Writing as a Learning Activity

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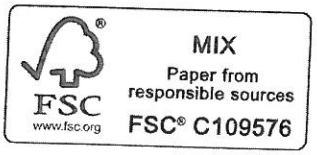

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Writing about Reading to Advance Thinking: A Study in Situated Cognitive Development

Charles Bazerman, Kelly Simon and Patrick Pieng

As teachers, we would like to think that students' thinking improves through discussing texts they find meaningful. The belief that becoming familiar with concepts through reading and rehearsing those concepts in challenging writing tasks will lead to integration of the concepts into the developing intellect of the student, provides the rationale for reading and writing assignments in many university subjects, where students are asked to become familiar with theoretical concepts of a field and use those concepts to discuss issues and solve problems. At this moment when media are transforming the modes of academic reading and writing from traditional print to digital multimedia hypertext, a well-grounded and detailed understanding of conceptual learning from reading realized through writing assignments would serve us well in designing assignments mediated in new ways. As a by-product of a previous study looking at the role of genres in cognitive development (Bazerman, Simon, Ewing & Pieng, forthcoming), we have found evidence of increased cognitive sophistication when students in their writing engage the meanings they find in texts in relation to problems and experiences they are attempting to work through. This evidence confirms that conceptual development occurs through writing about reading and gives us insight into the processes by which intellectual growth occurs.

Our data, collected for the previous study of the relationship between genre and cognitive development, were from a focused year-long graduate academic program in teacher education with well-articulated goals and assignments that introduced students to domains of thought and practice new to them and specifically relevant to professional training. As part of the earlier study we developed codes to characterize cognitive statements made in assigned writing, electronic forums, and class discussions. In examining the data for genre effects, we incidentally noted that the sentences which included references to the professional literature seemed to have higher cognitive codes than the surrounding sentences. Further we saw evidence of increasing sophistication in

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the use of citations over the year and several writing tasks investigated. Following on these clues we developed additional codes to characterize the nature of the citations and surrounding discussion, which we then correlated with our cognitive codes. That evidence has led us to the conclusion that reference to concepts from readings indeed supported more sophisticated expressed thought. Further, over time and with familiarity of domain, referenced ideas from reading were expressed in a more focused way, were more integrated into students' thoughts, and were discussed more extensively. All these findings suggest students internalized concepts from referenced sources in order to advance their own thinking.

1 Theoretical and Empirical Contexts

The process of adopting concepts from reading and incorporating them in one's writing can be seen from several intersecting perspectives, all of which recognize the interaction between individual and group cognitive development.

2 Intertextuality, Citation Studies and Referencing Practices

From a textual point of view, learning to use the ideas from reading in one's own statements can be seen as an aspect of intertextuality—that is, how each text relies on and takes positions towards previous texts within a field of socially and historically emerged information and ideas. The concept of intertextuality has its roots in Volosinov (1986) and Bakhtin (1980) as part of understanding how consciousness was socially formed. It was later developed (and given the name intertextuality) in literary theory (initially, Kristeva, 1980) primarily to contest the idea of the autonomous author. Within literacy and writing studies the concept of intertextuality has highlighted how writers enter into and contribute to a discussion through drawing on communal resources, characterizing and reformulating prior discussion, and commenting on specific statements of others (Bazerman, 2004a).

In academic and scientific writing intertextuality is explicitly indicated by citation practices. Citation in research publications has been the object of studies for over half a century, dating back to the start of citation indices which called attention to citations as a significant part of academic texts (Garfield, 1955). Early enthusiasm for citation as a simple measure of the influence of authors was tempered by an examination of rhetorical functions carried out

by citation (Chubin & Moitra, 1975; Moravcsik & Murgesan, 1975). Since then there have been extensive studies of the use of citations in many fields, from both scientometric perspectives (notably, Cronin, 1984; Cronin & Shaw 2002) and linguistic (e.g., Hyland 1999, 2004) perspectives. These textual studies have been supplemented by systematic interview studies (e.g., M. White & Wang, 1997, Wang & White, 1999; Harwood 2009). Both textual and interview studies have primarily developed taxonomies of purposes for citation and measured the relative frequency of these purposes within various fields. Some studies from rhetorical scholars, however, have looked at how citations have been used to frame specific arguments, particularly at moments when authors sought redirection of fields through reevaluation of literatures or bringing to bear new literatures (e.g., Bazerman, 1993; Journet, 1995; Ceccarelli, 2001; Wynn, 2012).

The dominant function of citations is to carry forward the intellectual content for the field of investigation. Small (1978) early on identified that citations could serve as symbols for concepts. These cognitive functions have been conceived in social terms, as carrying out the intellectual debate and work of the field, such as identification of concepts and invoking prior thought of the field, or codification of findings and ideas. Harwood's (2009) interview study, for example, identified such functions for citing as justification (of topic, method, claims), positioning work in field, engaging with ideas and building on prior knowledge. Such cognitive rhetorical moves participate in communal deliberation, disputation, and growth of knowledge through sorting out of claims and building networks of repeated claims of value to successive authors within disciplines. Citation mapping, in fact, uses patterns of citations to document the intellectual structure and growth of fields and specialties as publications cluster around key defining texts (Small 1973, 1977; Mullins et al. 1977; H.D. White & Griffith, 1981).

While citation studies indicate growth of communal thought, only by implication could they suggest that specific readings actually influenced the thinking of individual scientists, for the representations of the literature in research articles are rhetorical constructions to support the claims presented and not the actual thinking during investigative practice (Medawar, 1964; Bazerman, 1988). Nonetheless, autobiographical accounts of scientists are filled with the transformative effects of having read certain authors or identifying articles that posed puzzles or provided clues that lead to breakthroughs. Further, from rhetorical studies there have been studies of how terminology of disciplines have shaped the work and conceptualization of practitioners and clients particularly in psychologically related fields (McCarthy, 1991; Berkenkotter & Ravotas, 1997; Emmons, 2008).

