ Connecting objectives to students' lives ◦ Designing classroom tasks to support diverse students' simultaneous development of disciplinary content knowledge and literacy practices ◦ Creating rubrics that attend to both meaning and form

ELLs” (standard 8) as PSTs’ ability to plan and implement curriculum and instruction that supports students in understanding how language constructs content, constructs self and other, and is organized to flow in accordance with its purpose and audience.

While this theoretical approach resulted in a syllabus that differed somewhat from the prescribed RETELL syllabus used at some other institutions, it aligned with the Public State University College of Education’s stated “commitment to social justice” and eliminating the equity gap that “engulfs” U.S. public schools (Public State University website). However, Dr. O’Connell noted that this commitment was not necessarily

enacted in the college's recruitment practices, accelerated programming, or the language ideologies of some faculty in the secondary teacher education program (see Sleeter, 2008 and Zeichner, 2010 for analyses of these trends in relation to the influence of neoliberalism on teacher education). These contextual factors are important in that they likely influenced PSTs' experience with and response to a critical social semiotic paradigm within the RETELL course.

The secondary teacher education program at Public State University offered four paths to a degree and content area teacher licensure, including: a four-year undergraduate path and three graduate-level paths—one that could be completed in two years and often involved a suburban student teaching placement, and two accelerated choices that respectively focused on preparation for high poverty urban or rural teaching contexts. PSTs in all paths were required to take the RETELL course. While marketing materials emphasized that all paths in the program were designed for pre-service teachers who would “challenge and upend sociocultural norms that promote inequity and marginalization,” Dr. O’Connell characterized admissions as “more financially motivated” than social justice minded because of administrative pressures to achieve specific enrollment levels. She remarked, “In the context of teacher education, historically, there’s no real litmus test for how justice-oriented teacher candidates are. People want to fill seats and meet numbers and keep their jobs.” Zeichner (2010) echoed this critique, arguing that the subjection of teacher education to market forces means that PST cohorts reflect a wide variety of dispositions toward equity in public education. In the context of this study, the influence of this commodification of teacher education means the assumption that PSTs taking a RETELL course within this program would be

epistemologically aligned with a critical social semiotic paradigm was not assured. In addition, in line with national trends, PSTs enrolled in this program overwhelmingly identified as White, middle class, and could pay for program expenses out-of-pocket or access student loans (e.g., Hodgkinson, 2002, US DOE, 2016).

Further, the length of each path in the program sometimes promoted a false dichotomy regarding the usefulness of theoretically rigorous coursework for PSTs' learning. For example, the accelerated nature of some paths in the program left little time for PSTs' conceptual development, instead promoting an attitude among instructors and PSTs that one learns to teach by doing, not by taking courses, as if these were mutually exclusive types of teacher preparation (e.g., Sleeter, 2008). This view was made clear by one PST in an accelerated path who remarked that "theory is really only valuable to look at *before*" you get in the classroom and that in the one-year program, PSTs "really understand teaching...from being in [school] everyday, not from sitting in a lecture hall" (Lucas, Jan. 2016 interview). On the other hand, while the two-year program allotted more time for conceptual development, it placed less emphasis on the student teaching experience. This departmental divide may have contributed to PSTs' expectations for the RETELL course depending on what path they were enrolled in.

Similarly, PSTs' experience of the critical social semiotic version of RETELL was likely influenced by their experiences in other courses they were taking at the same time. Like Dr. O'Connell, other faculty in the secondary teacher education program espoused progressive educational values such as "constructivist" and "culturally responsive" teaching that "scaffolds" diverse students' learning. The National Council of Accreditation for Teacher Education (NCATE) had reviewed the program the summer

prior to the beginning of this study and rewarded its cohesion with accreditation through 2022. However, while PSTs confirmed that they heard the same terms from multiple faculty members and thus felt like their instructors were “preaching basically the same things” (Lucas, Jan. 2016 interview), Dr. O’Connell noted that from her perspective there appeared to be little consistency in what individual faculty meant by these terms “and not much desire or demand for faculty to do anything about it.” Therefore, one aim of this study is to explore what understandings PSTs developed in this context and carried with them into their teaching.

4.4. Methods

This study used longitudinal mixed methods to explore changes in PSTs’ knowledge, beliefs, and practices over time (Creswell, 2014). It tracked trends in 55 secondary PSTs’ learning over two years by combining in-depth qualitative case studies of three participants with surveys of the larger group as they completed a critical social semiotic RETELL course at Public State University, did their student teaching in nearby school districts, and then began their first in-service teaching jobs. Case study data such as interviews and classroom observations provided holistic accounts of changes in PSTs’ knowledge, beliefs, and practices in different settings over time, while survey data allowed for the identification of trends in the larger group. This mixing of methods offered the possibility for convergence of findings through triangulation and addressed small sample size limitations of a purely qualitative approach. Further, it was epistemologically and practically aligned with the phenomenon under study (for justifications of mixed methods in teacher education see Bacon, 2018; Henderson, 2017).

Table 4.2: Participant demographics (n=55).

	n	%
Gender		
Female*	33	60%
Male*	22	40%
Discipline		
English language arts	18	33%
Social studies	15	27%
Science*	12	22%
Math	10	18%
Practicum placement		
Urban*	20	36%
Rural	18	33%
Suburban	17	31%

**Indicates the affiliations of case study participants*

4.4.1. Participants

Case study participants were selected from a fall 2015 RETELL course offered to secondary PSTs in all four licensure paths (undergraduate, two-year graduate-level, one-year urban focus, and one-year rural focus). Over 70 PSTs pursuing secondary content area licensure in language arts, social studies, science, or math were enrolled in this course. During each weekly course meeting, PSTs would attend a 90-minute lecture and discussion where they were introduced to theoretical concepts and classroom examples. Then, they separated into 60-minute, discipline-specific workshop sessions where they practiced applying these concepts and presenting their work to peers. I had access to pre-service science teachers as their teaching assistant and workshop facilitator, therefore case study participants were all selected from this group. A purposeful stratified sampling technique was used to select five critical cases (Creswell, 2014), including focal PSTs who had ELLs in their practicum placements, were completing observations and student

teaching in different types of schools (i.e., urban, suburban, and rural), and who identified with different genders. However, attrition in the second year of the study resulted in three case study participants who all completed their student teaching in the same urban school district, “River City,” which had a much higher proportion of students designated as ELLs than other districts in the state.

Table 4.2 shows the demographic and disciplinary affiliations of these participants, as well as the larger group. Note that while over 70 PSTs were enrolled in the focal RETELL course, those participants whose pre- and post-course survey responses could not be matched were removed from consideration, resulting in 55 PSTs in the larger sample.

4.4.2. Data collection and analysis

Because of this study’s mixed methods design, two parallel lines of data collection took place, both in three phases. Phase 1 took place in Fall 2015 during the RETELL course. Case study data included state-level RETELL policy documents, course materials, samples of PSTs’ coursework (e.g., weekly free writes, a text/context analysis paper, curricular unit, written and oral reflections), as well as field notes and transcripts that captured PSTs’ participation in lecture and discipline-specific workshop sessions. Survey data on the larger group included a version of the *Beliefs About Language Learning Inventory* (BALLI; Horwitz, 1985) that was modified to include items about language teaching (Appendix 4A). The BALLI is a dated instrument, and one initially developed for use with foreign language teacher candidates to identify what Horwitz (1985) understood to be commonly held misconceptions about language learning from a

psycholinguistic perspective (e.g., Krashen, 1980). However, few alternate, validated measures of teacher beliefs about language teaching and learning are available (Kern, 1996; Kuntz, 1996).¹⁴

Phase 2 took place in Spring 2016 as PSTs completed their student teaching experiences. Case study data collection involved observing focal PSTs as they planned and taught a complete curricular unit meant to be responsive to the goals of the RETELL course. During this phase, data included school-specific policy documents, curricular materials, field notes and transcripts of teaching, and interviews with focal PSTs before and after each curricular unit that was observed (see Appendices 4B and 4C for sample field notes and interview protocols). The same survey was administered to the larger group a second time.

Phase 3 took place during the 2016–2017 academic year as participants completed their first year of in-service teaching. Case study data collection followed the same procedure as during Phase 2, though all case study participants were employed at different schools than the ones where they had completed their student teaching. The same survey was administered to the larger group a third time (see Appendix 4D for sample informed consent letters from each phase of data collection).

Key data sources for the analysis reported here are interviews, field notes of classroom observations, and surveys. The goals of this analysis were: (1) to identify influences of a critical social semiotic paradigm on PSTs' pathways of learning by coding qualitative case study data using an inductive and iterative approach; and (2) to triangulate trends in PSTs' movement back and forth along these pathways through

¹⁴ Since this study was designed and implemented, new measures of teachers' beliefs about language have begun to be piloted across the U.S. (e.g., Milbourn, Viesca, & Leech, 2017; see Chapter 5).

statistical analysis of quantitative survey data. To accomplish these goals, interviews and field notes first underwent open coding to gain an overall impression and characterization of focal PSTs' knowledge, beliefs, and practices. This process resulted in a set of concise summaries, analytical comments, and preliminary "pathway" codes that described focal PSTs' demonstration of knowledge, beliefs, and practices at different points in time. Then, preliminary codes were compiled along with supporting evidence for each code identified. Next, during a re-reading of the case study data, preliminary codes were reconciled, enriched, expanded, contracted, or collapsed to develop more refined pathway codes that both corresponded to the data and addressed the research questions regarding PSTs' learning. Table 4.3 shows the refined pathway codes that emerged from this process. Finally, during a third re-reading of the data, the refined codes were applied and recurring patterns were identified. Beliefs surveys were analyzed using paired *t*-tests to identify trends and statistically significant changes. Survey data were used to triangulate case study themes, thereby adding to the validity of the findings.

The themes that emerged from this analysis regarding changes in PSTs' knowledge, beliefs, and teaching practices are illustrated through a series of vignettes from the three case studies and supported by survey findings from the larger group. Therefore, the following section offers a brief introduction to case study participants and their different school contexts over the course of the study.

4.5. Case Study Contexts

All three case study participants were enrolled in the one-year urban teacher education program at Public State University (PSU), where they sought a master's degree

Table 4.3: Refined pathway codes for characterizing pre-service teachers' learning.

Knowledge: Language awareness			
Limited	Cognizant	Systematic	Reflective/Critical
<ul style="list-style-type: none">• Language is a fixed, decontextualized system; little explicit awareness of relationship between language and power• Superficial, formal description of language; vague/generalized reference to parts of speech (e.g., reference to verbs or adjectives in isolation); a “language is the way it is” attitude	<ul style="list-style-type: none">• Intuitive understanding that language is context-dependent• Discussion of social purposes shaping language use in and outside of school; attempts to name and describe the function of semiotic choices	<ul style="list-style-type: none">• Language is a contextualized system; recognition of a model of text-context dynamics• Comparison/contrast of social purposes shaping language use in and outside of school; use of a technical metalanguage to notice and name patterns in language use	<ul style="list-style-type: none">• Language is a contextualized system whose use is inflected by ideology and/or power• Reflection on dominating discourses and/or how language use shapes and is shaped by power

Beliefs: Language ideologies	
Standard/Subtractive/Monolingual	Dynamic/Inclusive/Plural
<ul style="list-style-type: none">• Standardization is needed for effective communication; assimilation leads to success; monolingualism is the norm, language diversity is a threat• Central focus on English; lack of attention to students’ home languages (i.e., comments about sharing a common language with reference only to English, needing English and not home languages for social mobility)	<ul style="list-style-type: none">• Bilingualism is beneficial; adding standard English leads to success in the dominating culture• Language variation, mixing, and hybridity are the norm for all language users; people have a single meaning-making repertoire, not multiple monolingual repertoires; “standard” and “success” are social constructs influenced by and intertwined with nonlinguistic structures (e.g., racism)• Disrupts the privileging of standard language use in school settings; makes comments that value and legitimize students’ language practices

Practice: Disciplinary literacy instruction			
Form-focused	Eclectic	Rhetorical	Functional
<ul style="list-style-type: none">• Vocabulary-oriented; little attention to the relationship between word and whole text• Heavily templated writing instruction with little attention to function	<ul style="list-style-type: none">• Some use of strategies from SFL pedagogies, but little to no discussion of function	<ul style="list-style-type: none">• Discussion of different types of texts in relation to their effects in context; teaches genre stages, uses models; names and describes the function of semiotic choices for/with students	<ul style="list-style-type: none">• Use of a Teaching/Learning Cycle that includes functional text deconstruction and joint construction; discusses how register choices make ideational, interpersonal, or textual meanings

in education and an initial license to teach secondary science. The intense schedule of this accelerated program left little time for paid work, so these participants relied on student loans and occasional substitute pay to cover their tuition, fees, and living expenses during the program, which required simultaneous full-time graduate studies, including the RETELL course, and a full-time observation/student teaching practicum in the “River City Public Schools.” A brief portrait of River City is offered below, followed by descriptions of the three case study participants and their prior schooling experiences, all of which, from a social semiotic perspective, contributed to their learning in and across these shared contexts.

4.5.1. RETELL in River City

River City is a former industrial city in Massachusetts that, like many U.S. cities in the last 50 years, has experienced rapid demographic, economic, and technological changes. Up until the 1960s, factory work was readily available there and supported large numbers of White European immigrant families from England, Ireland, Italy, and Poland. However, as these factories began to close in the 1970s and 80s, many of these families moved to the suburbs and were replaced by families from other parts of the world, including the Caribbean, Central America, Africa, the Middle East, and Asia. According to recent census data, River City residents speak over 110 languages in their homes. This diversity is reflected in the River City Public Schools, which serve a student population that is 65% Hispanic, 20% African American, 12% White, and 2% Asian. Three quarters of these students are considered economically disadvantaged, over 25% speak a language other than English at home, and 17% are officially designated as ELLs.

However, River City's diversity has often been constructed as a problem to overcome in state and local education policies rather than as a potential resource for student learning. For example, at the state level, in 2002 the "people of Massachusetts" declared that the state's public schools had a "moral obligation" not to speak to or teach a child in their native language if that language was other than English.¹⁵ This English-only law deemed "rapid" English acquisition "necessary to becom[ing] productive members of our society" (Secretary of the Commonwealth of Massachusetts, 2002). This emphasis on speed and assimilation became further embedded in policy through a state requirement that ELLs be subjected to high-stakes standardized content tests in English after receiving just one year of language support. As a result of these policies, River City ELLs quickly came to represent the highest percentage of low-performing students on these assessments, and the school district as a whole was labeled "Level 4," one of the worst ratings in the state's accountability system. By 2013, the district had not shaken this rating and the mayor of River City expressed how burdensome it had become for River City Public Schools to act out their state-mandated obligation to ELLs. "[River City] has done more than our fair share," he said. "I have to draw the line. The number of children who have little to no English language skills has overwhelmed...our public schools, and taken funding that was intended for [other] pupils" (Goonan, 2013).

Given these widely circulated views of teaching ELLs as a burdensome bureaucratic obligation, it is unsurprising that administrators viewed the state's

¹⁵ Though Massachusetts' 2002 English-only initiative cited the effectiveness of immersion approaches to English literacy instruction, other research demonstrates that bilingual approaches lead to greater literacy gains for students (e.g., López & McEneaney, 2012; López, McEneaney, & Nieswandt, 2014). Further, though the English-only mandate was overturned in Massachusetts in November 2017, individual schools retained the right to provide English-only instruction.

subsequent RETELL initiative as “a box to be checked” (Colombo, Tigert, & Leider, 2018, p. 55) and River City teachers quickly dubbed it “REHELL.” These impressions trickled down to pre-service teachers, including the three focal participants introduced below, who in separate 2015 interviews reported that their expectations going into the mandatory course were that it would be “awful, the worst class ever, not useful” (Lila); “crap you just have to go through” (Kelly); and “a useless, miserable experience...a time for me to do my own work in the back” (Lucas). While these impressions proved not to be lasting, they speak to the onus the RETELL initiative represented in River City at the time this study began.

4.5.2. “Lila”

In 2015, Lila Ballanger self-identified as a monolingual, White, female pre-service science teacher. She had graduated from a well-resourced suburban high school about an hour’s drive from River City and earned a bachelor’s degree in biology from a private religious college in the Midwest, both of which had predominantly White student populations (>93%) with very few students designated as language learners (~1%). Prior to beginning the urban teacher education program at PSU, she had completed a master’s in sustainability science there, where she reported being “exposed to more diversity” (27% of PSU graduate students identified as students of color and 6% reported English was not their first language).