At the university level, studies of writing with citations have centered on learning the practices and forms of proper academic citation such as giving credit and avoiding plagiarism, though patchwriting (using shards of borrowed material) has been recognized as part of a developmental process in learning to use sources (Howard, 1999). Students have also been found to deploy citations rhetorically to perform the role of industrious students who are attentive to the points of view expressed by the instructor (Harwood & Petric, 2012). A series of studies on discourse synthesis (Spivey, 1984) has examined more deeply the processes of how students learn to incorporate and synthesize multiple source texts into their own writing (Flower et al., 1990; Flower, 1994; N. Nelson, 2008). These studies have focused on the skills of writing necessary to make a coherent and purposeful synthesis under the control of the writer's voice. Even though the specific role of cited concepts in idea building is not examined in these prior studies, such work has important implications for how students incorporate ideas from reading into their expressed reasoning and establish the basis for focused forms of originality (Bazerman, 2010). Several studies in this current volume, however, do examine individual and collaborative processes by which student reasoning develops in writing tasks involving representation of sources or information from sources (see chapters by Hand et al., Klein, and Nykopp et al.).

A few studies at the more advanced secondary and higher education level have focused on discipline specific reading (Deegan, 1995; Hynd, Holschuh, & Hubbard, 2004; Boyd & Ikpeze, 2007; C. Shanahan, Shanahan, & Misischia, 2011) and critical and rhetorical reading (Haas & Flower, 1987; Haas, 1994; Hasswell, Briggs, Fay, Gillen, Harrill, Shupala, & Trevino, 1999; Norris, Phillips, & Korpan, 2003). A few studies as well have examined how students use their reading in their writing to form identity and affiliation within disciplinary contexts (Bartholomae, 1985; Berkenkotter, Huckin, & Ackerman 1991; Geisler, 1994) and their adoption of common practices for asserting presence within disciplinary fields (Swales & Najjar, 1987).

3 Conceptual Learning in the Writing-to-Learn Literature

While the incorporation of ideas from reading into one's writing and the role of those cited ideas in advancing one's thinking is an aspect of writing to learn, the research on writing-to-learn has focused its attention on other forms of learning through writing—particularly the improvements of factual memory through content rehearsal in writing and of conceptual integration through synthetic forms of writing (for reviews of the writing-to-learn literature see

Klein, 1999; Tynjälä, Mason, & Lonka, 2001b; Bangert-Drowns, Hurley, & Wilkinson, 2004; Bazerman, Little, Chavkin, Fouquette, Bethel, & Garufis, 2005; Newell, 2006). Monte-Sano & De La Paz (2012) have advanced a more specific understanding of how writing can elicit thinking about reading, by finding that different reasoning about reading is elicited by writing tasks in different genres, consistent with conjectures in Bazerman et al. (2005) and Bazerman (2008). Chapters in this volume extend the inquiry as well into the development of critical and analytic thinking through argumentative writing. The citation of concepts and ideas from reading, as examined here, proposes a different sort of learning—that is concepts drawn from reading provide a way of focusing writing about experiences and reflections, framing thinking, solving problems, and developing more sophisticated approaches.

4 Internalization of Concepts

From a cognitive perspective, learning to use ideas from one's reading in thought can be seen as an internalization process, forming higher modes of perception and thinking by adopting the externally received signs as tools for the regulation of one's internal thought and then as means of expressing that thought through externalization processes (Vygotsky, 1986). Vygotsky in fact associates the adoption of culturally received signs as tools for the regulation of internal perception and thought as the means of developing higher modes of thinking. Culturally developed and received knowledge, according to Vygotsky, moves from interpersonal symbols to intrapersonal signs and then deeply felt cognitive gists. Further, Vygotsky characterizes the organized bodies of socially received thought transmitted in schools as scientific concepts, which then can serve to reorganize a person's spontaneous concepts, thereby becoming deeply personally meaningful in the way one experiences and responds to the ambient world. Thus, the organized, conceptually rich reading done as part of schooling can enter into the cognitive structure of educated individuals, transforming their ways of thinking (Bazerman, 2012). From this perspective, writing about reading can provide a key mechanism of intellectual growth.

This study focuses on the cognitive outcomes expressed in student-produced texts rather than the cognitive processes underlying the outcomes. This study, however, provides robust evidence that under the specific conditions examined, reference to readings in student writing correlates with advances in the cognitive level of student expression of ideas, and thereby provides empirical confirmation of the role reference to reading in writing can take in intel-

lectual development. Further, the data provide evidence that as students gain familiarity with the domain and relevant texts, their discussion of referenced texts become more focused and extended. While the qualitative discussion of a sample case after the quantitative results gives a more concrete picture of how the role of references evolve in one student's writing, it is important to first establish on more quantitative grounds the phenomena that referring to reading has a positive correlation with advances in students' thinking within a specific domain, and students' discussion of cited texts change as students become more familiar with the domain.

5 Methods

This study consists of a reanalysis of data collected for a previous study of the cognitive impact of writing particular genres within the context of a rich set of educational experiences. Here we first summarize the method by which the data were collected and initially analyzed, and then detail the new analytical procedures specific to this study. For a more detailed account of the methods of the prior study, see Bazerman et al., forthcoming.

6 Site and Materials

In the prior study, to find specific and identifiable cognitive effects rather than generalized cognitive skills, we sought subjects engaged in an academic program that had well-defined cognitive goals within a well-formed sequence of activities and assignments directed toward those goals which were largely new and unfamiliar to the students. We found an appropriate research site in a one-year M.Ed. teacher education program at a major public university in California. In the first academic year of our study we determined the program goals, the curricular structure, writing assignments, and student orientation to the activities through interview and ethnographic observation, from which we developed a strategy for gathering and initial analysis of data. In the second year we collected our main data from six focal students for detailed analysis.

The small tightly-structured cohort based program runs from mid-July to mid-July of the following year. In the academic year of our main study there were 46 students in the primary multi-subject credential program and 40 in the secondary single-subject credential program, with 12 specifically seeking the secondary English credential. We followed the cohort of English Education

students, who all took the exact same course work, and we collected all major written assignments across the year, including credential documents. We also observed them in selected classes, recording large samples of their classroom discussion and collecting informal writing. The focus of the writing in all the assignments was the student teacher's observations and reflections on their experiences in their classroom internships. They experienced three cycles of internship with responsibilities increasing from observation to full takeover of a classroom for a semester.