Lila’s practicum took place in 10th grade biology at River City Vocational High School, whose demographics mirrored those of the district. At this school, students alternated between academic classes and “shops,” where they spent extensive time

studying a trade (e.g., auto body repair, cosmetology, carpentry, graphic design). As a student teacher, Lila tended to rely on pre-packaged curricular units provided by the state or those shared by her mentor teacher or other colleagues, making minor modifications to fit the requirements of her graduate program and licensure assessments.

After completing her practicum and earning licensure, she was offered a full-time teaching job in River City. Instead, she accepted an unbenefitted part-time position in “Bingham,” a suburban district closer to the high school she had attended that “felt more familiar” (Nov. 2016 interview). In 2016, when Lila began her first year of in-service teaching at Bingham High, the student population was 89% White with only 1% of students officially designated as ELLs. Unlike in River City, these ELLs were short-term exchange students from Europe and the school administration intentionally placed them in content courses with more experienced teachers. As a result, Lila went from having daily contact with students labeled ELLs as a student teacher to virtually no contact with ELLs as a beginning in-service teacher.

4.5.3. “Kelly”

Kelly Ward also self-identified as a monolingual, White, female pre-service science teacher. She had attended elementary and middle school in the suburban district adjacent to River City, as her grandparents had been among Polish immigrants who moved to the suburbs when River City factories began to shutter. For high school, Kelly attended a private boarding school out-of-state on an athletic scholarship and subsequently completed a bachelor’s degree in biology at a large state university near the boarding school, but with a substantially more diverse student population (43% identified

as students of color and 16% reported English was not their first language). Afterward, she considered a number of laboratory science careers, but decided on teaching after a series of positive experiences working with middle and high school students in River City as a substitute teacher and summer camp counselor during college breaks.

Once enrolled in the urban teacher education program at PSU, Kelly's practicum took place in 10th grade biology at River City Central High School. This school, one of the favored high schools in the district for academics and athletics, served a diverse student population, but had a somewhat lower proportion of Hispanic students (50%), ELLs (11%), and poor students (44%) than the district overall. As a student teacher, Kelly was responsible for four sections of "college prep" biology, the lowest academic track available at the school despite its name. She was expected to stick closely to the school's list of required topics and standards, as well as their pacing guide. However, she was not required to use any particular curriculum for meeting these standards, and tended to design her own units and materials.

After completing her practicum and earning licensure, she accepted a full-time position teaching 9th grade environmental science at River City STEM, another district high school. Demographically and socioeconomically, this school mirrored the district. However, it differed from the school where she completed her student teaching in two important ways: first, it had a much higher proportion of ELLs at 21% of the total student population, and second, because of consistently low test scores, it was designated a "Level 4" school, meaning it was deemed "low achieving" and "not improving" by the state, and was, in part, seen as responsible for the district's Level 4 status. While Kelly reported that she had significant freedom to plan her own curriculum there, she also

experienced intense pressure to improve test scores and a great deal of what she called “I gotcha” surveillance, which was characterized by her and her colleagues “always listening in the background for a [state observer] coming in” but rarely receiving helpful feedback (March 2017 interview).

4.5.4. “Lucas”

Lucas Andrews self-identified as a bilingual, Latino, male pre-service science teacher. He reported attending an urban high school where approximately 20% of the student population, including him, identified as “Hispanic.” After high school, he earned a bachelor’s degree in biology at a small liberal arts college and a master’s in conservation biology at a large research university in the Midwest, both of which reported “diverse” student populations (32% identified as students of color).

Lucas’ practicum took place in 9th grade environmental science at the River City Expedition School, a STEM-focused magnet school. Students were selected by lottery, thus the makeup of the student population differed somewhat from that of the district (i.e., much higher proportion of White students, much lower proportion of ELLs and poor students), a common trend in schools with elective application processes (e.g., Frankenburg, Siegel-Hawley, & Wang, 2010). Unlike the schools where Lila and Kelly completed their student teaching, the science department at River City Expedition required hands-on content experiences in every curricular unit and had explicit year-long disciplinary literacy objectives posted in every science classroom. In this environment, Lucas was free to create his own curricular units building on the school’s list of required

topics and standards, which he tended to do drawing on his prior training and experience as a lab scientist.

After completing his practicum and earning licensure, he was also offered a full-time teaching job in River City. However, he opted to begin a PhD program in environmental conservation instead. Nevertheless, he maintained a connection with the River City Public Schools. As a first-year doctoral student, he continued to design environmental science curriculum and piloted it in a small number of River City schools.

While Lila, Kelly, and Lucas' professional trajectories were not known at the beginning of the study, these three cases ultimately mirrored national teacher attrition patterns, in which teachers can be categorized as “stayers,” “movers,” or “leavers” (Darling-Hammond, 2003). Prior research has shown that secondary teachers in urban districts serving higher percentages of poor and/or racially minoritized students are more likely than any other group of teachers to move districts or leave the profession (e.g., Hanushek, Kain, & Rivkin, 2001; Shen, 1997), as Lila and Lucas did. Further, “for teachers early in their careers, increases in the proportion of students with limited English proficiency also heightens the probability of exit” (Feng, 2005, p. 14), which appeared to be true in Lila's case.

4.6. Findings: Influences of a Critical Social Semiotic Perspective on PSTs'

Knowledge, Beliefs, and Practices

This section presents findings from analyses of these three participants' learning pathways, supported by data from the larger group of 55 PSTs who completed the RETELL course with them. Specifically, these analyses reveal three trends in PSTs'

learning: (1) increased language awareness regarding an understanding of language as context-dependent; (2) the negotiation of ideologies of standard related to language use in schools (e.g., “appropriateness,” assimilation, monolingualism); and (3) movement away from behavioral methods of teaching specific linguistic forms (e.g., vocabulary memorization) toward more functional disciplinary literacy instruction.

4.6.1. Knowledge: Moving beyond limited language awareness

As outlined in the theoretical framework, this study conceptualizes PSTs’ knowledge about language as an ability to use and describe linguistic practices common in school settings and a critical awareness of how these practices are shaped by and shape social relationships of power. This conceptualization reflects the idea that the more explicit knowledge teachers have about language, the more conscious and sensitive they can be to processes of language learning in their classrooms, and the more principled they can be in designing and implementing language instruction specific to their content area, for both ELLs and other students new to reading and writing in disciplinary ways (e.g., Gebhard, 2019; van Lier & Corson, 1997). However, as explicit grammar instruction has faded from most U.S. curriculum (e.g., Gebhard, Accurso, & Chen, 2019), many PSTs who enrolled in RETELL exhibited little explicit knowledge about language at the beginning of the course. As described in Table 4.3, this limited language awareness is characterized in this study as PSTs’ understanding of language as a fixed and decontextualized system, with little explicit awareness of the relationship between language and power. Possible realizations of limited language awareness include the superficial naming of traditional grammar terms; comments that name parts of speech or

make vague, generalized reference to language (e.g., reference to verbs or adjectives in isolation); or a conceptualization that “language is the way it is.” Case study data revealed that all three focal PSTs made movement toward increased language awareness as they studied and applied a critical social semiotic perspective of language, a finding that was supported by survey data from the larger group.

Toward cognizance: Lila. At the beginning of the RETELL course, Lila defined language as “a collection of words and rules” (Sept. 2015 field notes) indicating a more decontextualized conceptualization of language and grammar. However, over time, she began to exhibit an intuitive understanding that language is context-dependent by discussing social purposes shaping language use in and outside of school and naming or describing the function of different semiotic choices. For example, by the end of her first year of in-service teaching, Lila began to articulate her expectations for students’ language use in different disciplinary contexts. She explained that “there’s a difference in the *way* you state things” in different content areas. “If I read something in an English class I want to see metaphors and adjectives...but these drop off when you do science cause you’re very focused on statistics and your data” (July 2017 interview). In addition, Lila began to articulate an understanding that within her own discipline, she had expectations for language use that differed according to purpose and audience:

[My expectations] depend specifically on what format [students] are communicating in. Cause what I expect in a paper is completely different from the bullet points in PowerPoints. Like, I *want* bullet points...if you put sentences, you lose your audience because they’re gonna read your PowerPoint. They’re not gonna listen to you. (July 2017 interview)

While this data suggests that a social semiotic perspective challenged Lila’s personal theory of language and led to somewhat more awareness of language as a dynamic

context-sensitive resource, this theory appeared to still be in flux more than a year after the RETELL course, demonstrating that knowledge development is not unidirectional. At the same time she exhibited a more expanded awareness of language, she also made comments that suggested she still understood language to some extent as a fixed system (e.g., “Formal writing is formal writing across the board,” July 2017 interview).

Toward systematicity: Lucas. Lucas also exhibited movement along a language awareness pathway, but toward a more systematic understanding of language as a contextualized system in which he consciously recognized a model of text/context dynamics. This level of awareness differs from the cognizance Lila displayed in that it involves the use of a technical metalanguage to describe or explain context-dependent differences in language use across contexts. Though Lucas was initially resistant to SFL metalanguage introduced in the RETELL course (e.g., *genre, register, field, tenor, mode*), saying that he was not willing to “totally buy into this” (Oct. 2015 field notes), as he began to use this metalanguage in weekly workshop sessions, he developed a new perspective:

It gave me some words or theories to things that I was seeing. And you know how when you don't notice something until you have a name for it? Like tenor, and even things as simple as codeswitching. It became, like, “Whoa. I do that so much.” Because I have that grad school experience and that workplace experience, but then I've also done a lot of urban education with high school kids. Tons of different contexts. And I grew up in a city environment, too. So, [talking about register variation in the RETELL course] I would realize that when I'm talking to the students from the front of the classroom versus when I got down to them and then explained things to them differently, and then was “between classes Mr. Andrews” to the students, it was totally different. And just paying attention to the way kids spoke to each other in and out of class. It's just so cool to think about how language evolves and it's constantly evolving and these like, crazy little phrases they bring up and how people are constantly bouncing around. (Jan. 2016 interview)

Toward criticality: Kelly. Kelly began the RETELL course with an intuitive awareness that language use differs by context and that “languages are learned through use *in* social contexts” (Sept. 2015 free write). Like Lucas, Kelly first developed a more systematic understanding about ways language is used in her discipline by applying SFL metalanguage. As she became more “familiar and comfortable” with the metalanguage, she developed a new line of thinking about the language of science. “I started thinking *who* is this being written for? What type of verbs are they using? Like, what’s really different when they say ‘cells’ and [students] say ‘things’?” (Jan. 2016 interview). This demonstrates that Kelly was using SFL metalanguage to systematically consider why certain meaning-making choices might be more effective for certain audiences.

However, unlike Lucas, she went on to use this social semiotic understanding of text/context dynamics to critically reflect on students’ language use in her practicum placement. For example, she began to consider how institutional structures like course placement protocols for “beginner” ELLs might influence these students’ language use in school. With regard to a student who “came in not knowing the language at all,” Kelly recounted how:

their advisor was saying that behavior problems were keeping them from learning the language...But it turns out this student had taken really advanced classes in Bogotá, but was in all remedial classes here with kids who had failed [the state content test] multiple times and weren’t even really expected to graduate. And he felt isolated in a way being stuck in these classes, so he didn’t even try. Plus these kids would say really rude stuff to him in Spanish all the time, and the teacher had no idea so they didn’t do anything, which kind of led to the behavior. But when his parents finally got him in some more challenging classes, his behavior and learning just shifted dramatically. He actually interacted more, and moved up levels, and his grades were actually good enough to get on varsity soccer. So that was an interesting piece. How the social side of [school] can affect the inside. (Jan. 2016 interview)

Changes in Kelly's language awareness suggest that a critical social semiotic perspective may be helpful for some PSTs in reflecting on dominant deficit discourses regarding ELLs' academic abilities and part of a pathway toward recognizing how language use is shaped by power dynamics in institutional contexts.

Trends in the larger group. PSTs' movement beyond limited language awareness was reflected in survey data, as well. Due to space limitations, I will highlight just two survey items (Table 4.4). In these items, PSTs were asked to rate their level of agreement with statements about language and language learning on a 5 point Likert-style scale. On the first item, which addressed the role of vocabulary in a language system, 14% of PSTs initially believed strongly that there is more to learning English than learning sets of discrete vocabulary. After the RETELL course, 23% of PSTs indicated this strong belief, which suggests a small shift in the group's limited conceptualization of disciplinary language as sets of specialized vocabulary. More than a year after the course had ended, 18% of PSTs retained this strong belief. Similarly, on the second item, which addressed the role of decontextualized grammar rules in language learning, 42% of PSTs initially believed that there is more to learning English than grammar rules. This number increased to 54% after the course, and appeared even stronger more than a year later, with 64% of PSTs indicating a conceptualization of language as more than just grammar rules. While these shifts in PSTs' survey responses were not statistically significant, they do suggest that as PSTs were introduced to and practiced applying a critical social semiotic perspective during and after the RETELL course, their level of language

Table 4.4: Survey data indicating increased language awareness.

ITEM (adapted from Horwitz, 1985)	PRE-COURSE (Sept. 2015)	POST-COURSE (Dec. 2015)	DELAYED POST-COURSE (June 2017)
9) Learning English is mostly a matter of learning a lot of new vocabulary words	14% strongly disagree	23%	18%
12) Learning English is mostly a matter of learning a lot of grammar rules.	42% disagree	54%	64%

awareness expanded to reflect a conceptualization of language as more than just “a collection of words and rules,” as Lila had expressed early in the study.¹⁶

These findings support research conducted with in-service teachers in other policy contexts (e.g., Carpenter, Achugar, Walter, & Earhart, 2015 in Texas; Macken-Horarik, Sandiford, Love, & Unsworth, 2015 in Australia) indicating the potential of a critical social semiotic perspective for supporting secondary teachers’ development of language awareness. In addition, these findings contribute data from a larger sample and help fill in gaps in the literature regarding pre-service teacher populations. However, as Fang (1996, p. 49) points out, language awareness is not the only influence on teachers’ literacy teaching practice; rather, beliefs are an important part of how PSTs will “perceive,

¹⁶ **Item 9:** PSTs’ conceptualization of vocabulary shifted from M=3.95 (SD=0.58) in the pre-course survey to M=4.05 (SD=0.72) post-course to M=4.00 (SD=0.76) delayed post-course. This was not a statistically significant change in the short-term ($p=0.25$ pre- to post-course) or the long-term ($p=0.34$ pre- to delayed post-course).

Item 12: PSTs’ conceptualization of grammar rules shifted from M=3.18 (SD=1.05) in the pre-course survey to M=3.41 (SD=1.01) post-course to M=3.55 (SD=0.67) delayed post-course. While this also was not a statistically significant change in the short-term or long-term ($p=0.14$ pre- to post-course, $p=0.12$ pre- to delayed post-course), together with item 9 it suggests that PSTs’ conceptualization of language and language learning did shift somewhat over time

process, and act upon information in the classroom.” Therefore, the next section explores PSTs’ developing beliefs about language and language learners.

4.6.2. Beliefs: Negotiating language ideologies

Monolingual language ideologies and ideologies of standard circulate widely in the United States. These language ideologies reflect institutional values that have been shaped over time and have influenced dominant understandings of what pedagogy is supposed to be doing within U.S. public schools (e.g., standardizing students’ language use), and thereby official and unofficial language and language teaching policies at the national, state, and local levels (e.g., Accurso, 2015; de Jong, 2013). Possible realizations of these dominating ideologies in individual PSTs’ beliefs include a central focus on English, lack of attention to students’ home languages, comments about sharing a common language with reference only to English, or comments about students needing English and not their home languages for social mobility. Unsurprisingly, these widely circulating language ideologies were present in both case study and survey data throughout the study. However, focal PSTs all appeared to go through a process of questioning and reconfiguring their beliefs about English learning and who “language learners” are over time. During this process, they articulated and embodied multiple and, at times, contradictory language ideologies in ways that suggested they were drawing on discourses from a critical social semiotic paradigm to negotiate their ideological contexts as pre- and in-service teachers.

Reconfiguring models of “language learner.” At the beginning of the study, the three focal PSTs reported varying degrees of familiarity with the institutional designation

“ELL.” For example, Lila had never heard the term before, but thought maybe she had “interacted with one” in high school; Kelly had heard the term in her previous work as a substitute teacher and thought that there might be two types: students “learning English as a second language, and students that are not good at comprehending English;” and Lucas described an intimate association with the term, saying, “my own father, in fact, was an ELL” (Sept. 2015 field notes). Despite these varying associations, all three shared the belief that students bearing this designation would be educated in separate classrooms from those who do not. This initial model of a “language learner” as a distinct type of person educated in a distinct classroom setting seemed to contribute to a shared unawareness among Lila, Kelly, and Lucas that in their respective River City practicum placements, they were each actually observing students who actively bore this designation. When first asked, they each reported that there were no ELLs in their assigned classrooms, but that they could visit this type of student in a separate ELL class (Sept. 2015 field notes), a perspective reinforced by school labels and structures that fail to acknowledge linguistic variation as the norm.

However, during the RETELL course, Lila, Kelly, and Lucas began to reconfigure their initial model of who is a language learner and where you find these people in a school. Yet they did so in a way that accommodated *both* an ideology of standard and a more plural view (see Table 4.3). For example, early in the study each of the three expanded the category of “language learner” to include all the students in their assigned classrooms, yet continued to perceive these students to be entirely non-ELL by virtue of their presence in a “mainstream” classroom (Oct. 2015 field notes). In this model, PSTs imagined designated ELLs to be one kind of language learner educated in

one kind of classroom who would become another kind of language learner and inhabit a different classroom space once they had achieved a certain level of standard English. In these articulations, PSTs' maintained a central focus on English while at the same time beginning to embrace the idea that language variation, mixing, and hybridity are the norm for all language users.

This conceptualization of ELLs was modified yet again as PSTs completed course assignments that asked them to analyze student placement and support protocols at their respective practicum sites and each one discovered that they had, in fact, been regularly observing officially designated ELLs. However, each PST further reconfigured their ideological model of "language learner" differently based on this information. For instance, Lila refined her definition of "ELL" to include some notion of academic failure:

I thought, "Oh, that's interesting [that there actually are ELLs in my classes]," but it didn't really affect me too much because my ELLs, they're not necessarily doing more poorly than my other students. Maybe if I had seen a big difference, like, "Oh, these students are all doing poorly." But I'm not in an ELL science class. Maybe if I were I would notice a difference. (Feb. 2016 interview)

In this excerpt, Lila moves back toward a more standardized model of "ELL," in which this category is defined not just by a first language other than English and a generally separate learning environment, but also by "poor" academic performance. Wiley and Lukes (1996, p. 511) characterize this ideological stance as one in which language diversity is viewed as an "alien and divisive force." My goal in sharing this excerpt is not to vilify Lila for exhibiting a deficit stance, but to highlight how this stance reflects monolingual ideologies embedded in local and state policies, program labels, and school structures even as Lila encounters contrasting institutional discourses at PSU. As Nieto (1995) points out, when the attitudes and practices of schools, communities, and society

do not value linguistic diversity, the chance is much higher that their White, monolingual teachers will not embrace such diversity either. As this finding illustrates, Nieto's point holds true for Lila, who applied to the program expressing an interest in challenging "low expectations" of marginalized students, was presented with more pluralist discourses in the context of a program that explicitly aims to "recognize and encourage diversity" and "upend norms that promote marginalization" (PSU website), and yet was continually influenced by the deficit discourses surrounding her in school policies and practices.

In contrast, Lucas further developed his notion of pluralism. Whereas Lila rationalized the presence of ELLs in her practicum classroom as a matter of successful assimilation (i.e., behaving in standardized ways that made them indistinguishable from non-ELLs to her), Lucas intentionally set aside this new information about his students' language status as a way of "respecting the diversity of all learners" (Jan. 2016 interview). In this way, he adopted what he called "an equalizing mindset," which allowed him to imagine all of his students not just as language learners, but as scientists in training. These changes in his beliefs were closely intertwined with his changing language awareness, in which he was coming to regard language as a dynamic social tool. Nearing the end of his student teaching, he reported a new understanding that "science is *not* a body of knowledge, it's a way you understand... It's another language that all students have to learn, like learning how to even read or write or think or do anything" (April 2016 interview). In this way, Lucas appears to be attempting to accommodate Halliday and Hasan's (1985) assertion that all people are language learners in the sense that their meaning-making repertoires expand by necessity as they grow up and develop semiotic resources they to navigate the social, academic, and work environments in

which they find themselves. Yet Lucas' attempt to be more inclusive did not appear to take into account the ways that, historically, students' ability to be seen as speakers of "science," even within schools, has been deeply impacted by nonlinguistic structures such as racism and sexism.

Short-term changes in Kelly's beliefs occupied a space in between that of Lila and Lucas. At the same time she adopted a view that all her learners were language learners (indicative of a more plural ideological stance), she also articulated a conception that all her students were "academic strugglers" because of their "obvious" lack of standard English (indicative of a more standard ideological stance, Jan. 2016 interview). However, over time, she further reconfigured these multiple and seemingly contradictory beliefs by moving further toward a norm of language hybridity rather than standard. As an in-service teacher, Kelly made a concerted effort to expand her understanding of the multiple ways students represented their disciplinary knowledge: "I really try to allow if they can get their point across in their way. Like, as I go along, thinking about *how* they're showing what they know and whether it's coming across" (Jan. 2017 interview). This signals a shift away from privileging only the use of standardized language forms and toward increased value of the meaning-making repertoires her students brought to the classroom (e.g., Gutiérrez, Baquedano-López, & Tejeda, 1999). From the perspective of language ideologies scholars, this type of movement – where a "hegemonically positioned White perceiving subject" (Rosa, 2019, p. 6) suspends the idea of a single-looking and sounding disciplinary literacy display – is an important part of denaturalizing monolingual ideologies. Further, it is an example of repositioning students as thinkers and knowers, rather than "strugglers." Bucholtz, Casillas, and Lee (2019, p. 172) call this

a move toward “facilitating basic human rights for speakers of minoritized language: to be respected, to communicate, to listen and understand.” In “an educational system that has refused to acknowledge, much less validate, [many students’] home languages,” this data suggests that, over time, Kelly made a move to acknowledge her multilingual learners as thinkers and knowers by shifting the way she hears them and perceives their language use.

Increased confidence for teaching “language learners.” As PSTs reconfigured their beliefs about ELLs as a type of student, they also reported increased confidence for teaching this population. Survey data from the larger group revealed this to be a statistically significant trend.¹⁷ At the beginning of the RETELL course, 35% of PSTs agreed with the statement, “I feel comfortable teaching ELLs in my subject area.” However, by the end of the course, this proportion had increased to 64% of PSTs, and more than a year later, it had increased further to 73% of PSTs. While these changes in PSTs’ confidence do not indicate that participants in this study were necessarily doing a better job of teaching ELLs in their content areas, this finding is interesting because it stands in contrast to research on the confidence levels of early career secondary teachers who complete other versions of the RETELL course. For example, Bacon (2018) reports that the confidence levels of secondary teachers in another part of the state were stagnant over time. While further research is needed to substantiate the relationship between a critical social semiotic model of text/context dynamics, changes in PSTs’ beliefs, and their confidence for teaching ELLs in the content areas, the case study and survey data

¹⁷ **Item 25:** PSTs’ level of confidence for teaching ELLs shifted from $M=2.73$ ($SD=0.98$) in the pre-course survey to $M=2.36$ ($SD=0.90$) post-course to $M=1.91$ ($SD=0.81$) delayed post-course. This was a statistically significant change in the short-term ($p=0.05$ pre- to post-course) and the long-term ($p=0.00$ pre- to delayed post-course).

presented here suggest that some PSTs in this study experienced shifts in their understanding of language and the category of “ELL” that made them feel they could do this work more adequately.

While in some ways promising, this finding is also somewhat disconcerting. For example, though changes in Lila’s beliefs over the course of this study at times reflected an expanded model of “language learner,” at other times they reflected a reinforcement of standard language ideologies in which effective language teaching is an issue of supporting *English* language learners to learn and use an empirical set of language forms shown to result in academic success. From this ideological position, by the end of the study, she still felt “intimidated” by students whose language she could not understand. Further, she had difficulty imagining how her beliefs about teaching and learning could accommodate language difference:

How am I supposed to teach someone who doesn’t necessarily understand my language? Like, how do I teach Spanish people when there’s a language gap? How do I speak with them differently? The words coming out of my mouth, are they going to be different? Should I be saying things differently? Should I be *doing* things differently? (July 2017 interview)

At the same time, she chose a professional path in which she was increasingly removed from students designated as ELLs, yet her confidence levels for teaching these students increased. Her case, alongside the other two presented here, supports arguments made by other teacher educators and language ideology scholars who argue that an even more explicit approach than the one employed in this study is needed to better support teachers in navigating schools as ideological contexts and disrupting dominating ideologies of standard English supremacy (e.g., Flores & Rosa, 2015; Henderson & Palmer, 2015; Rosa & Flores, 2017b).

4.6.3. Practice: Moving beyond form-focused literacy instruction

Few secondary content teachers attend to language and literacy instruction as part of their work, seeing this as a role belonging more to licensed ESL teachers, language arts teachers, or other multilingual staff (Yoon, 2008). Math and science teachers tend to be among those most inclined to see literacy teaching as someone else's job (Arkoudis, 2005; Tan, 2011), and if they incorporate literacy instruction into their practice at all, it tends to be form-focused, realized as vocabulary drills that pay little attention to the relationship between the word and the whole text, or heavily templated writing exercises (e.g., Janzen, 2008). As a result, few PSTs arrive in teacher education programs having experienced anything other than such form-focused literacy instruction themselves, including over half of those participating in this study, who mentioned "vocabulary" practice, "templates," or "graphic organizers" as the chief method their own middle and high school teachers had used to teach reading and writing in their content area. However, an analysis of case study data suggests all three focal PSTs made movement beyond this kind of form-focused literacy instruction as they studied and applied a critical social semiotic perspective of language and learning, a finding that was supported by survey data. Further, longitudinal case study data shows that PSTs' language instruction practices continued to become more functional over time.

Developing an eclectic literacy teaching practice: Kelly. During the final module of the RETELL course, all PSTs completed a project in which they were asked to apply a critical social semiotic perspective to the design of disciplinary curriculum, instruction, and assessment. Kelly designed a 10th grade biology unit focused on building

students' content knowledge of the cell cycle and scientific literacy knowledge around the genre of explanation. Drawing on her developing knowledge about language, her unit materials included an explicit outline of genre and register features she planned to teach and assess students' use of that would support them in meeting state content standards, Common Core literacy standards, and WIDA English language development standards. While Kelly's instructional planning reflected the paradigm presented in the course, classroom observations revealed that she hesitated to fully enact the curriculum she designed. Instead, Kelly's pre-service literacy teaching practice could be described as eclectic, meaning she moved beyond form-focused vocabulary instruction by bringing in some metalinguistic and pedagogical concepts from SFL such as using model texts to identify semiotic choices that construct a *field* of knowledge, but did not explicitly discuss the social function of these choices.¹⁸

Kelly explained this difference between her planning and her practice as a “balancing act” between trying to accommodate what she was learning in the RETELL course, what she was learning in other teacher education courses, and her own high school literacy learning experiences, which included “teachers asking lots of reading comprehension questions” (Sept. 2015 field notes). In explaining her eclectic approach, Kelly said:

RETELL definitely got me thinking about how can I add in the reading and writing side of it and really planning for that to happen...like, thinking about what should they be getting out of writing and trying to help them really explain or describe, not just write simple definitions. But I also try to connect to some of the writing they're more familiar with, like creative stories, because there's so many

¹⁸ Similarly, in a longitudinal study of pre-service English teachers, Chen (2018) found that while beginning teachers were very capable of recognizing the social function of authors' semiotic choices, they rarely discussed these choices with students and provided little explicit support for students to practice constructing different voices in their own writing to achieve different social purposes.

different types of ways to acquire knowledge in your language and you need a little piece of each. I mean, you *do* need a little bit of rote memorization, but doing it with a genre in mind helps because [students] can see what they want to be writing. So, like, if they're writing a lab, showing an example of a lab and using it to read from. And we can work on trying to underline where they're finding information from which forces [students] to use the reading to back up their data... And for writing we use a writing frame. (Jan. 2016 interview)

Kelly's in-service literacy teaching practice remained eclectic, but at times she attempted to include explicit discussions of different semiotic choices in relation to context. For example, when she had a "little extra time," she would generate conversation with students by posting short writing samples on the board and asking, "'Can I mail this to the governor? Is this good to go? I'm ready, can I send this to the principal at the school? This is good, right?' to see what [students] would say" (May 2017 interview). Fairclough (1992, p. 216) calls this type of exploration "strategic discourse," arguing that such simulations of interpersonal can support students in learning to strategically calculate the social effects of different semiotic choices. However, while Kelly described "wanting to do more" of this type of exploration with her students to connect what they were learning in her class to "real world" interactions, she rarely felt she had time to because of the school administration's emphasis on classroom management and seeing specific "improved" student behaviors as a result of their Level 4 status (see 2002, 2013 for further discussion of such contradictions in school efforts to manage and reform).

Developing a rhetorical literacy teaching practice: Lila. Lila also designed an SFL-inspired biology unit during the RETELL course, and like Kelly, as a student teacher, she experienced a tension between planning principled literacy instruction and implementing it. With regard to planning, Lila talked about being very aware of new literacy learning goals outlined in the Common Core State Standards and Next

Generation Science Standards and wanting to design curriculum that scaffolded these literacies. Yet when it came to implementing this curriculum, she felt acute “anxiety because my mentor teaching isn’t doing it this way so it’s kind of foreign a little bit” (Feb. 2016 interview). As a result, Lila’s pre-service literacy teaching practice remained prescriptive and form-focused:

For language, [students] learn vocab. The biggest thing is that we break down words... Part of it is definitely that I saw my mentor teacher, Ms. W do it. It’s just part of how she lectures and does the notes, and I would be like, “Oh, that’s really good. I should do that.” Now it’s one of those things that just clicks that you need to do it. I don’t even think about it. It’ll just pop out of my mouth to break a word down... But on [students’] writing, I wouldn’t mark them for vocab, per se. Not mark them down, but just comment, like, “Oh, you need this here” or “This is proper.” (June 2016 interview)

However, as she moved into in-service teaching, felt more curricular autonomy, and less test preparation pressure, Lila’s literacy teaching practice continued to change. Classroom observation and interview data indicate that Lila no longer focused solely on breaking down vocabulary words, but began to discuss different types of texts in relation to context, teaching students about genre stages, using model texts, and beginning to name and describe the function of semiotic choices to students. By the end of her first in-service year, Lila reported that in the context of reduced performance pressures, disciplinary literacy teaching had become “actually very interesting” to her:

When you are a scientist, you make posters, and you make PowerPoints, and you present your research... But you still need to teach [students] some language and ways to present. For instance, I don’t want full sentences. Do not *give* me full sentences. Full sentences are not effective... You’re supposed to be presenting the research; the PowerPoint is just to aid you. And sometimes students, or even researchers, don’t understand that, or they understand it but they don’t care because they want the comfort of being able to read off of it. But that doesn’t show that they understand, it shows that they can read. Versus they should be just having little statements on there, they should make it easy to read, they should present tables, they should present graphs. (July 2017 interview)

Long-term changes in Lila's practice clearly related to her developing knowledge about language, which was rooted in a social semiotic model of text/context dynamics. Though at times Lila still prescribed certain semiotic choices (i.e., "I want at least one figure. I don't want to just see words, that's boring."), at other times she engaged students in exploring processes of meaning-making by leading discussions about semiotic choices and how they function in certain contexts (i.e., "What happens when you put 'I think' in a scientific paper?" or "How does using 'I, we, or you' or 'I feel' or 'I believe' hurt your argument?"). These types of instructional conversations that explicitly explore how a particular choice or "rule" relates to values, principles, or goals in a particular community have been shown to support students in developing new ways of thinking about, responding to, and producing texts in schools (e.g., Moore & Schleppegrell, 2014; Schleppegrell & Moore, 2018).

Developing a functional literacy teaching practice: Lucas. Like the other focal PSTs, Lucas also designed a curricular unit that reflected the paradigm presented in the RETELL course. His unit focused on the content topic of body systems and the genre of a medical case summary. Unlike the other focal PSTs, Lucas attempted to fully implement this unit in his student teaching placement. In doing so, he implemented a critical social semiotic teaching and learning cycle that included modeling reading by jointly analyzing model medical case summaries; modeling writing by constructing a case summary together with his students; supporting students' development of expanded semiotic repertoires by discussing how different register choices construct different meanings related to ideas and experiences, social relations, and modes of contact; and having them

present their work to a wider audience at an event he coordinated with a local museum (see Gebhard, 2019 for discussion of a critical social semiotic teaching and learning cycle).