There are four major writing assignments we examined. Due in mid-November, a theory-directed action inquiry called the *Hiding-out paper* asked teacher candidates to identify and gather information about two students in the classes they are observing who have reading difficulties and exhibit coping behaviors to avoid being exposed as poor readers. The teacher candidates are asked to interpret the collected information through Brozo's (1990) characterization of those students as hiding-out. We also examined a more open-topic writing assignment from a seminar in *English Education* due shortly thereafter. In this assignment students were simply asked to consider an issue that was coming up in their internship observations in relation to the course reading on English Education.

We next examined a teaching portfolio, called *PACT* (Performance Assessment for California Teachers), consisting of two videotaped selections of their internship teaching along with several commentaries concerning school and community context; planning and rationale; a narrative account of the unfolding of the lesson recorded on videotape and the decisions made by the teacher candidate; assessment of the work produced by students; daily reflections on what is working, what is not and what to do next; and overall reflection on the teaching event, citing relevant literature and theory. This portfolio was prepared over the winter and submitted in March.

Finally we examined *M.Ed. theses*, submitted in June, though worked on in parts throughout the year. The final thesis presents a structured action research inquiry built on a sequence of narratives and interpretations of artifacts (or evidence) collected as the teacher candidate develops in thinking and problem solving as a teacher. The different artifact discussions represent different moments in thinking about the educational issues that drive the candidate's teacher inquiry. The final thesis also must include an introductory narrative of personal development describing evolution of thinking about the inquiry question.

7 Initial Coding

Relying on Vygotskian assumptions that advanced forms of thought are discipline or activity specific (Vygotsky, 1986; Scribner & Cole, 1981), based on the particular kinds of judgments to be made by participants engaged in specific activities within distributed systems (Hutchins, 1995), we developed program specific categories of perceptions and thoughts about actors and actions in the classroom. Our first draft of these categories was based on our interviews with program leaders and our ethnographic observations during the first year, but then we grounded and revised these in relation to the detailed data gathered in the second year of the study. The coding scheme we developed reflected the program goals of turning the teacher candidates into reflective practitioners able to make thoughtful and evidence-based classroom choices. We coded statements in each sentence of the writing and in each turn of the student's classroom talk using the scheme. As we identified puzzles in coding, anomalous statements, and other difficulties, we revised and refined the coding scheme.

The final cognitive codes contained nine categories for sentences characterizing classroom actors and events (see Scheme 1). Overall these levels move towards increasing understanding of the educational situation as complex, based on multiple external influences and dynamics within the situation, and ultimately guided by the reflective participation of teachers and students. In this way all the levels at code 4 and above are distinctly different from the first three coding categories that attribute educational events to fixed characteristics of individuals (such as personality or intelligence attributes), prior conditioning that controls current behavior, or fixed moral responsibilities that individuals either live up to or violate. To reiterate, these codes are not intended to be universal or self-evident from differing educational perspectives; rather, they are grounded in the goals and practices of this particular teacher education program. A more extensive account of and rationale for the coding scheme and analytical procedures are to be found in Bazerman, et al. (forthcoming).

In order to get a better qualitative understanding of the course of students' expressed thinking we decided to focus our analysis on six of the twelve cases, purposefully chosen to include the two teacher candidates who expressed higher level thoughts from the beginning, and the remainder randomly chosen from the class and reflective of the general level. For the initial study, we coded the full text of the hiding-out papers, the English Ed. paper and all sections of the Teaching Portfolio for the six teacher candidates, except for the context commentary that contained few relevant comments on classroom behaviors. For the M.Ed. papers we coded the presentations and analyses of the first

SCHEME 1 *Cognitive codes*

1. *Fixed Characteristics.* These statements about teachers, the school system, or students assume that that the classroom and its participants are unchangeable and non-reactive.
2. *Prior Characteristics Shape Current Learning.* These statements assume a student or teacher's behavior/actions/thoughts are a result of unchangeable prior characteristics, such as language, class, disability, personality, or moral characteristics.
3. *Educational Moral Imperatives.* These statements imply that all students should respond in similar ways to instruction or assignments without considering the intricacies of the student responses.
4. *Influences on Students.* These statements detail specific assignments or lesson plans with the underlying assumption that students will be affected.
5. *Reactiveness of Educational Setting.* These statements depict the teacher's reactions in the classroom, or they depict a student response to something happening in the classroom—maybe to a classmate or teacher.
6. *Complexities in Situation.* These statements consider a student's life outside the classroom and can include reflections about the student's family or language background, or will include specific assignments explicitly tailored to reach outside-the-class interests of students.
7. *Dynamic Complexities of Responsiveness.* These statements consider learning differences in the classroom by identifying the reason a certain student behaves in a certain way.
8. *Learning in Dynamic Systems.* These descriptive statements about classrooms go beyond description of lesson plans and consider what to the teacher hopes to achieve, and/or what actually happened in the classroom, and/or what the teacher, would have or should have done differently.
9. *Reflective Command over Environment.* The statements provide supported conclusions/theories about school or learning that highlight a complexity to learning/teaching. These statements will recognize learning and teaching as situated in a large and reactive system. The 9's do not have to be grounded in observation about specific classroom practices, but they sometimes are.
0. *No characterization of students, teachers, or classroom interactions.*

and last artifact, the review of literature and the concluding discussion. For this study we added back the intertextual events in parts not examined in the previous study.

8 Additional Analytic Codes for This Study

To these initial codes for the prior study we added further codes to examine the use of intertextuality and how it was realized within the student writing. In developing and assigning the following codes, we initially developed the codes in discussion between the first two authors, the second author then applied the codes, and the two discussed problem cases, and revised codes to create more precise and appropriate codes grounded in the data. The first author then recoded a sample of the data, and the second author also brought all problem cases to the first for discussion, and all differences were discussed until we achieved 100 per cent agreement on the assigned codes.