In reflecting on his developing practice, Lucas identified two factors that contributed to his ability to engage in this kind of functional literacy instruction: first, “you need to build up your own genre knowledge beforehand;” and second, “you need to see the whole importance of language knowledge, or lack of, in the River City context” (Jan. 2016 interview). He went on to say that he did both “pretty well” because of his prior experiences as an urban high school student and his exposure to scientific literacies in undergraduate and graduate studies, as well as in a professional lab setting. But he also went on to explain the role the RETELL course played in his developing practice:

RETELL definitely did get me thinking about building up [students’] genre knowledge and the importance of that. So some stuff I have been implementing is model texts. I wouldn’t have probably used those as strongly before, but I’ve been seeing the value now that we’ve implemented them and have been going over them together in class...So we printed out some good and bad examples of medical case summaries and had a station where we underlined different aspects in different colors. Straight out of RETELL. Not exactly using the metalanguage, but where are [those authors] being precise and using scientific vocab, where are they reviewing patient history, and stuff like that. (Jan. 2016 interview)

After implementing the unit he designed during the RETELL course, Lucas used the same approach to design and implement subsequent curricular units. Over time, this practice contributed to changes in the way he and his students viewed one another and new developments in students’ disciplinary literacy practices. For example, the final unit of his student teaching experience centered around energy flow in ecosystems and developing literacy skills for reading and writing lab reports. At the end of the unit, Lucas reported:

[Students] are able to do more than you think. They pull it off. Seeing those kids present and really know what they were talking about, I was like, “How in the world did they do this with me as their teacher?” It’s amazing; great. And a lot of their lab reports are really great...I really built up to it going back and forth between the content and the writing and that helped them pretty well to build up their thoughts and also put their thoughts together into a lab report. And some students who *did* use those things, they ended up getting a good grade. Like, some students who wrote nothing before, their writing was still choppy here, but they had all the pieces, and that’s progress. There’s one student who has “intense” needs or whatever, like, he’s an ELL that I’m not even supposed to grade, and he got a three [meaning ‘meets expectations’]. And he was *so* happy that he came up behind me and, like, wrapped me in a bear hug, you know? Like, he’s clearly never been expected to do well and then today I saw him and he was like, “Aww yeah, Mr. Andrews, he’s my man cause I got a three on my lab report.” (*laughs*) Like, I didn’t *give* you a three, you earned that three! It was good. (June 2016 interview)

While it is beyond the scope of this article to discuss the impact of these types of teaching on student learning, this data supports other research suggesting more functional approaches to literacy teaching can play an important role in “affording students multiple literate identities” (Harman, 2007, p. 31) and supporting their content learning, disciplinary thinking, and expanded literacy practices (e.g., Gebhard, Chen, & Britton, 2014; Schall-Leckrone & Barron, 2018; Schleppegrell, Greer, & Taylor, 2007).

Instructional trends in the larger group. Though the three focal PSTs experienced different changes in their disciplinary literacy teaching practices over time, they each respectively moved toward more explicit and functional literacy teaching. Survey data from the larger PST population revealed this to be a statistically significant trend, regarding PSTs’ belief that effective literacy instruction involves explicitly teaching the language associated with different school subjects.¹⁹ At the beginning of the

¹⁹ **Item 23:** PSTs’ belief in the necessity of explicit disciplinary literacy teaching shifted from M=2.95 (SD=1.21) in the pre-course survey to M=2.18 (SD=0.85) post-course to M=2.09 (SD=1.19) delayed post-

RETELL course, 32% of PSTs agreed with the statement “students need to be explicitly taught the English they need for learning different subjects.” By the end of the course, this proportion had increased to 73% of PSTs, and more than a year later, 64% of PSTs still agreed. While case study data suggests that PSTs actually engaged in explicit literacy teaching to different degrees over time and that this practice was influenced by a number of contextual factors, these findings importantly suggest that challenging new teachers to study and practice applying a critical social semiotic approach can plant seeds of change. This is a significant finding when considered alongside studies of other paradigmatic approaches to the RETELL policy that show many teachers do not significantly change their instructional practices as a result of completing mandated courses (e.g., Bacon, 2018; Colombo, Tigert, & Leider, 2018). In contrast, this study illustrates the possibility of significant long-term change.

4.6.4. Summary of findings

The longitudinal case study and survey data presented here have shown how RETELL coursework designed from a critical social semiotic perspective supported changes in secondary pre-service teachers’ knowledge about language, their beliefs about the category “language learner,” and their ability to design and implement more functional literacy teaching. While PST learning trended in these directions over time (i.e., toward increased language awareness, between standard and more plural language ideologies, and away from solely form-focused literacy teaching), participants showed different types and degrees of learning as they participated in the RETELL course,

course. This was a statistically significant change in both the short-term ($p=0.00$ pre- to post-course) and the long-term ($p=0.05$ pre- to delayed post-course).

completed their student teaching, and became in-service professionals. Thus, in contrast to findings from studies of other paradigmatic approaches to RETELL, these data show that when challenged to learn a critical social semiotic theory of text/context dynamics, pre-service teachers were not simply parroting the perspective long enough to earn a mandatory endorsement, but were drawing on the perspective in different ways in different contexts over time. It is notable that within the context of this study some participants developed a more critical awareness of language and its relationship to ideology and power, yet case study data did not reveal the development of what might be called a *critical* functional literacy teaching practice, in which teachers' growing critical awareness led them to guide students in noticing, naming, and/or reflecting on dominating discourses within schools or specific disciplines, or more generally how language use in these contexts shapes and is shaped by power. Thus, these data highlight the complex nature of pre-service teacher development and the influence of multiple contextual factors and discourses on such learning, rather than the influences of a single policy or course.

4.7. Discussion and Conclusions

Teacher educators today face a difficult task in responding to equity gap policies that position teachers as failing professionals who simply need more knowledge about language to “adequately” do their jobs with respect to teaching disciplinary literacies to students labeled ELLs. This task is particularly challenging given critiques that many responses to such policies simplify complex issues in ways that obscure historical and contemporary processes of discrimination within education and thus reproduce some of

the inequities they are meant to address; and have thinly articulated conceptual frameworks that seem to default to psycholinguistic conceptions of language, broad sociocultural conceptions of learning, and little articulated conception of ideology, inequity, power, or social change. This section returns to these critiques to discuss the findings from this study and their implications for theory, research, and practice in teacher education.

To be clear, this discussion is not focused on judging whether the course in this study was good or bad, or whether the participants in the course learned to be good or bad teachers. Rather, this discussion focuses on what possibilities were available when these people were situated within a set of discourses that included a critical social semiotic paradigm, the mission of the College of Education at Public State University, and the state's RETELL policy. This policy mandated a single language-focused course intended to produce teachers who were "adequately trained" to respond to a longstanding, federally recognized equity gap in the state's public schools. The critical social semiotic framework implemented at Public State University provided a counterdiscourse to this policy, offering a theoretical challenge to the idea that social change in schools is a byproduct of discrete teacher trainings. However, when situated within a teacher education program that marketed paths for pre-service teachers to become highly credentialed change agents in one short year, this approach played into the critique that oversimplification of a complex problem obscures important aspects of context and can limit the effectiveness of a targeted response. In this way, both the RETELL policy and the programmatic response masked significant issues that contribute to the challenge of designing and implementing professional development that works toward the goal of

social change. These challenges include a lack of theoretical coherence within and across courses and a lack of sustained support for new teachers. While these issues have long plagued teacher education (e.g., Darling-Hammond, 2006), in the current sociopolitical context, they have dire consequences for the equitable education of ELLs when considering who goes into teaching, how they are recruited into and funded for teacher education programs like the one described in this article, what they learn, how they are provided with supports for critical reflection, and who stays in the field.

With regard to what the pre-service teachers enrolled in such programs learn, findings from this study suggest that while a critical social semiotic approach to RETELL did influence some changes in PSTs' knowledge about language and beliefs about language teaching, learning, and ELLs, there was still a general underexamination of language ideologies within and beyond the course. Like other scholars who have explored teacher learning in the context of RETELL-like policies, I suggest this constitutes a missed opportunity (e.g., Bacon, 2018; Hara, 2017; Henderson, 2017; Schall-Leckrone, Bunning, & da Conceicao Athanassiou, 2018). PSTs experience a complex collision of language ideologies and discourses that influence their stated and enacted beliefs: policy discourses; institutional discourses within their teacher education programs, including in mandated courses, as well as in school and district placements; and discourses from their own past schooling experiences. While a critical social semiotic theory accounts for dynamic interaction between multiple and contradictory discourses across contexts, a number of PSTs in this study tended to background or uncritically accept these contradictions in the context of the RETELL course, and doing so influenced the way they approached disciplinary literacy instruction with dominant and minoritized

student populations, including ELLs. This finding has implications for both theory and practice. Therefore, I offer three recommendations.

First, this complicated relationship between PSTs' beliefs, knowledge, and practice suggests future policy responses within teacher education could benefit from a conceptual framework that draws even more heavily on the contributions of social theorists working to address issues of ideology, inequity, and power within a new critical paradigm (e.g., Gal, 2006; Hasan, 2003, 2005; Luke, 1996; Silverstein, 1996; see Blommaert & Bulcaen, 2000 for a brief survey of this paradigm). These scholars are working to counter deterministic tendencies that presume dominant ideologies are stable, which can lead to an acceptance of dominant ideologies as "background facts" (Blommaert, 1997, p. 70) as may have happened among some PSTs in this study. Instead, work within a new critical paradigm emphasizes the importance of developing tools for exploring how individuals are actively and consequentially orienting to these ideologies.

Over a decade ago, Hasan (2005, p. 74) noted an "urgent need" for this type of theoretical development within a critical social semiotic paradigm, and I echo her call here. Engaging in language education for social change must involve explicitly denaturalizing the construction of students' academic identities in relation to an idealized monolingual standard (Gebhard, Demers, & Castillo-Rosenthal, 2008; Hasan, 2003). Yet a critical social semiotic paradigm as articulated and implemented in this study did not offer PSTs specific enough tools for doing so. As a result, the course did not articulate a systemic view of language ideologies, explore the relationship between individual beliefs and widely circulating ideologies, or spend much time analyzing examples of individual beliefs or broader ideologies in practice, as it did with other language systems (e.g., *field*,

tenor, and *mode*). Rather, the course focused on equipping PSTs with tools for noticing and naming linguistic formations of disciplinary knowledge and for expanding their own or students' disciplinary meaning-making repertoires. Thus, while it was conceptually undergirded by a theory that recognizes the problems implicit in policies that demand only certain students change their linguistic behaviors, the course gave PSTs little in the way of tools for contesting these problems individually or collectively.

From within the field of teacher education, Graham (2015) argues that advancing a critical social semiotic framework to offer a more clearly developed way for teachers to analyze and discuss ideologies is a particular necessity for teachers whose privilege may make it difficult for them to acknowledge the social exclusivity of dominant ideologies. Further, as Flores and Rosa (2015) have pointed out, when confronted with the problematic nature of ideologies of standard, it is common for teachers to “attempt to reframe the problem of language diversity by emphasizing respect for the home linguistic practices of minoritized students while acknowledging the importance of developing standardized language skills” (p. 150). Findings from this study are consistent with this observation; for example, in Lucas' case where he spoke about developing an “equalizing mindset” while also building a language teaching practice that promoted students' ability to notice and use certain linguistic forms in contexts where these uses are valued. This approach may have the unintended consequence of objectifying disciplinary language and thereby participating in the marginalization of students whose linguistic practices differ and contributing to the reproduction of a deficit perspective of ELLs (e.g., Luke, 1996). Therefore, with regard to social change, better supporting teachers' ability to analyze and discuss ideologies that impact schooling experiences is an important step toward creating

spaces in which they can work together with students to “imagine and enact alternative, more inclusive realities” (Flores & Rosa, 2015, p. 168).

Second, PSTs will need not just theoretical and practical tools for doing this work, but sustained support from colleges of education willing to show up for the ideals of democratic education in new ways. The idea that a single course can offer a full treatment of language, literacy, teaching and learning, *and* raise intertwined issues of linguistic, racial, and economic oppression in schools to some level of critical consciousness among PSTs is unrealistic. Particularly given that PSTs are increasingly opting for programs like the one described in this study, where they are taking a full load of graduate courses every night of the school week after completing full-day observation and student teaching requirements. As findings from this study add to a growing body of research documenting what one-off professional development mandates and one-year teacher education programs are doing and not doing in terms of a social justice or equity agenda (e.g., Colombo, Tigert, Leider, 2018; Sleeter, 2008), I urge teacher educators to further reimagine their responses to RETELL-like equity gap policies. Instead of attempting to respond to the demands of mandated “panacea” courses, these mandates should be seen as opportunities to open critical spaces for PSTs and teacher educators alike to begin the “difficult introspective work of identifying and unsettling the troublesome assumptions we bring to the classroom” (Rosa, 2018). Further, policymakers and teacher educators must make stronger commitments to sustaining this kind of collective reflexivity (Hasan, 1996) by valuing and modeling the development of critically conscious teaching practices over time as a matter of investing in the types of social change they both imply and explicitly express an interest in. This study illustrates how marshaling a robust conceptual

framework may contribute to opening such a space for PSTs, but may have limited effects if not paired with changes in the way colleges respond to neoliberal trends in teacher education. Specifically, this study suggests it is important for colleges of education to take collective responsibility for teacher education by increasing their investments in coherent and sustained mentorship, recruiting and funding teacher candidates, and making programmatic commitments to social justice that are more than nominal.

Third and finally, if teacher educators are to make such sustained investments in change, they must work together across academic traditions to pursue the difficult work of understanding not just how teachers change, but why they change (or not). This will require stronger interdisciplinary ties between teacher educators with backgrounds in applied linguistics and scholars working in other fields that have also been invested in exploring issues of change in schools, such as linguistic anthropology, sociolinguistics, and social justice education (e.g., Dyches & Boyd, 2017; Rosa & Flores, 2017a; Wortham, 2008). While, at times, scholars have been known to cling to modernist disciplinary divides and take shots at the “practical” work of teacher educators, greater professional collaboration between these groups must become a priority, particularly as much of their work is complementary within a new critical paradigm. Of course, this is easier said than done, but as standardization and accountability policies continually narrow what it means to be an “adequate” teacher (e.g., Cochran-Smith, 2005; Cochran-Smith, Keefe, & Carney, 2018; Cummins, 2000; Sleeter, 2008), it becomes increasingly important to work together to imagine what it could mean and how teachers can come to develop in such ways (e.g., Ladson-Billings, 2006).

4.8. References

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APPENDIX 4A

MODIFIED BELIEFS ABOUT LANGUAGE LEARNING INVENTORY (BALLI)

	1 Strongly agree	2 Agree	3 Neither agree or disagree	4 Dis- agree	5 Strongly disagree
1. It is more difficult for high school students to learn English than elementary students.					
2. Some students are born with a special ability which helps them learn a second language.					
3. Some languages are easier to learn than others.					
4. English is an easy language to learn.					
5. Learning English is different from learning other school subjects.					
6. It is easier for a student who already speaks multiple languages to learn English.					
7. It is important to speak English with an excellent accent.					
8. Learning English is mostly a matter of learning a lot of new vocabulary words					
9. It's important to repeat and practice a lot to learn English.					
10. If students are allowed to make mistakes in English when they are first learning, it will be hard to get rid of them later on.					
11. Learning English is mostly a matter of learning a lot of grammar rules.					
12. It's important for students to practice their English in a special language class.					
13. It is easier to speak than understand English.					
14. Students will learn English simply by spending enough time around English					
15. Learning English is a matter of translating from another language.					
16. If students learn to speak English very well, it will help them get a good job.					
17. It is easier to read and write a language than to speak and understand it.					
18. Students who are good at math/science are typically not good at learning languages.					
19. Students should only use English in U.S. classrooms.					
20. To learn English, students must have many chances to interact with others.					
21. Students who speak more than one language well are very intelligent.					
22. Students need to be explicitly taught the English they need for learning different subjects.					
23. All students are capable of learning English.					
24. I feel comfortable teaching ELLs in my subject area.					

APPENDIX 4B

SAMPLE FIELD NOTES FROM CLASSROOM OBSERVATION

FN34 160318 – Classroom Observation of 10th grade biology class with Kelly Ward –
Day 9 of unit – 8:50am – Room 309 – River City Central HS²⁰

Lesson objectives for today:

- SWBAT explain DNA replication and protein synthesis by starting a project

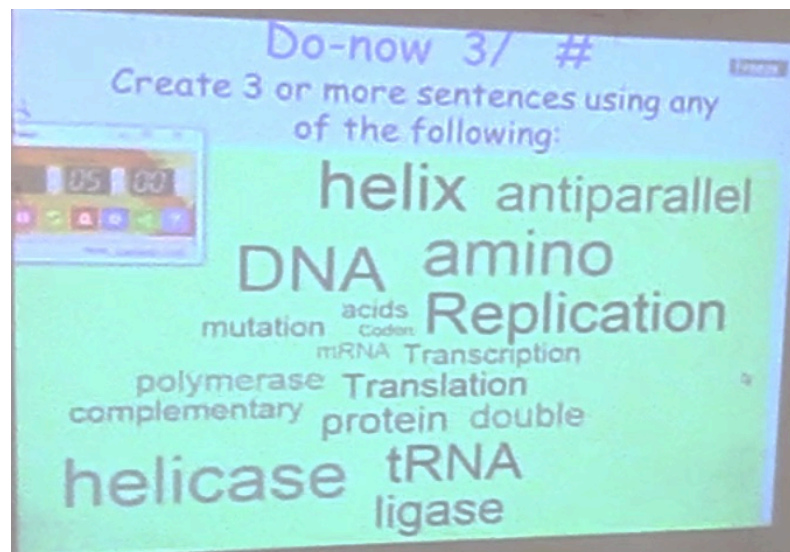
Block F: 14 students present today (Ariana and Josue absent)

Unit topic: DNA

Today's Lesson: Beginning of culminating unit project (writing, video/audio project)

8:50am

The Do Now for the day is to “create 3 or more sentences using any of the following:”



A number of students ask if they need to write full paragraphs, and KW emphasizes that it just needs to be 3 complete sentences. The sentences don't have to connect to one another.

There's a lot of student chatter in the class because a few students have discovered the SPS wifi network password (which is otherwise not given to students or teachers). They talk about selling it to other people and several try to sell it to KW.

²⁰ All teacher, school, and student names are pseudonyms

8:56am

KW collects students' review packet (students were supposed to finish it as homework). "So I can get some sort of grade in for you." Then she allows students to pull cold call cards to have other students share some of their Do Now sentences:

Justin: "DNA has the structure of a double helix."

Brandon: (head down) "Helicase unzips DNA strands."

Martin: "When DNA is copied it's called DNA replication."

Beto: "Mutations are not always bad."

Nashaly: (KW calls on her, but she didn't write any sentences, doesn't look up, and rummages in her backpack; KW prompts her to add something about proteins, but Catalina answers instead)

KW warns students about having phones out and threatens to collect them in a box if she sees any out, "so at this point, just put them away."

9:05am

KW introduces the unit project. The following is transcribed from 160318a video [00:12:52.03–00:28:28.14]:

1. KW: So what we're gonna be doing today is you're going to start the project that we're working on and I'll come around with directions. But today what you're gonna do is the writing part of it. So you're gonna be writing your script for the video that you're gonna do.

Observer comment (OC): Throughout class, there are a lot of ways KW talks about the genre and purpose of this piece of writing students are about to begin (e.g., script, explanation, letter to a friend at a different school)
2. S: Writing a script?
3. KW: So we're gonna go over parts of it, but what I want all of you to do is log in to BrightSpace
4. S: Now?
5. KW: Yeah.

[students get computers and log in; KW passes out assignment sheet (see 160318 lesson materials) and some students rearrange themselves into different groups:

- Martin, Nashaly, Catalina, and Nate
- Igor, Roman, Brendon
- Nicholas, Brandon
- Alex, Justin
- Beto, LJ, Darnell

Transcript resumes at 00:14:30.08]

6. Nate: Miss, can we be in a group?
7. KW: Yeah, we're gonna go over the directions. We'll be working on the project...you'll have time.

[students continue to get logged in; transcript resumes at 00:15:54.08]
8. KW: Okay, so while we're waiting for computers to log in to BrightSpace, can we multitask.
9. Nicholas: No
10. KW: Can't log in and listen to directions at the same time?
11. Nicholas: XXX
12. KW: XXX
13. Nicholas: It's a challenge
14. KW: Alright, so we're gonna go over the directions while we're waiting for the computers because sometime the computers are slow. So we're gonna go over the directions, okay?
15. KW: So, the first part of it says that instead of having a test on DNA there's a project. So the project has two parts. You have the writing part and the visual and audio part. And you'll have at least four class periods to work on it. So the first thing that is being changed is the date. Because I forgot that on Tuesday we don't meet because of MCAS and Wednesday and Thursday I imagine that we're not gonna be super productive because you've been doing MCAS all morning. Right? Is that a fair assumption?
16. Ss: Yeah.
17. S: Wait, we have XXX?

18. KW: Yeah, you have Tuesday, so you don't meet here at all. Cause you're in MCAS during that period. So what I want you to do first is change the date to March 31st. So on your paper, change it to March 31st and I'll change it up here. (KW changes due date on white board)
19. S: 31st?
20. KW: So March 31st, you're changing the date. So I'm giving you a couple extra days because of MCAS.
21. S: Woohoo!
- [students have side conversations about MCAS]
22. Roman: XXX (*asks KW question*)
23. KW: I'm gonna talk
24. KW: Alright, so pulling it back together, we're okay with March 31st? Yes or no?
25. Darnell: Yes
26. KW: We're okay with March 31st?
27. Beto: Yes. March, wait, what is that?
28. KW: I think it's a Thursday.
- [Beto tries to convince KW that there's no school that day, she shows them the school calendar and that there is school on 3/31]
29. Beto: Okay. So wait, what's the project?
30. KW: Okay, so that's what we're gonna answer. But I just wanna change the date because I had made these before I realized there was MCAS going on. So, what you're gonna be working on today is the writing part. We're gonna go over the writing part- Catalina and Nate are we following along?
31. Nate: Yes
32. KW: And then the other three class periods or four class periods you're gonna be working on the visual part. So, on the visual part it says that you could do a Paper Slideshow, and when we get to that period where we're actually trying to make our video, I'll go over what Paper Slideshow is. But basically what you can do is, out of paper, make like a ribosome. You can have your strand of RNA coming into your ribosome. So you're gonna be almost acting it out with paper.

OC: Only one day on extended writing?

33. Beto: Yeah

34. KW: But we'll get more into that part. And then your other option is you can either narrate it using what you write today, or you can sing a song. So you'll have that choice.

OC: Earlier in the unit, there was a moment when some students talked about rapping about DNA. I had wondered why they didn't, but now KW has provided an opportunity for that outlet in this project. Students can either speak or sing the narration for their video project.

35. KW: So for the writing part. Some of you are already in BrightSpace. If you go into DNA-

36. Beto: Ms. Ward, would you believe this is the only class I use BrightSpace for?

37. KW: I find that hard to believe, but-

38. Nicholas: No, dead serious, this is like the only class.

39. Martin: Nah, I use BrightSpace in almost every class.

40. KW: XXX

41. KW: So then,

42. Martin: XXX, it's not that great

[Nate is called out of class by a visitor - by his last name; other students speculate that it's because he has the wifi password]

43. KW: So if you're in 'DNA' you scroll down to 'writing sample for unit project.' Does everyone see where this is? Darnell, you see where we're going to? 'Writing sample for unit project'

44. Beto: What?

45. KW: So the 'writing sample for unit project' (*KW pulls up a model text she wrote on the front screen; see 160318 lesson materials – model text*). So you can download it or you can just look at it on here, either way.

46. Catalina: Miss, do we have to color code it?

47. KW: Ok. Alright, so I know the computers are running a little bit slow today, but the reason I have you looking at this and it's small up on the board, but how many parts if you look at the directions do you have to answer for the writing part?
48. Nicholas: Ten? I'm taking a random guess.
49. KW: Ok, so if you look on here how many parts do you have to answer?
50. Ss: Six
51. KW: Six. Do you think maybe I color coded to parts of the question.
52. Catalina: Maybe
53. KW: Possibly. So that's actually what I had ended up doing. So, I want you guys to read the red part. So whether you're reading in on your computer, or you're reading it on there. So take a minute or two to read the red part.
54. Nicholas: Those words up there?
55. KW: The red is like the first-
56. Nicholas: No, in the XXX folder
57. KW: Under DNA (helps him find document on his laptop) And you want to read the red part. Just the red part. So again, if BrightSpace is seeming a little slow, you have it up there, too.
58. Beto: So what are you doing?
59. KW: So you want to take a minute or two to read the red part. Just the red part for right now.
60. Beto: For about how much time will we be working on this project?
61. KW: You will, just not on the writing part

OC: KW seems to diminish the importance of the writing part of this project by setting up the task as being important for only about one class period. Though she tells students (specifically Beto and Darnell) later that writing does happen in science, the way she sets up this assignment does not necessarily communicate that or support students in doing an effective job of writing in ways that she expects. See later exchange between Beto, Darnell, and KW in this class period.

[KW circulates to make sure students are reading]

62. KW: Does anyone need more time reading the red?
63. Nicholas: No
64. KW: So, what I want you to do is look at these six parts and figure out, did the red part answer any of these?
65. Nicholas: Say that again?
66. KW: So, did the red part that you just read, answer any of these six parts (referring to assignment sheet). The six parts on your direction sheet.
67. S: On this right here?
68. KW: Yup, on your direction sheet. Did the red part answer any of them.
69. Ss: Yes
70. Beto: A and B?
71. KW: It answered A?
72. Beto: And B
73. KW: So A is the function of DNA and B is the structure of DNA. So, with that one, I heard you guys say it did a little bit of A and B
74. Nicholas: Yeah
75. KW: So, did I use that as an introduction?
76. Nicholas: Yeah
77. KW: So can my introduction let me know answers- (pause for announcement over the PA system). So can my introduction part answer a couple of the questions?
78. Nicholas: Yes
79. Ss: Yes
80. KW: So, now with green. It says, 'Since DNA is doing an important job, it makes sense that it has a complex structure.' Does that answer anything on here?
81. Nicholas: Yeah
82. KW: Okay, what part do you think?

83. Brandon: B?
84. Nicholas: B
85. KW: You think B? The structure?
86. Brandon: It says 'describe the basic structure' and it says that it has a COMPLEX structure'
87. KW; Okay, so in this sentence it tells me it has a complex structure, but is it telling me anything about what it actually looks like?
88. S: No
89. KW: So what do you think I used that sentence for? Why do you think I put that in there? If I'm not answering just one of these questions, why do you think I put that in there?
90. Beto: Information
91. S: Cause, cause background
92. Nicholas: Detail
93. KW: So a little bit of detail. What else?
94. S: Background
95. Catalina: Background
96. KW: Background information. If I didn't have that sentence in there, would it flow really good? Would the first part connect to the second part?
97. Catalina: No. We wouldn't know what DNA is and what it does.
98. KW: Or how, like, complex it is?
99. Catalina: Yeah
100. KW: So the reason I did put that in there is I somehow wanted to connect what I have in red to what I have in blue. So instead of just going though and answering - alright guys, I'm almost done -
101. S: Oh, I'm sorry

102. KW: Instead of just going through and answering, we have a tendency of saying, like in Part A, 'describe the function of DNA', we all have a tendency of saying just 'The function of DNA is...to store genetic information.' And then we tend to move on to just Part B. So what I want you guys to really work on today is, if you want to follow along with this that's okay, or make your own, but in your own words, you want to answer parts A through F. So I'm sure we all just heard directions, so one more time.
103. Beto: One more time
104. KW: Okay, so we're doing A through F. Are we going through and just saying A and answering A, and then B and answering B?
105. Catalina: No
106. Nicholas: No
107. KW: What do we want to do with them?
108. Catalina: We want to make sure it flows
109. KW: We want to make sure it flows. How can we make sure it flows?
110. Catalina: By giving background information
111. KW: Okay, background information-
112. Nicholas: Details
113. KW: Details. Details are really key here. Where can you find some details if you're confused?
114. Nicholas: Research
115. KW: Okay, so you could research. Where do we already have some details?
116. Brandon: In the book?
117. KW: Okay, so there's books over there. Where else could there be?
118. Brandon: Our minds.
119. KW: Okay, so in your mind
120. S: Computer

121. Nicholas: Worksheets, quizzes
122. Brandon: Our teachers
123. KW: Okay, so worksheets that you have. You've all done about three worksheets on DNA. So those are good to look back to.
124. Beto: Are you giving us our paper on XXX packet back?
125. KW: I can give 'em, yeah, if you want to look at that, I can give it back to you.
126. Beto: Can I use the bathroom?
127. KW: (nods) Okay, are we okay with what we're doing today? So, I want these to be typed up so that you can save it on your computer, and each of you needs your own writing.
128. Nicholas: So why are we in a group for?
129. KW: The group will be for when you do the video.
130. Nicholas: And the writing has to be due by today?
131. KW: No. You're just getting a good start on it today.
-

9:17am

Students are free to begin their writing. KW circulates and talks with students one-on-one about their work, including the following exchanges:

1) KW talks with Brandon (who has no fingers on one hand) about still wanting him to type it because it looks better and so he can go back and add details more easily. He says he doesn't like to do it because it takes him a lot longer than writing. She questions what would happen if he handwrote a whole draft and it turned out that something in the beginning of the draft and something later in the draft weren't connected very well.

Brandon protests, "But that's the whole point of writing; everything has to be connected.

OC: I wonder *how* students think ideas are connected, or what connects writing if that is the "whole point." Additionally, I wonder what KW thinks connects ideas in writing.

2) Igor asks her if they have to write something totally their own or if they can use her model. She replies, "So, you can go off of that, but I still want you to use your own words. You can work with someone and talk with someone, but I still want you to use your own words."

OC: Without any attention to the writing process, I wonder how students will go about collecting and organizing their "own words."

3) Catalina asks if the whole thing has to be finished today. KW replies, “If you don’t finish the writing part today, it’s okay. We’ll work on it next period.”

OC: Even though KW has planned only one class period for this part of the unit project, I wonder how much time (and support) she will end up giving students in class to work on this.

4) Really interesting exchange with Beto, LJ, and Darnell about writing in science. The following is KW’s exchange with them, captured in real time as I sat nearby; supplemented with 160318 audio near the end:

132. KW: (shows her model text) “This is how I would answer it, but you might not get into as much detail.”

133.

OC: Why wouldn’t students get into as much detail? Though KW does encourage students (e.g., PPT slides that say “You can do it!”), comments like this seem like they would communicate relatively low expectations.

134. Beto: Can I answer them first and then start writing? (referring to parts A-F of the prompt)

135. KW: Yeah, if that works for you.

136. Beto: Is all of this due March 31?

137. KW: Yeah, this is all we’re going to be doing for the rest of the class periods. And I *really* want you to be working on the writing part today.

138. D: I thought this was bio, not English

139. KW: You don’t think we write in science?

140. D: No, we don’t need to. This is like writing in geometry. No one’s used to doing it. I mean science? You’re telling me now we’re *writing*?

OC: Science teachers are not the only ones who have trouble fathoming writing as part of science teaching and learning. This student has internalized, and is now expressing, the same idea. Writing doesn’t belong in math or science, it belongs in English class.

141. KW: Mind blowing, we’re writing. Making you work.

142. D: Stop saying that.

143. KW: Can I leave you alone? Are you really going to focus?

144. B: Did you have to write like this when you were in high school?

145. KW: Yeah, we did lab reports.

146. B: Wait, how long was your lab reports?

147. D: A page or two?

148. KW: For high school, I think they were 3 to 4

149. B: Paragraphs, or pages?

150. KW: Pages

151. B: Pages? Never mind. Never mind

152. D: So y'all *really* had to write, y'all really had to write in science.

OC: Why is this so unbelievable? Especially paired with these students' disbelief in line 160 that KW is from the same general area (a neighboring district just across the river from this school) makes me wonder if they think a certain caliber of student or school would write in science, but theirs wouldn't.

153. B: 3 or 4 four pages? Pages? So, XXX

154. D: XXX

155. KW: So yeah, lab reports are very lengthy.

156. B: How long does this have to be?

157. KW: Everyone's will be different, so XXX

OC: I notice that KW is not prescribing a length

158. D: I was gonna say, XXX I'm not smart enough.

OC: Perception that length equals intelligence?

159. KW: XXX

160. B: Oh you're from here?

161. KW: Yeah

162. B: For real?

163. D: Of course. XXX one of the top three regions
164. KW: So, I need you guys to get to work. Did you say I'm from Watertown? That might be like me saying you're from-
165. B: Chatham
166. KW: XXX
167. B: What XXX is that?
168. KW: XXX
169. B: I knew it.
170. LJ: Why would y'all think we would write this way.
- OC: LJ moved to the area about 4 months ago from South Carolina. I couldn't totally hear what the comment was he was responding to, but his regional identity probably differs from Beto and Darnell.
171. B: That's where they say XXX
172. D: We're really writing in science. This is, like, dumbfounding.
- OC: I wonder if he would have the same reaction if the project had been set up and scaffolded (specifically the writing part) over the last two weeks.
173. KW: Exactly

Several minutes later, LJ is kneeling next to his lab table and KW asks him what he's doing. LJ is silent, but Darnell covers for him by yelling:

D: We're writing in science class!