First, most directly, we identified whether each sentence contained a reference to a professional source or not. We coded all sentences in the corpus simply on whether it contained an explicit reference or citation to another text or not. The use of a term such as "hiding-out student" or "scaffolding" without explicit mention of a source did not count as a reference.

Second, we examined each intertextual reference to determine the content that was taken from each source. In particular, we were interested in whether students found the texts they were citing useful primarily for the conceptual content or for other reasons. We developed four categories that covered all instances of reference in our corpus: referring to a fact, referring to an example, referring to a procedure or method, and referring to a concept (See Scheme 2, which includes examples from our corpus). To determine a composite picture, we summed the content codes for all students with each assignment and then aggregated these across all students and assignments.

Third, to see whether referring to texts made a difference in the character of the thought students expressed, we correlated the cognitive codes for each sentence with whether or not there was an intertextual reference. We compared the profiles of cognitive codes for referring and nonreferring sentences for each assignment (summing all students) and for all the assignments aggregated. We also calculated the means of the cognitive scores for referring and nonreferring sentences for each assignment and for all the assignments aggregated.

Fourth, to see whether students adapted the content from the references to the context of their own arguments, we assigned a Representation Code to each sentence with a reference. The representation codes characterized the form in which the student presented the content from the source (see Scheme 3). We then compared the aggregate profiles of intertextual representation across assignments to see whether the manner of presentation of the reference varied according to assignment and over time.

SCHEME 2 *Content codes with examples*

1. *Referring to a fact.* Example: Purves argues in his article, "by secondary school, the large majority of students in the United States report that .... they read to take tests on what is read."
2. *Referring to an example.* Example: In a study by Lave (1988) in a Weight Watchers class, a participant used the resources available to him to solve a math problem. When told to measure three-quarters of the two-thirds cup, instead of using an algebraic formula, he "filled a measuring-cup two thirds full of cottage cheese, dumped it out on the cutting board, patted it into a circle, marked a cross on it, scooped away one quadrant, and served the rest" (as cited in Brown et al., 1989, p. 35).
3. *Referring to a procedure or method.* Example: Jane Schaffer's method used the idea of structured, five-paragraph essays in the teaching of writing. Each paragraph that is written under this model has a "topic sentence," "concrete details" from the text, "commentary" by the writer on the concrete details, and a "concluding sentence."
4. *Referring to a concept or idea.* Example: Moffet's (1968) final line in his chapter "Kinds of Discourse" grabbed my attention and ignited my thinking about student-centered learning in secondary classrooms: "In moving outward from himself, the child becomes more himself. The teacher's art is to move with this movement, a subtle act possible only if he shifts his gaze from the subject to the learner, for the subject is the learner" (p. 59).

Fifth, to see how extensively students discussed each reference to a source text we then identified continuous sequences of sentences that comprised a single reference and related discussion of a referenced text, labeling each sequence as an intertextual event, and counted the number of sentences in each event. We then calculated the mean sentence length of intertextual events for each assignment across all students and compared these mean lengths over time and across assignments.

Sixth, to see how the students discussed the cited material we assigned a discussion code to each sentence within each intertextual event. These discussion codes are contained in Scheme 4. We then compared the aggregate profiles of discussion codes for each assignment.

SCHEME 3 *Representation codes*

1. *Direct quotation.* Uses words directly from the original source, identified through quotation marks or block quotations. (Example: Bodrova & Leong (1998) say that scaffolding is used "... to specify the types of assistance that make it possible for learners to function at higher levels of their zones of proximal development (p. 3).")
2. *Paraphrase.* Represents the information or ideas from the original in the same detail as the original but with changes in wording. (Example: It is not our goal as teachers to entertain our students; our goal is to teach them through methods that are comprehensible to them (Dewey, 1913).)
3. *Summary.* Presents a shortened and focused form of the original source material, perhaps in relation to material from other sources. (Example: Greene (2008) argues that students do their best most of the time, and that the responsibilities of the adults in the classroom include the responsibility to help the students develop the skills to sustain attention and pursue difficult or boring but necessary tasks.)
4. *Mention.* Mentions the source text but without specifics or elaboration. (Example: The use of formative assessment in which I am most interested is called by Sharkey and Murnane (2006) the conceptual approach.)

SCHEME 4 *Discussion codes*

1. *Direct Presentation.* Directly represents an idea from a source (Example: This exercise relates closely to Brozo's "Adapt instruction to low ability students" instruction, in that it helps to "buoy confidence and see that their input is valued.")
2. *Explanation.* Explains the cited idea, often by extending a definition, or by providing a contrast without any conceptual addition. (Example: While my idea of scaffolding has certainly changed throughout each chapter, I now believe that it is a positive support given by a more knowledgeable party that gives either immediate guidance, long-term learning, or a mixture of both which helps the learner do something he or she could not do prior.)
3. *Response.* Responds specifically to a cited point, drawing out a consequence or posing a question directly related to the cited text. (Example: "If students actively construct their own knowledge by ... making connections, building mental schemata and developing new concepts from previous understanding" (Roehler & Cantlon, 1996, p. 3), we need to give them opportunities to practice this high level of thinking on their own.)

4. *Example.* Offers an experience or specifics which exemplify the concept from cited text. (Example: While his rubric score on that essay would represent him as a better writer than many of his peers, he lacks an understanding of some of the latent criteria of the assignment. He fulfills the letter of the assignment, without achieving the spirit of that assignment. Sadler argues that formative assessments are well-suited to bring these latent criteria to students' and teachers' attention. Some students, especially low-achieving students, may lack many of the latent criteria necessary to successfully achieve grade level standards.)
5. *Expanded Thought.* Builds upon the cited material to explore implications, develop judgments, or otherwise develop further thoughts. (Example: The founding theory of my inquiry was that personal connection enhanced the level of student understanding. Based on Moffet's idea of "Kinds of Discourse" that each student is not a hollow container that a teacher needs to fill up with ideas but rather a dynamic person with formed ideas and perspectives on the world already in place created through personal experiences, I believed that I needed to link what the student already knew about the topics with new knowledge of the topic (1968). This was a way for students to abstract content, or think about the content in their own terms, for their own understanding. Looking at this big idea, I realized I first needed to discover exactly what I meant by personal connection. I created a working definition of personal connection to have a starting point.)