9:33am

I circulate to see how students are getting started and ask about their process for getting going. Igor and Roman says their plan is just to "get started" writing – no planning first. Brandon, though, says his usual process is to study the directions and a sample first so he really knows what to do. He is reading KW's sample at the time.

Around this time, I overhear KW prompting Igor's thinking by encouraging him to think about writing a letter to a friend at another school.

OC: Genre confusion? A number of students don't seem to know where to get started with this assignment. Is the problem partially what Darnell expressed above (that writing in science is a crazy, unfamiliar idea)? Or is it that they've seen a long model text, but have short bulleted instructions and don't know how to get from one to the next? Is it that they're just not invested in the assignment or the topic? Not sure.

KW to Justin: Sometimes I like to start writing by just saying everything I know, then I go back and think about if I want to add more and go back and add more details.

Justin is bulleting his answers (his document had A-D with fragments of thoughts and phrases) and is going to put them together later.

Martin has a paragraph put together to address part A. I'm not sure where he was pulling information from, but he combined simple and complex sentences, as well as everyday and more specific language to "describe the function of DNA in organisms (e.g., *blueprint, construct, nucleus, body, mother*). He says he will just send the text to Nashaly when it's time to turn in. I encourage her to work on another part of the assignment.

9:40am

Brandon: Miss, look at this beautiful sentence! You can't tell me it's not beautiful.

KW: That is beautiful.

9:43am

Wrap-up. KW prompts students to save their files and make sure they will be able to find them back. They will continue to work on the writing part next week and then begin to work on the video part.

OC: More structure needed. Students wrote 1-4 sentences in the time allowed.

APPENDIX 4C

SAMPLE INTERVIEW PROTOCOLS

INITIAL PST INTERVIEW PROTOCOL (PHASE ONE OF DATA COLLECTION)

The purpose of this interview is to explore how you think about and approach teaching ELLs as well as other students, and how coursework from a critical social semiotic perspective has influenced this work. We will also talk about your ideas for revising the course for future teacher candidates.

Part 1. PST Context

1. How did you decide to become a teacher? (*Try to keep this brief; can include in a later interaction if necessary to save time*)
2. Have you begun your student teaching?
 - a. [If YES] What have you taught so far? How would you say it's going?
 - b. [If NO] When do you begin? How do you feel about it?
3. What would you say your teaching philosophy is?
 - a. Is there any specific theory of learning or teaching that shapes your teaching philosophy? Probe: In other words, is there an approach you use that you think supports learning for **most** students?
4. Tell me where your thinking is at regarding ELLs and the mandate that they learn "academic" English.

Part 2. RETELL Course Evaluation

1. What were your expectations for the RETELL course coming in?
2. What were your impressions at the end of the course?
3. At the end of the course, what was your perception of a critical social semiotic perspective on language (i.e., SFL, genre-based pedagogy) for supporting content instruction in diverse classrooms?

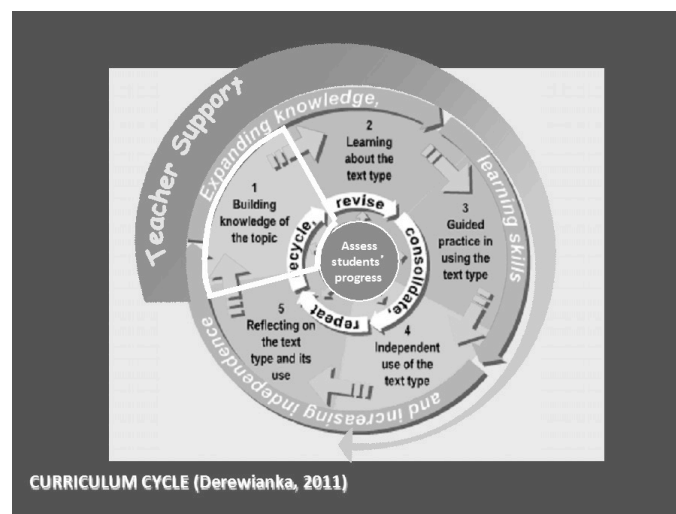
- a. In class we talked about how a social and functional theory of language differs from other theories of language and learning (i.e., behavioral perspectives, innatist theories). What was your impression of this perspective on language and learning?
 - b. Did this impression change at all throughout last semester?
4. How effective was the course for you in terms of building knowledge *about* language? What in particular did you find effective?
5. How effective was the course for you in developing a deeper knowledge of the **context** in which you're teaching?
 - a. Did you become more aware of any **outside** factors that shape what happens **inside** your classroom?

(Give examples if necessary: state policy, standards, educational ideologies, etc.)
 - b. Did you become aware of any specific policies you think will impact your work? (If necessary: positively or negatively)
 - c. [If not mentioned previously] What do you think about these initiatives? How do they affect your student teaching, if at all?

[Show respondent the list of initiatives.]
 - Common Core
 - MCAS/PARCC
 - WIDA/ACCESS test
 - RETELL
 - TPA (Teacher Performance Assessment)
 - SEEDS (Springfield teachers only)
 - Others?
6. How effective was the course for you in terms of building pedagogical knowledge, regarding the design of effective curriculum, instruction, and assessment?
7. How effective was the course for you in terms of thinking about language and difference in the classroom in new ways?
8. In your advanced methods course, you'll have to do an NCATE assessment task (specifically a written response analyzing your "impact on student learning"). What are your initial thoughts about how you could do that? Do you think our course will be helpful to you in completing a task like that?

Part 3. Curriculum, Planning, and Instruction

1. Could you describe your approach so far to designing and teaching science curriculum? (If teacher has more than one class of students, OK to focus on the class with more ELLs)
 - a. [If needed] What types of materials do you (plan to) use?
 - b. [If needed] Do you (or will you) plan differently for different groups of student? How so?
2. Did the RETELL course **change** anything in how you think about teaching science or your approach to designing and teaching curriculum?
3. Do you incorporate reading and writing instruction into your teaching? If so, how? Has that **changed** at all? [If necessary] Have you changed anything in particular based on what you have learned in our RETELL course?
4. In your student teaching so far, do you see yourself as teaching content AND language at the same time? If so, how? If not, how do you separate them?
5. [If she or he doesn't mention social semiotics, SFL, or genre-based pedagogy] Our RETELL course focused on systemic functional linguistics (SFL) and genre-based pedagogy. Are you using genre-based pedagogy or SFL? Why or why not?
6. [If not mentioned previously] Are you using Backwards Design? Why or why not?
7. [Show the Teaching and Learning Cycle Diagram]: Do you remember this diagram from the course? Has it been helpful to you? Why or why not? What part, **if any**, do you find **most** helpful? How do you use it?



Part 4. Wrap Up

1. Is there anything else you'd like to add? Anything you think we should know about changes in your teaching since taking the RETELL class?
 2. Thank you so much for your time!
-

POST-OBSERVATION PST INTERVIEW PROTOCOL (PHASE TWO OF DATA COLLECTION)

1. Tell me about how you planned this unit – daily activities, the final project, etc.
 2. General reflections on unit – What do you think went well? What do you think could have gone better?
 3. What do you think your students learned content and language-wise? How could you tell?
 4. I noticed two interesting things happening in the back of the room during this unit. You had one group of students who relied on Martin to answer questions they would ask in Spanish. And you had another three who were constantly rapping and beat boxing.
 - a. Tell me about how you thought about bringing those students into the final project.
 5. (Look at student work and teacher feedback) – How effective was the unit for low, mid, and high performing students? How did you approach giving them feedback on the different parts of their project?
 6. Further reflection for students at different levels – what could you do differently in this unit (or subsequent ones) to support students like these low, mid, and high performers?
-

END OF STUDENT TEACHING PST INTERVIEW PROTOCOL (PHASE TWO OF DATA COLLECTION)

1. I noticed that in the last unit of the year, you focused again on the same genre again but with new content regarding the health of a community water source.
 - a. What do you think your students learned content and language-wise?
 - b. How could you tell?
 - c. How effective was it for you and for students to keep your focus on the same TYPE of writing even as you moved forward with new content?

- d. You used a similar rubric for this unit. How did you use the rubric this time around, since it was already prepared for the last lab report?
 - 2. (Look at student work and teacher feedback)
 - a. How effective was the unit for low, mid, and high performing students?
 - b. How did you approach giving them feedback on the different parts of their project?
 - 3. Any other reflections on how you were able to support a pretty diverse group of students in expanding their language resources for learning and doing science by approaching your units this way (e.g., integrating explicit language teaching into your content teaching)?
 - a. Do you think that, in any way, your approach “leveled the playing field” for students who might not typically be expected to do well in the sciences?
 - 4. Anything you would want to tell other pre-service teachers about the importance of building scientific language skills? Or advice you would want to give looking back on your experiences student teaching?
-

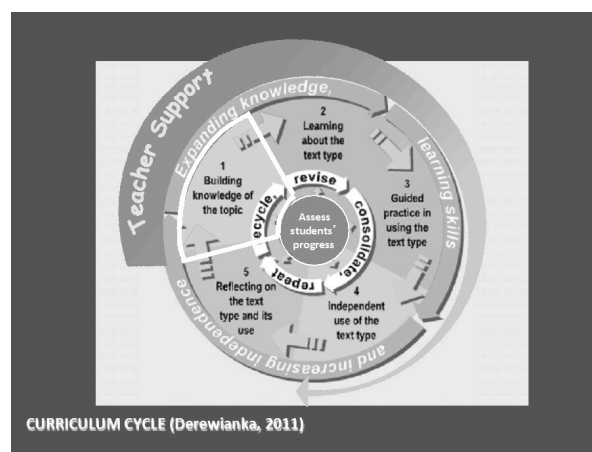
INITIAL IN-SERVICE INTERVIEW PROTOCOL (PHASE THREE OF DATA COLLECTION)

Part 1. PST Context

- 1. How are things going so far this year?
- 2. Tell me about this school – how is it different than the school where you completed your student teaching?
 - a. Who are your students? What does “diverse” mean here? What is the student population like here?
 - b. With regard to ELLs?
 - c. What are the expectations like of you as a new teacher?
 - d. Does the department or school have any specific emphasis on writing or writing in science, in particular?
- 3. Where is your thinking at regarding what you want your students to know – science-wise and regarding writing?

Part 2. Curriculum, Planning, Instruction

4. How do you design and teach science curriculum in this context? Describe your approach this year to designing and teaching science curriculum? In particular for ELLs? Other struggling learners?
 - a. [If needed] What types of materials do you (plan to) use?
 - b. [If needed] Do you plan differently for different groups of student? How so?
5. Since the RETELL course, has anything **changed** in how you think about teaching science or your approach to designing and teaching curriculum?
6. Do you incorporate reading and writing instruction into your teaching? If so, how? Has that **changed** at all? [If necessary] Have you changed anything in particular based on what you have learned in our RETELL course?
7. Do you see yourself as teaching content AND language at the same time? If so, how? If not, how do you separate them?
8. Are you using genre-based pedagogy or SFL? Why or why not?
9. Are you using Backwards Design? Why or why not?
10. [Show the Teaching and Learning Cycle Diagram]: Do you remember this diagram from the course? Has it been helpful to you? Why or why not? What part, **if any**, do you find **most** helpful? How do you use it?



Part 3. Describe the upcoming curricular unit

END OF STUDY INTERVIEW PROTOCOL (PHASE THREE OF DATA COLLECTION)

Note: End of study interviews were heavily tailored to each case study participant and included excerpts and quotes from their prior work.

Part 1. ON ‘ELLs’ and Teaching Language

1. When you started the RETELL class, you wrote that you think of ELLs as “students learning English as a second language or students not good at comprehending English.” You also thought of them as “being in a separate class or included with a helping adult.”
 - a. What associations do you have with the term ELL now?
2. You also wrote that “languages are learned through use and social context” (9/29/15) and that you liked the idea of “going over processes as these are the major new concepts in science...I will go over it verbally and help students to see how a text does the same thing. I will also try to use more pictures to help visualize.”
 - a. Do you see yourself as a language teacher in some measure now?
 - b. Do you think you follow the plan you set out there? To introduce new information verbally and then help students see how texts build up that same information?
 - c. RETELL was, in part, about getting some tools for noticing how language works in your discipline. When you’re wanting to help students notice how to make meaning in science, do you feel you have the tools to do that noticing yourself? If you look at a text that you’re thinking about giving students, how do you go about picking out what to highlight for students?
3. When we were learning about the curriculum cycle (show picture) you wrote that you would probably use stage 3 most, which is guided practice in using the text type. Your idea at the time was for writing lab reports and you thought you might start by giving struggling students a basic template to fill in. Then “over time, they will be expected to come up with more writing on their own. Before having students do this, we will talk about what writing in science looks like. I will also have them fill out a rubric on their writing so they can reflect on their work.” (11/3/15)
 - a. Would you say you’ve followed this model?
 - b. Can you think of a particular example of talking with your students about language choices that are common in science? Or why those choices get made? Why they’re effective?
4. When we first sat down to talk after the RETELL class (1/13/16, lines 121-137), we also talked about what aspects of language you could really see yourself teaching, and you mentioned: 1) audience being a big one – “WHO are you writing this, or WHO is this being written for;” 2) types of verbs; and 3) more specific vocabulary.
 - a. Do you find yourself emphasizing those things in your teaching now?

- b. You talked about doing these things to “elevate [student] writing” (line 126). Something I think a lot about is how to teach students new ways of using language is how to do that without communicating to students that there’s something wrong with or deficient about the language that they have and use to live their life everyday.
 - i. Is that something you think about when you’re in front of your students? Or when you’re giving them writing assignments and talking about how you want them?
- 5. In that conversation, we also talked about the importance of pictures and images for making meaning in science (1/13/16 interview, lines 92-104). We talked about a mitosis project you had students do where even if students were struggling with their writing, you were able to see what they understood about cell division by their drawings.
 - a. I know you use a lot of images in your teaching and incorporate graphic elements into your projects. Do you talk explicitly with students about what types of images are helpful in science? Or how to select or create images that make disciplinary meanings?

Part 2. On Language and Society

- 6. When we first sat down to talk after the RETELL class (1/13/16, lines 39-44), you mentioned that you had noticed language having something to do with the way students “fit in socially” and that you had learned more about the “social struggles ELLs face” – or at least the focal student you observed.
 - a. Can you tell me about how you see that now?
 - b. In school, or even more generally, what do you think is the connection between language and social status?

Part 3. On Knowing Your Students

- 7. During RETELL, you once wrote that “if you don’t know your students, you can’t help them” (freewrite 9/22/15).
 - a. Tell me about how you get to know your students now and what kinds of information you look for in order to help them.
- 8. You also wrote “I need to learn how to diversify my teaching style – different methods for different learners. (After my program) I can continue to do research for proven ways that help different students learn.” (9/22/15)
 - a. Tell me about your progress in this area. What kinds of different methods do you use for different learners?
 - b. ELLs in particular?

Part 4. Review Examples of Feedback from Phase 3 Focal Unit

APPENDIX 4D

SAMPLE INFORMED CONSENT

PHASE ONE INFORMED CONSENT

RESEARCHER	Kathryn Accurso
STUDY TITLE	Preparing K–12 Teachers to Support L2 Academic Literacy Development (Phase One)

DESCRIPTION OF STUDY

The purpose of the study is to better understand how useful a functional perspective on language is for preparing pre-service teachers to support English language learners (ELLs) in developing academic literacy skills. This study uses a mixed methods approach to explore pre-service teachers' beliefs and knowledge about language teaching and learning, and how these factors impact their design and implementation of curriculum to support ELLs academic literacy development over time. The study will integrate different types of data, including surveys, class activities, and written assignments from your RETELL course.

DATA COLLECTION

With your consent, we would like to collect the following types of data:

- Samples of work submitted for RETELL (Fall 2015)
- Video and/or audio recordings and field notes of RETELL class meetings (Fall 2015)

TIME COMMITMENT

Your participation in this phase of the study will occur entirely within RETELL, so there is no additional time commitment on top of your routine participation in the course.

USE OF RESULT

The results of this study will be used in a doctoral dissertation, as well as academic presentations and publications.

PRIVACY

Every effort will be made to protect your privacy. All data containing confidential information will be kept in possession of the researcher. Names and other identifiers will be removed from field notes and transcripts. Pseudonyms will be used in place of your name, school names and district names. In disseminating results, every effort will be

made to mask positively identifying information about you, your school, and your school district.

RISKS AND BENEFITS

There are no physical risks associated with this study and there are no specific benefits associated with participating in this study. The potential benefit will be that with the data collected, research can then better inform school districts and teacher education programs regarding which instructional practices best serve pre-service teachers in developing a pedagogy to support the development of academic literacy.

YOUR RIGHTS

You have the right to not participate. Your participation is voluntary. Your decision whether or not to participate will not affect how you are treated or evaluated in RETELL. If you do decide to participate, you have the right to withdraw from the study at any time.

QUESTIONS

Should you have any questions or concerns about your participation in this study, you may contact Kathryn Accurso at kaccurso@educ.umass.edu, or Dr. Meg Gebhard at gebhard@educ.umass.edu, (413) 577-0863. If you would like to discuss your rights as a research subject, or wish to speak with somebody not directly involved in the project you may contact Dr. Linda L. Griffin, Associate Dean for Academic Affairs at (413) 545-6985 or lgriffin@educ.umass.edu.

SUBJECT STATEMENT OF VOLUNTARY CONSENT

I have read the information in this consent form, and have decided that I will participate in the study. I have had the chance to ask questions regarding the study, and have received satisfactory answers. I understand that I can withdraw at any time. There are two copies of this form. A copy of this signed Informed Consent Form has been given to me.

Participant's Full Name (print)

Signature

Date

PHASE TWO INFORMED CONSENT

RESEARCHER	Kathryn Accurso
STUDY TITLE	Preparing K–12 Teachers to Support L2 Academic Literacy Development (Phase Two)

DESCRIPTION OF STUDY

The purpose of the study is to better understand how useful a functional perspective on language is for preparing pre-service teachers to support English language learners (ELLs) in developing academic literacy skills. This study uses a mixed methods approach to explore pre-service teachers' beliefs and knowledge about language teaching and learning, and how these factors impact their design and implementation of curriculum to support ELLs academic literacy development over time. The study will integrate different types of data, including surveys; interviews; coursework from your RETELL course; curricular materials designed by participants; and observations of teaching.

DATA COLLECTION

With your consent, we would like to collect the following types of data:

- Samples of curricular units/lesson plans that you are using with your students
- Samples of student work on which you have provided feedback as part of your instruction
- Observations, field notes and audio/video recordings of classroom instruction (approx. 6 times during Spring 2016)
- Audio recordings of semi-structured interviews comprised of questions regarding your design and implementation of academic literacy instruction (approx. 2 times during Winter 2015 and Spring 2016)

TIME COMMITMENT

The majority of your participation during this phase will occur during a 6-month period starting in December 2015. Observations will be done during your student teaching and would occur at your school during the year (with the consent of your cooperating teacher and school principal). Interviews will be approximately 45 minutes long and will be done at a time and place of your convenience. However, we may also wish to conduct brief informal interviews over the course of the project during the 2015–2016 school year.

USE OF RESULT

The results of this study will be used in a doctoral dissertation, as well as academic presentations and publications.

PRIVACY

Every effort will be made to protect your privacy. All data containing confidential information will be kept in possession of the researcher. Names and other identifiers will be removed from field notes and transcripts. Pseudonyms will be used in place of your name, school names and district names. In disseminating results, every effort will be made to mask positively identifying information about you, your school, and your school district.

RISKS AND BENEFITS

There are no physical risks associated with this study and there are no specific benefits associated with participating in this study. The potential benefit will be that with the data collected, research can then better inform school districts and teacher education programs regarding which instructional practices best serve pre-service teachers in developing a pedagogy to support the development of academic literacy. In addition, participants in studies like this in the past have found reflecting on their work as part of ethnographic practice to be beneficial.

YOUR RIGHTS

You have the right to not participate. Your participation is voluntary. Your decision whether or not to participate will not affect how you are treated or evaluated in your graduate program. If you do decide to participate, you have the right to withdraw from the study at any time.

QUESTIONS

Should you have any questions or concerns about your participation in this study, you may contact Kathryn Accurso at kaccurso@educ.umass.edu, or Dr. Meg Gebhard at gebhard@educ.umass.edu, (413) 577-0863. If you would like to discuss your rights as a research subject, or wish to speak with somebody not directly involved in the project you may contact Dr. Linda L. Griffin, Associate Dean for Academic Affairs at (413) 545-6985 or lgriffin@educ.umass.edu.

SUBJECT STATEMENT OF VOLUNTARY CONSENT

I have read the information in this consent form, and have decided that I will participate in the study. I have had the chance to ask questions regarding the study, and have received satisfactory answers. I understand that I can withdraw at any time. There are two copies of this form. A copy of this signed Informed Consent Form has been given to me.

Participant's Full Name (print)

Signature

Date

PHASE THREE INFORMED CONSENT

RESEARCHER	Kathryn Accurso
STUDY TITLE	Preparing K–12 Teachers to Support L2 Academic Literacy Development (Phase Three)

DESCRIPTION OF STUDY

The purpose of the study is to better understand how useful a functional perspective on language is for preparing pre-service teachers to support English language learners (ELLs) in developing academic literacy skills. This study uses a mixed methods approach to explore pre-service teachers' beliefs and knowledge about language teaching and learning, and how these factors impact their design and implementation of curriculum to support ELLs academic literacy development over time. The study will integrate different types of data, including surveys; interviews; coursework from your RETELL course; curricular materials designed by participants; and observations of teaching.

DATA COLLECTION

With your consent, we would like to collect the following types of data:

- Samples of curricular units/lesson plans that you are using with your students
- Samples of student work on which you have provided feedback as part of your unit instruction
- Observations, field notes, and audio/video recordings of classroom instruction (during Spring 2017)
- Audio recording of a semi-structured interview comprised of questions regarding your design and implementation of academic literacy instruction (1-2 times during Spring 2017)

TIME COMMITMENT

The majority of your participation during this phase will occur during one curricular unit during the 2016–2017 school year. Observations will occur at your school during the year (with the consent of your school principal). Interviews will be approximately 45 minutes long and will be done at a time and place of your convenience. However, we may also wish to conduct brief informal interviews over the course of the project during the 2016–2017 school year.

USE OF RESULT

The results of this study will be used in a doctoral dissertation, as well as academic presentations and publications.

PRIVACY

Every effort will be made to protect your privacy. All data containing confidential information will be kept in possession of the researcher. Names and other identifiers will be removed from field notes and transcripts. Pseudonyms will be used in place of your name, school names and district names. In disseminating results, every effort will be made to mask positively identifying information about you, your school, and your school district.

RISKS AND BENEFITS

There are no physical risks associated with this study and there are no specific benefits associated with participating in this study. The potential benefit will be that with the data collected, research can then better inform school districts and teacher education programs regarding which instructional practices best serve pre-service teachers in developing a pedagogy to support the development of academic literacy. In addition, participants in studies like this in the past have found reflecting on their work as part of ethnographic practice to be beneficial.

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You have the right to not participate. Your participation is voluntary. Your decision whether or not to participate will not affect how you are treated or evaluated in your graduate program. If you do decide to participate, you have the right to withdraw from the study at any time.

QUESTIONS

Should you have any questions or concerns about your participation in this study, you may contact Kathryn Accurso at kaccurso@educ.umass.edu, or Dr. Meg Gebhard at gebhard@educ.umass.edu, (413) 577-0863. If you would like to discuss your rights as a research subject, or wish to speak with somebody not directly involved in the project you may contact Dr. Linda L. Griffin, Associate Dean for Academic Affairs at (413) 545-6985 or lgriffin@educ.umass.edu.

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Participant's Full Name (print)

Signature

Date

CHAPTER FIVE

CONCLUSION

The guiding mission of this dissertation was to seek a better approach to preparing teachers in the United States to support *all* students' literacy development, including students institutionally labeled ELLs. The work presented here pursued that somewhat abstract goal in the context of a very real problem in education. School reforms arising out of histories of racism, nationalism, and linguistic prejudice assign students to seemingly empirical categories like race, national origin, and language (e.g., Banks, 2015; Ladson-Billings, 1995, 2000; Rosa, 2016; Rosa & Flores, 2017a, 2017b) and then pit them against each other according to their performance on standardized tests that measure narrow conceptions of literacy (e.g., Au, 1998; August & Shanahan, 2006; Ladson-Billings, 2006). And much teacher preparation programming and coursework—like that I experienced—takes these social categories and dated conceptions of literacy as givens (e.g., Sleeter, 2008; Street, 2003). As a result, ELLs, who are often minoritized in all three of these categories, are found to be at the bottom of an “achievement” hierarchy (NCES, 2018), and their teachers are routinely given decontextualized trainings or scripted curricula designed to address these “achievement gaps” by improving test scores rather than more robust preparation (e.g., Darling-Hammond, 2010; Sleeter, 2008).²¹

Advances in what we know about language, literacy development, teaching and learning, and social change have simply not found their way into teacher education programming

²¹ ELLs in U.S. public schools are popularly assumed to be immigrants (e.g., Suárez-Orozco & Suárez-Orozco, 2009). However, recent data shows the vast majority of students bearing this institutional label were born in the United States (e.g., Zong & Batalova, 2015), meaning their minoritization according to national origin is based on inaccurate assumptions.

as quickly as the ELL population has grown in U.S. schools (Calderón, Slavin, & Sánchez, 2011; de Jong & Harper, 2005; Gándara & Hopkins, 2010; Gándara, Maxwell-Jolly, & Rumberger, 2008; Menken, 2010), and this lag has had profound consequences for teachers and students (Gebhard, 2019). As a way of responding to these issues, this dissertation has presented research that explores how critical social semiotic theory might be applied to teacher education in the current sociopolitical context.

This dissertation contributes to existing research by exploring how critical social semiotic theory has been applied to teacher education within the U.S. policy context, as well as what learning outcomes this has had for pre-service teachers, in-service teachers, and students. Collectively, the three manuscripts offer evidence that critical social semiotic theory can be productively integrated into teacher education programming to meet the demands of state and federal standards regarding disciplinary literacies. More specifically, the literature review manuscript (Chapter 2) shows that this theory can provide a useful basis for supporting teachers' development of knowledge about language and an understanding of how to explicitly incorporate that knowledge into their literacy teaching practices. This manuscript shows that to a lesser extent, it can also support teachers' growth in terms of critical awareness, or a more conscious understanding of the relationship between text, context, power, and ideology; confidence for literacy instruction; and deeper knowledge of their content area. The two empirical manuscripts offer additional support for these overarching claims (Chapters 3 and 4). Importantly, these manuscripts also highlight a number of significant challenges and limitations associated with how a critical social semiotic approach has been applied in U.S. teacher education contexts to date. In what remains of this chapter, I offer some discussion

regarding the contributions and limitations of each manuscript, how the three “speak to” one another, and how they address the guiding questions set out in Chapter 1. I also briefly discuss what was left out of these manuscripts in making decisions about which aspects of the research to write up for this dissertation, and how those decisions influenced the contributions and limitations of each manuscript. Next, I discuss what questions this research leaves on the table regarding the topic of teacher preparation that takes into account language, learning, and social change in the current sociopolitical climate. Finally, I outline an agenda for research and practice in teacher education that I hope will support the field in imagining different models of teacher education and different futures for teachers and their students.

5.1. Contributions and Limitations

Chapter 2 presented a literature review that offered substantial evidence of critical social semiotic theory functioning as a mediating tool for teachers’ and students’ language awareness. It documents a body of empirical evidence that both groups developed a more conscious understanding of functional language systems and how people make choices within these systems to construct meanings in different contexts (see Tables 2.3 and 2.4). It is the only one of the three manuscripts that addresses both teacher and student learning, and therefore all three of the guiding questions set out at the beginning of this dissertation. This manuscript also points to specific aspects of the theory that have been most useful for mediating this type of learning by marshaling nearly 100 publications to show what aspects of the theory are most often presented to teachers and students, and thus associated with these outcomes, such as the use of a

functional metalanguage. Thus one of the major contributions of this manuscript is the weight it adds to the claims of individual researchers.

However, another major contribution of Chapter 2 is the evidence it provides for ways this theory is *not* necessarily working in U.S. educational contexts. For example, the majority of publications indicated teacher educators' interest in the way critical social semiotics accounts for power and ideology and might support social justice agendas in schools by mediating tools for increased critical awareness. Yet explorations of power and ideology in different contexts of use were often back seated to involving teachers and students in concentrated studies of linguistic systems (see Figure 2.5). Therefore, it is not surprising that teachers' and students' development of critical awareness after interaction with this theory was more limited. This finding may help teachers and teacher educators reconsider how they present the theory and associated pedagogies. For example, those committed to doing more critical work in the sense of explicitly valuing diversity, flattening hierarchies, and correcting oppression may reconsider their balance of text and context analysis, choosing to incorporate more exploration of power and ideology into their study of language and other semiotic choices. As Chapter 2 suggests, this practice may support teachers' and students' collective ability to "expose and critique the forms of inequality and discrimination that operate in daily life" (Denzin, 2017, p. 9).

Finally, Chapter 2 provides a quantitative account of issues and challenges teacher educators perceive to be preventing them from putting the theory to further use, such as the demands it places on their knowledge base and concerns around their ability to provide teachers with sustained support, especially as teachers go into school environments that do not support instructional change (see Table 2.6), which points to a

number of important considerations for developing possible future models of teacher education and classroom practice that draw on critical social semiotics. This literature review may help teachers and teacher educators prioritize certain aspects of their work based on the experiences and findings of others in their field.

Chapter 3 focused on how 55 pre-service teachers used their developing language awareness to provide feedback on disciplinary student writing. Despite the fact that new standards are increasingly emphasizing the need for all teachers to teach disciplinary writing, at the secondary level, writing is often still seen as something primarily done in the English language arts classroom (Arkoudis, 2005; Tan, 2011). This perception was alive and well among participants in this study. Though Chapter 3 focused solely on survey data, field notes and transcripts from the larger dissertation study showed an attitude that the literacy teaching requirements and focus on supporting ELLs' disciplinary language development in new standards were "annoying...like, hey, I'm teaching science, I shouldn't have to [teach writing]...it's a pain in the butt" (Lila, Sept. 2015 interview). And this was a perception shared by many students. Multiple times, I observed students in secondary science classrooms resist writing instruction by arguing that this type of work belongs in English language arts. For example, as illustrated in the following exchange between another PST and two 10th grade biology students after she asked them to write a paragraph explaining DNA replication, transcription, and translation:

1. PST: I *really* want you to be working on the writing part today.
2. Student 1: I thought this was bio, not English
3. PST: You don't think we write in science?
4. Student 1: No, we don't need to. That's like writing in geometry. No one's used to doing it. I mean science? You're telling me now we're *writing*?

5. PST: Mind blowing, we're writing.
[...]
6. Student 2: Did you have to write like this when you were in high school?
7. PST: Yeah, we did lab reports.
[...]
8. Student 1: So y'all *really* had to write. Y'all really had to write in science.
[...]
9. Student 1: We're really writing in science. This is, like, dumbfounding.
(Kelly, March 18 2016 classroom observation)

Prior research shows that even when disciplinary teachers like this PST do incorporate writing into their teaching, they struggle to provide meaningful feedback on that writing, especially to students labeled ELLs (e.g., Ferris, 2007; Hyland & Hyland, 2006). As Chen (2018) details, many instructors focus on correcting what they see as errors in vocabulary and syntax rather than on idea development, text organization, and coherence and cohesion (e.g., Ferris, Brown, Liu, Eugenia, & Stine, 2011; Furneaux, Paran, Fairfax, 2007; Lee, 2008, 2009; Montgomery & Baker, 2007). And teachers who do attempt to provide these types of feedback generally do so in ways that are too broad or vague to help students produce meaningful texts (Patthey-Chavez, Matsumura, & Valdes, 2004). However, Chapter 3 demonstrates that critical social semiotics can support PSTs' ability to analyze and respond to student writing with greater specificity (see Tables 3.2 and 3.3). A number of scholars have suggested this might be possible (e.g., Hyland, 2007; Gebhard, Chen, Graham, & Gunawan, 2013; Martin & Rose, 2012; Schleppegrell & Go, 2007), but this study is one of only two that connects teachers' study of critical social semiotics with the content of their written feedback (see also Aguirre-Muñoz, Park, Amabisca, & Boscardin, 2008). Therefore, the main contribution of this manuscript is the evidence it provides that PSTs are able to grasp concepts and metalanguage from an admittedly dense theory and relatively quickly operationalize them

in responding to student writing. Specifically, it shows that the majority of PSTs were able to more explicitly address disciplinary writing expectations, prompt students to consider the purpose of their writing, and make semiotic choices effective for that purpose. These findings are encouraging in that many PSTs were able to explicitly recognize and begin to talk about the multiple semiotic systems at play in disciplinary classrooms (e.g., linguistic resources, symbolic representations, visual images).