SCHEME 5 *Summary of codes*

Each sentence was assigned a:
  cognitive code (kind of thought expressed–9 categories)
  reference code (whether makes reference or not–2 categories)
Those sentences that make a reference were each assigned a:
  content code (what was taken from the source–4 categories)
  representation code (form of representing material–4 categories)
  discussion code (how the source material discussed–5 categories)
Each intertextual event was provided a:
  count of sentences for length of event.

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9 Results

9.1 *Sources were Used Overwhelmingly for Their Conceptual Content*

For all the assignments in this study, references were used for conceptual content over 80% of the time and in one case 100% of the time (see Figure 1). This is not to say that this would be the case in all academic programs in all domains, as readings may be oriented to providing facts, examples, or procedures. In such cases one might not find the same cognitive effect as reported in the further finings below. In the case of this study, however, the overwhelming orientation to concepts may be a result of the goals and structure of this program which sought to develop reflective understanding of practice, and which therefore asked students to develop conceptual understanding of their internship experiences. Accordingly, students were exposed to readings that provided relevant conceptual resources and then asked to use them to reflect on experience. Nonetheless, many academic programs and courses are similarly structured, and this case provides a demonstration that students can use references to identify concepts relevant to their reflection on experience or data.

9.2 *Referring to a Source Supported Higher-Level Thought*

On all four major assignments for the six students we examined, we found significantly different distribution of cognitive codes for sentences with references than those without. Further, the referring sentences had higher mean cognitive codes than those without.

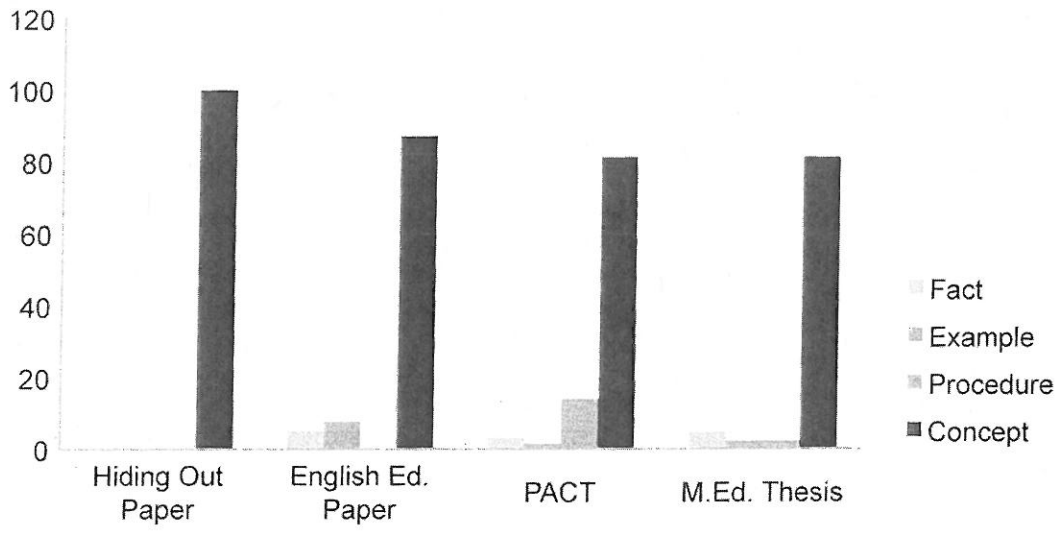

FIGURE 1 *Content codes of each assignment (percentages)*

The comparative distribution between the referring and nonreferring sentences for each of the assignments are shown in Figures 2 through 5. In each of these figures it can be seen that the cognitive levels of sentences with references (darker bars) have a different distribution than the sentences without references (lighter bars). Further, the distribution of sentences with references is greater in each case at the higher end of the scale. Thus, from the fall term writing assignments (the Hiding-out Paper and the English Ed. Paper) through the winter PACT portfolio to the final M. Ed. Thesis in the spring, sentences embodying references regularly displayed a higher cognitive profile than other sentences in the same assignment. Particularly noteworthy on all assignments is the strong association between referring sentences and scores at the highest end of the scale.

Figure 2 reveals that for the Hiding-out paper submitted in mid-November, over half the statements that referred to reading were coded 7, 8, or 9, and none were coded at the lowest 1, 2, or 3. Few nonreferring sentences were coded at 8 or 9, while some nonreferring statements did receive lower codes, particularly 3 and 4.

Figure 3 reveals an even more striking pattern on the English Education paper submitted shortly thereafter in early December. Over 80% of the referring statements were coded 7, 8, or 9, while just 20% of the nonreferring state-