However, a significant limitation of the research design used in this study was the way it limited my ability to say whether and how PSTs did this in their actual classrooms, or what impact it had on students' disciplinary literacy practices. The methodological trade-off was that a mixed methods survey administered within the context of a required course allowed me to capture data on a larger sample of PSTs with a high response rate (77% of participants enrolled in the course completed the entire pre- and post-course survey). After the course, as part of data collection for Chapter 4, I was able to collect situated data on three participants' feedback practices over time, but this data ultimately did not appear in any of the three manuscripts. This would be an interesting aspect of the data to analyze in a future manuscript.

Like Chapter 3, the manuscript presented in Chapter 4 also focused more on course design and PSTs' development than on student outcomes, addressing only guiding questions 1 and 2 presented in the introduction to this dissertation. This was a significant limitation in the design of the larger dissertation project. While it would have been ideal to also collect student writing and assessment data in each of the case study contexts, the institutional hurdles to obtain appropriate consent/assent across districts, schools, and languages, as well as the demands of data collection were simply too great for me to

undertake as a single researcher conducting an (initially) unfunded dissertation project. It took a great deal of time to simply gain the appropriate permissions to sit in multiple classrooms and audio record instruction. Thus, the empirical research presented in this dissertation does not fully respond to Cochran-Smith and Zeichner's (2005) call for studies that link "teacher preparation contexts" with "what candidates actually learn [and] how this influences pupils' learning" (p. 2). However, it is important to note that even if matters of time, money, and access hadn't existed, these complex links are methodologically difficult to make, presenting "steep and thorny research challenges" (Cochran-Smith & Fries, 2005, p. 51).

Nevertheless, the research presented in Chapter 4 does respond to a different need in the field—for longitudinal and situated studies of teacher learning. The American Educational Research Association's 2005 panel on research and teacher education noted that "there are still only very few studies in which the graduates of teacher education programs are followed into the first years of teaching" (Cochran-Smith & Zeichner, 2005, p. 16). In addition, this panel called for more mixed methods research to help bridge the gap between large-scale quantitative studies that suggest relationships between factors but cannot illuminate the nature of the relationship, and short-term small-scale qualitative case studies performed by researchers who are also teacher educators and provide little information that can be transferred to other contexts. The research design of Chapter 4 begins to address these concerns. By combining case study and survey methods, the manuscript contributes a nuanced view of how PSTs interacted with discourses from critical social semiotics in different contexts as they completed their coursework, became student teachers, and then moved into their first positions as in-service teachers. Further,

it offers a set of refined codes that can be used as a starting point for other researchers, teacher educators, and teachers (Table 4.3). While these codes were developed to better understand the pathways of learning PSTs in this study exhibited and are not meant to suggest a developmental trajectory that PSTs should be expected to follow in other contexts, they can be used as a reflective tool in other contexts. For example, teacher educators could guide pre- and in-service teachers to use, revise, or add to these codes as they evaluate and reflect on their own learning and make links for themselves between their knowledge, beliefs, practices and their students' learning.

Another contribution of Chapter 4 is the way it takes on the question of social change, showing that critical social semiotics as applied to teacher education in this study can play a role in this effort, but is not enough on its own. Many have argued that teachers' awareness about or knowledge of language is an important step toward teaching for social change, particularly with regard to equitable education for ELLs (e.g., Gebhard, Austin, Nieto, & Willett, 2002; Hasan, 1998; Palmer & Martínez, 2013). And findings from this study, as well as findings presented in Chapters 2 and 3, suggest that critical social semiotic theory can support the development of this type of knowledge. But this study also attempts to connect this finding to PSTs' beliefs, practices, and contexts of learning and teaching, which are other important elements of change (e.g., Richardson & Placier, 2001; van Lier, 2004). In studying these aspects of PST learning together, Chapter 4 demonstrates that the application of critical social semiotics in teacher education is more about planting seeds of change by complicating PSTs' beliefs about language and language learning, and supporting PSTs' ability to apply their knowledge to practice aspects of explicit and critical literacy instruction. In this way, Chapter 4

provides an important counterbalance to Chapter 3, which presents impressive short-term knowledge and practice results that on their own can make quick policy fixes look effective. Taken on their own, the narrative created by such impressive short-term results may ultimately perpetuate inequitable outcomes for ELLs (e.g., Sleeter, 2008). In contrast, longitudinal findings that show more measured impacts can better support calls for programmatic responses as opposed to quick fixes like the addition of a single course to an already packed licensure program. As a number of scholars have pointed out, calls for more equitable education for ELLs are shallow unless we can develop a teacher education model that disrupts what Hasan (1999) calls the “disempowerment game” of teacher education by following through on impactful short-term coursework and supporting revised pedagogies in the long-term (Alim, 2005; Viesca, Torres, Barnatt, & Piazza, 2013). Data presented in Chapter 4 supports this call.

5.2. What Got Left Out?

Inevitably, in the process of data reduction and writing, a lot got left out of these manuscripts. For example, since drafting the literature review presented in Chapter 2, a number of new publications have come out that fit the inclusion criteria and warrant consideration, as well (e.g., Gebhard & Graham, 2018; Moore, Schleppegrell, & Palincsar, 2018; Shin, 2018). This is not surprising given the relative explosion of publications related to the topic of this dissertation since 2010 (see Figure 2.3), but it would be interesting to update the manuscript for publication with this additional literature in mind.

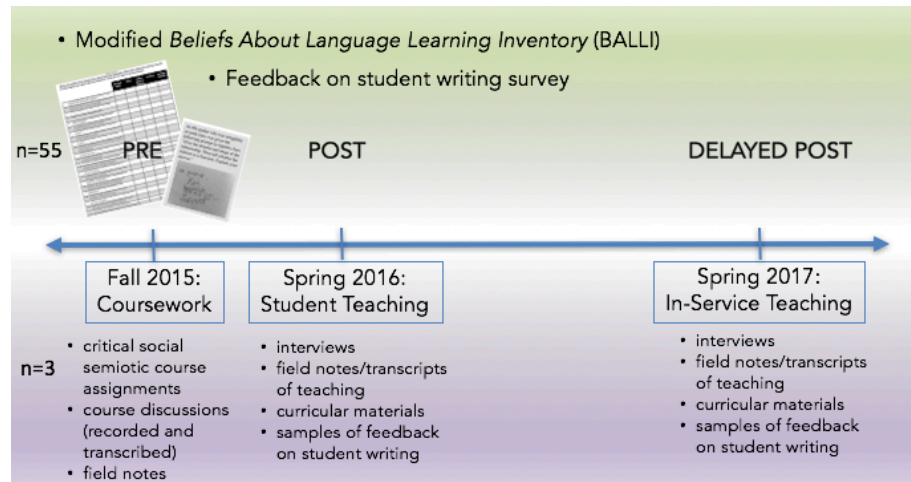


Figure 5.1: Empirical data collected as part of dissertation study

What was left out of Chapter 3 was also a matter of available data at the time the manuscript was prepared and published. Figure 5.1 summarizes the data collected as part of the whole dissertation project, showing three administrations of the feedback on student writing survey presented in Chapter 3. However, this chapter was written in late 2016 and published in 2017 before delayed post-course data collection began. Therefore, it does not include longitudinal survey data, though this type of data was collected as part of the larger dissertation study. The third survey administration in June 2017 featured a different, but similar, student writing sample and the same prompt for participants to provide numeric and written feedback, as well as a brief rationale for their feedback (Appendix 5A). The data generated by this delayed post-course survey was interesting in terms of what participants retained (and didn't) regarding feedback practices 18 months after completing the course in critical social semiotics and 12 months after graduating from their teacher education programs.

Table 5.1: Types of delayed post-course feedback on student writing.

	PRE- COURSE (Sept. 2015)	POST- COURSE (Dec. 2015)	DELAYED POST-COURSE (June 2017)
Type of Feedback	% of PSTs (n=55)	% of PSTs (n=55)	% of PSTs (n=12)
Vocabulary-oriented	42%	7%	0%
Broad prompt for more detail	24%	16%	36%
General encouragement with caveats	27%	31%	27%
Prompt for oral feedback session	22%	11%	0%
Purpose-oriented	0%	36%	9%
Genre-oriented	0%	29%	18%
Register-level advice			
• Field/content resources		27%	9%
• Tenor/voice resources		5%	0%
• Mode/flow resources		5%	9%
• Use of graphic elements		16%	9%

As Table 5.1 illustrates, the data from this third survey administration suggests that promising short-term changes in PSTs' feedback practices diminished somewhat, but did not disappear. In particular, as highlighted in yellow, among those participants who responded, there was a resurgence of broad prompts for the student to "say more" and a decrease, though not disappearance, of specific feedback on what kind of more to add. However, this data is weak in a number of ways. The response rate on this follow-up survey was normal, but low at approximately 22% of participants (Dillman, 2007). In addition, the disciplinary makeup of longitudinal respondents was somewhat different from that presented in Chapter 3. While the larger group included 18 English language arts PSTs, 15 social studies PSTs, 12 science PSTs, and 10 math PSTs, it was

predominantly science and math teachers who responded to the longitudinal survey (83% of delayed post-course respondents). So, while the longitudinal data is interesting, it does not necessarily provide a representative picture of changes in the practices of the larger group described in Chapter 3 over time. Nevertheless, it points to possible future work in this area regarding longitudinal changes in the quality of teachers' feedback on disciplinary writing and explorations of what leads teachers to revert to feedback practices that are known not to be supportive of student learning.

What got left out of Chapter 4 was less a matter of available data and more an issue of data reduction and research design. One of the main drivers of data reduction in this manuscript was which case study themes could be supported by survey data collected on the larger group. However, I would count the survey instrument that I used, a modified version of Elaine Horwitz's (1985) *Beliefs About Language Learning Inventory*, as something of a limitation in the degree to which it did not include items that got at some prominent themes that came through in the case study data. For example, one interesting theme that arose out of the case study data but did not come through in the modified BALLI survey had to do with PSTs' conceptualization of the relationship between language and content. In interviews throughout the duration of the study, case study PSTs repeatedly expressed the thought that language teaching and content teaching existed in a "give and take" relationship (e.g., Lila, July 2017 interview), meaning that they couldn't "give" on content teaching in order to "take" time to teach language, implying that the two were separate. Yet these PSTs also consistently bemoaned their students' reading, writing, and presenting skills, not making the intellectual leap implicated in critical social semiotic theory that teaching language *is* teaching content. No items on the BALLI

survey beyond those presented in Chapter 4 were particularly relevant for identifying whether or not this was a trend in the larger group.

Other themes that were prominent in the case study data but simply not addressed by the survey instrument included: PSTs' conception of the relationship between oral and written language (i.e., the mode continuum); PSTs' perception of student "effort" and their tendency to judge students' literacy practices according to the amount of "effort" they perceived students to be putting in; the privileging of official literacies; and PSTs' understanding of the relationship between language and social status. As a result, these themes were largely left out of Chapter 4, but would be interesting to explore in future manuscripts based on deeper qualitative analysis of the three focal cases. In addition, I would like to collect survey data with subsequent cohorts of PSTs that may be more sensitive to tracking these themes. To this end, I am currently piloting an instrument called the *Beliefs About Multilingualism in Schools Survey* (Milbourn, Viesca, & Leech, 2017) in a series of follow-up studies at "Public State University."

5.3. Remaining Questions

To review, what made it into and was left out of the three manuscripts point to a number of directions for future research that address problems of practice, theory, and research methodology. For example, the literature presented in Chapter 2 suggests a need for:

- Continued study of critical social semiotics as applied in U.S. teacher education using a range of research methods;
- Increased use of design-based research to inform the implementation of a critical social semiotics in ways that are responsive to local contexts;

- Further studies that explore the impact of increased support for teachers and students in learning how to analyze and discuss the relationship between literacy practices, ideologies, and social change;
- Longitudinal studies of teachers' learning as they make sense of and enact theories of language, learning, and social change;
- Additional large scale studies of students' disciplinary literacy development to substantiate qualitative case study and small scale mixed methods research findings;
- Additional studies regarding what kind of metalanguage will best serve teachers and students in developing disciplinary literacies, semiotic awareness, and critical awareness;
- Greater attention to multimodality in teacher education and literacy research; and
- Explorations of how to increase teachers' access to expertise and opportunities for meaningful collaboration focused on student learning.

The empirical study of changes in secondary PSTs' feedback on student writing

presented in Chapter 3 suggests a need for:

- Longitudinal studies of whether or how PSTs operationalized disciplinary linguistic knowledge in their actual classroom practices with diverse secondary students
- Explorations of PSTs' responses to a range of student writing samples across disciplinary genres; and
- Explorations of students' interactions with feedback informed by critical social semiotics to track the impact of this feedback on their development of different disciplinary literacy practices.

The mixed methods study of changes in PSTs' knowledge, beliefs, and practices

presented in Chapter 4 suggests a need for:

- The development of a conceptual framework for preparing teachers to that draws even more heavily on the contributions of social theorists working to address issues of ideology, inequity, and power within a new critical paradigm;
- A more clearly developed set of tools for teachers to analyze and discuss ideologies;

- Reimagined models of teacher education that provide sustained support for teachers as they develop a complex knowledge base over time;
- Research that crosses academic traditions to pursue investigations of not just how teachers change, but why they change (or not).

Finally, some other areas of future inquiry related to this topic, but not necessarily raised in Chapters 2-4 include:

- What ideas pre- and in-service teachers have about social change. In teacher education and licensure programs, teachers are routinely asked to articulate a theory of learning, and as this dissertation shows, increasingly asked to confront their conceptualizations of language. However, they are not yet routinely asked to articulate a theory of social change and explicitly explore their role in that process;
- How administrators and teacher leaders interact with critical social semiotics in their respective roles within schools; and
- The role of disposition in teachers' learning (Villegas, 2007) and how dispositions might be taken into account in processes of recruiting and selecting teacher candidates.

5.4. An Agenda for Research and Practice in Teacher Education

Going forward as an applied linguist, researcher, and teacher educator, I imagine an agenda for research and practice that approaches these questions using longitudinal mixed methods to study the complex links between teacher education, teacher learning, and student learning in context. This agenda is motivated by problems of practice I experienced as a teacher myself, research findings presented in this dissertation, and recommendations for future research from leading scholars in teacher education who have noted that this kind of agenda is all the more important given a number of shifts in contextual factors over the last 30 years, including: changing national demographics, politics, economics (globalization), and educational reform movements (e.g., Cochran-Smith & Zeichner, 2005; Sleeter, 2008; Zeichner, 2010).

In many colleges and universities, the strict separation of departments and academic fields can lead to research agendas that revolve around debates about the strengths and shortcomings of the best way to approach social problems *in theory*. But in teacher education, there is a unique urgency for these debates to inform practice, and this work must be interdisciplinary. As Nieto (2005) points out, “we cannot afford to sit around and wait” for theoretical resolution and structural change to take place. “In the meantime,” she writes, “too many young people are being lost. The times call for working on what *can* be done to help keep the most caring and committed teachers in our public schools” (p. 8). Therefore, I envision an agenda that keeps the main constructs of this dissertation in mind (i.e., language, learning, and social change), intentionally draws on work being done across related disciplines (e.g., applied linguistics, linguistic anthropology, sociology), is eminently practical, and has the potential to make significant contributions to theory. Enacting such an agenda might involve imagining, designing, and researching possible models for teacher education that address not just a knowledge base of what to teach or how to teach, but also preparation to understand and analyze the contexts in which this work is taking place – local, institutional, historical, political, economic, and ideological contexts – and what being situated in those contexts might mean for designing, implementing, and reflecting on teaching for change within the content areas.

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APPENDIX 5A

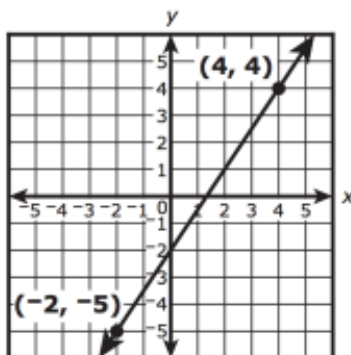
DELAYED POST-COURSE FEEDBACK ON STUDENT WRITING SURVEY

Student Writing Sample

An 8th grader who was struggling in math class was given the following prompt in Algebra class.

Your answer

Function H:



Write the equation for finding the slope of a line. Then find the slope of the line that represents Function H. Show your work and explain how you got your answer.

$\frac{3}{2}$ height over base

What feedback would you give this student? *

Your answer

How would you score this answer? *

- ☐ 1 Needs Improvement
- ☐ 2 Meet Expectations
- ☐ 3 Exceeds Expectations

Give some reasons for why you scored it that way. *

Your answer