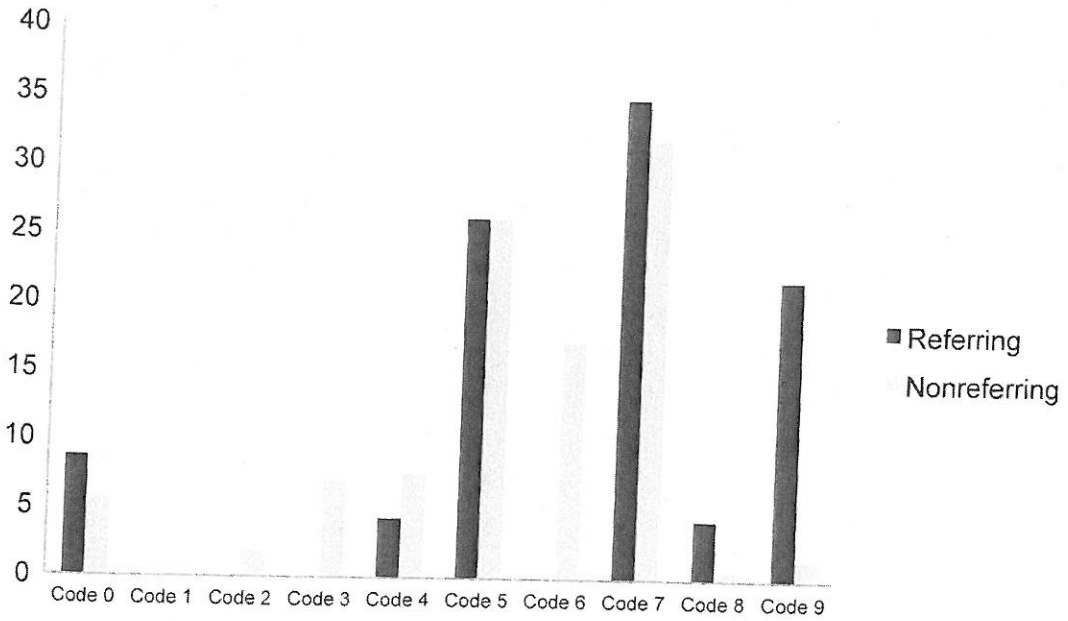

FIGURE 2 *Hiding-out paper: distribution of cognitive codes in referring and nonreferring sentences (percentages)*

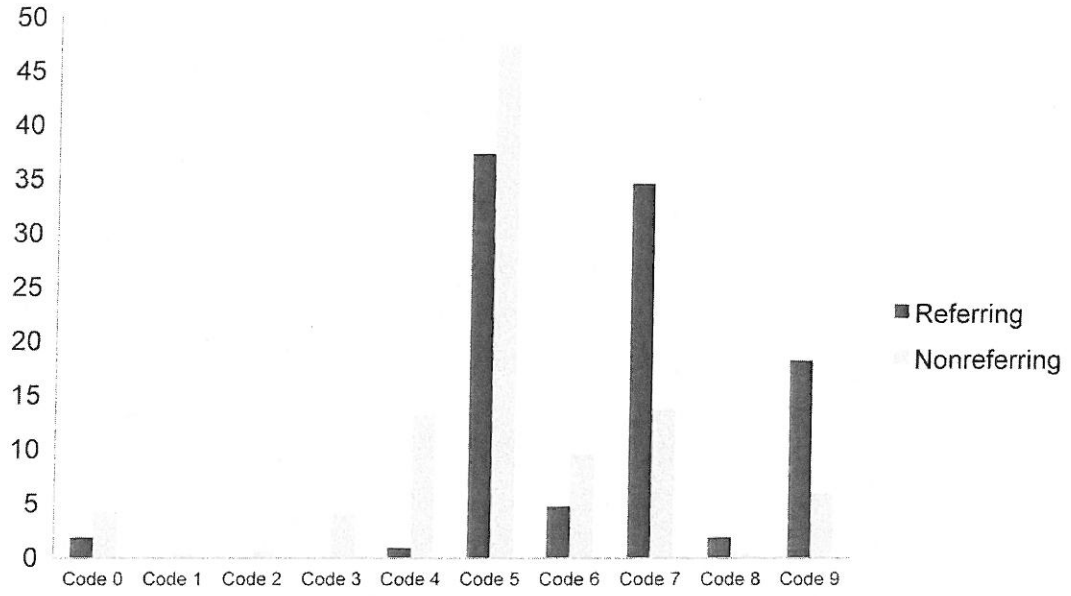

FIGURE 3 *English education paper: distribution of cognitive codes in referring and nonreferring sentences (percentages)*

ments received those higher codes. Also all the lowest codes of 1, 2, or 3 came only from nonreferring statements, and nonreferring statements were much more likely than referring statements to be coded at 4.

Figure 4, presenting data from the PACT portfolio submitted in March, shows a similar pattern with just over 60% of the referring statements at 7, 8, or 9, while under a third of the nonreferring statements received those codes. The lowest codes have almost entirely vanished, but nonreferring statements were much more likely to receive code 4 than referring statements.

In the final M.Ed. thesis submitted in June, as shown in Figure 5, both referring and nonreferring statements tend to receive higher codes, but still referring statements are more likely than nonreferring statements to be coded 7, 8, or 9. Just over 80% of the referring statements obtained these higher codes, while just over 60% of the nonreferring statements do.

The aggregated distribution of codes for all assignments is shown in Figure 6. This figure again highlights the higher distributions of cognitive codes for referring statements than for nonreferring statements, with the difference being most striking at the higher codes of 7, 8, and 9.

A two-sample Kolmogorov-Smirnov (KS) test was conducted to test the equality of the distribution of codes (aggregated across all four genres) between the referring and non-referring groups of sentences. The distribution of the aggregated codes between the two groups was significantly different ($D = .36$, $p < .001$). Additional two sample KS tests were conducted to test the equality of the distribution of codes between the referring and non-referring groups for

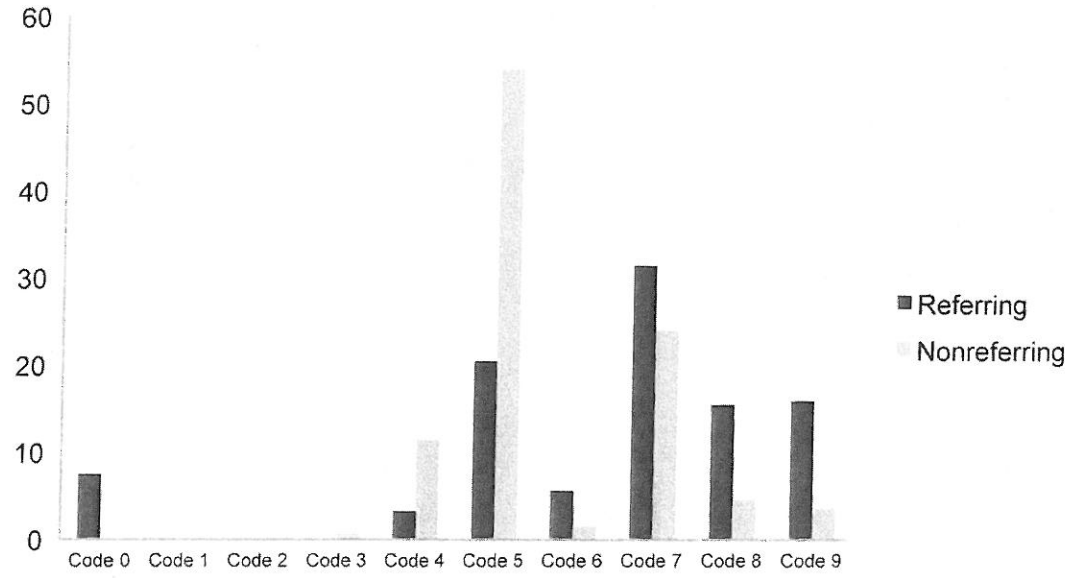

FIGURE 4 *PACT: distribution of cognitive codes in referring and nonreferring sentences (percentages)*

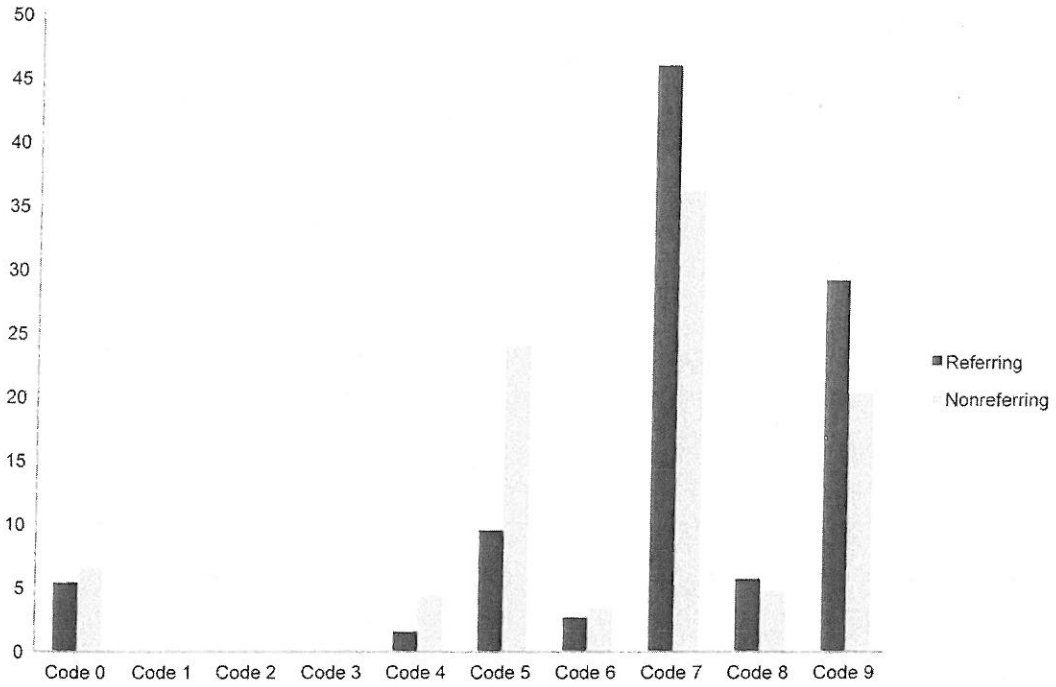

FIGURE 5 *M.Ed. thesis: Distribution of cognitive codes in referring and nonreferring sentences (percentages)*

each paper (genre). Significant distributional differences between groups were found for the English Ed. paper ($D = .35$, $p < .001$), PACT ($D = .35$, $p < .001$, and MED paper ($D = .19$, $p < .001$). The distributional difference between groups for the hiding-out paper was marginally significant ($D = .27$, $p < .06$).

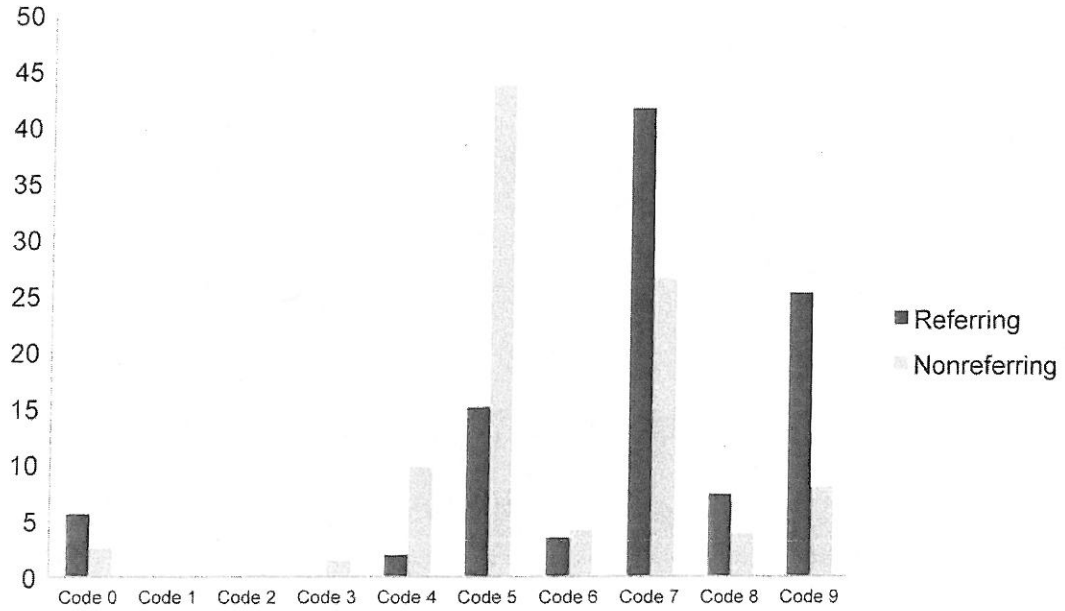

FIGURE 6 *Aggregate of all papers: distribution of cognitive codes in referring and nonreferring sentences (percentages)*

From Figures 2 through 6 one can see that the cognitive codes for the referring sentences tend to be substantially higher than for the non-referring sentences on all the assignments. This tendency is confirmed by taking the means of the cognitive codes of the two groups for each assignment and then for all aggregated, as displayed in Figure 7. This suggests that referring to sources can serve as a cognitive bootstrap by providing concepts that can help students articulate the meaning of their experiences. Qualitative reading of the student papers supports this suggestion; the qualitative discussion of one student below provides examples of how reading provides organizing and focusing concepts for the student's observations. While each student showed a different path of intellectual development, each repeatedly used references to provide concepts that made sense of their experiences and observations.

Noteworthy on Figure 7 is that the codes tend upwards for both groups across the assignments as the year progresses, suggesting an overall increase in cognitive sophistication, though it is difficult to separate the effect of genre task in requiring different kinds of thought and use of citations from the effect of increasing familiarity with the domain over time. These two variables of genre and time are even more entangled in that the tasks assigned became more challenging over time, as is typical in well-designed educational programs. Also noteworthy is that distance between the means for the two groups becomes somewhat narrower as the year progresses, which might indicate that students are able to maintain more sophisticated thought on their own with less need

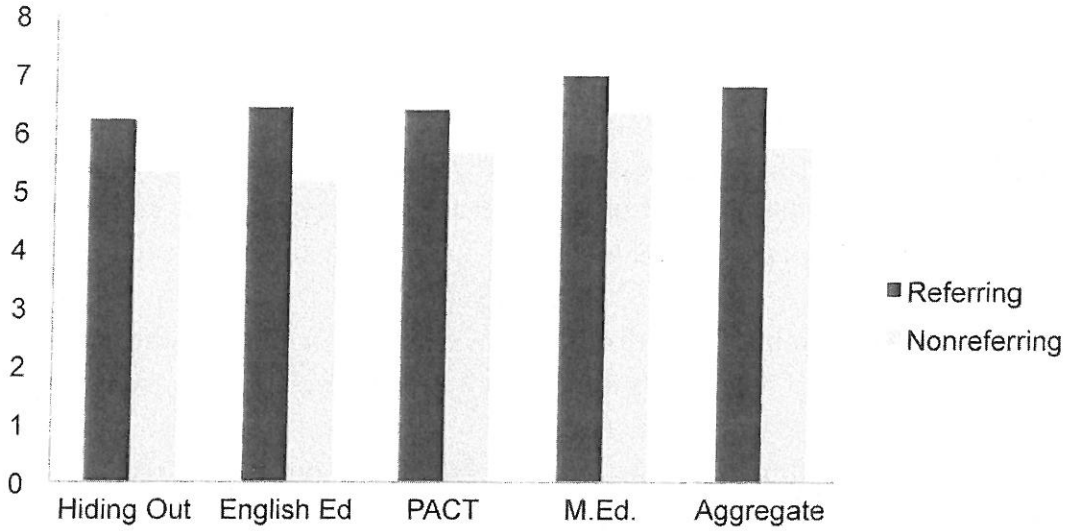

FIGURE 7 *Mean cognitive codes of referring and non-referring sentences in all assignments*

for the bootstrap of references to provide concepts. Qualitative reading of the student papers supports both speculations.

An independent samples t-test was conducted to compare the mean cognitive code (aggregated across genres) between the referring and nonreferring groups. The mean cognitive code for the referring group ($M = 6.79$, $SD = .07$) was significantly higher than the mean cognitive code for the nonreferring group ($M = 5.74$, $SD = .03$), $t(1392.86) = 14.73$, $p < .001$. Additional mean comparisons were conducted to compare the mean cognitive codes between groups within each assignment. For the hiding-out paper, the mean cognitive code for the referring group ($M = 6.22$, $SD = .52$) was significantly higher than the mean cognitive code for the nonreferring group ($M = 5.32$, $SD = .11$), $t(335) = 2.12$, $p = .03$. For PACT, the mean cognitive code for the referring group ($M = 6.38$, $SD = .16$) was significantly higher than the mean cognitive code for the nonreferring group ($M = 5.64$, $SD = .03$), $t(224.32) = 4.58$, $p < .001$. For the MED paper, the mean cognitive code for the referring group ($M = 6.99$, $SD = .08$) was significantly higher than the mean cognitive code for the non-referring group ($M = 6.34$, $SD = .07$), $t(1767) = 6.13$, $p < .001$. For the English Ed. paper, the mean cognitive code for the referring group ($M = 6.42$, $SD = .17$) was significantly higher than the mean cognitive code for the nonreferring group ($M = 5.16$, $SD = .08$), $t(588) = 6.65$, $p < .001$.)

9.3 *Text Representations Become More Focused and Compact*

Over the year, across the four assignments, the content of the referenced texts became represented in more compact ways that were integrated into the voice and stance of the writer. That is, the students relied less on direct quotation

and increasingly used paraphrase and summary, as is displayed in Figure 8. In the hiding-out paper in the fall term almost 53% of the content representations were direct quotation, with only 17.5 percentage as paraphrase or summary, while in the final M.Ed. thesis only 18% were quotation, while over 55% were paraphrase and summary. The use of mentions-only followed a more erratic pattern, perhaps reflecting the genre expectations of each assignment.

Two sample Kolmogorov-Smirnov tests were conducted to test the equality of the distribution of representation codes between genres. The distribution of representation codes was significantly different between the following pairs of genres: Hiding-out and PACT ($D = .45$, $p = .002$); Hiding-out and MED ($D = .35$, $p < .02$); PACT and MED ($D = .27$, $p = .001$); PACT and English Ed ($D = .57$, $p < .001$); and MED and English Ed ($D = .53$, $p < .001$). The distribution of representation codes between Hiding-out and English Ed was not significantly different ($D = .21$, $p = .45$).

9.4 *Intertextual Events Became Longer*

While the representation of cited material became more compact and focused, the intertextual events became longer, indicating more extensive discussions involving ideas from sources. Events lengthened from about 2.4 sentences in the Hiding-out assignment in the fall to about 6.4 sentences in the M.Ed. finished in June, as shown in Figure 9. The mean length of intertextual events in the Hiding-out paper was significantly shorter than that of the other three papers. The fact that the English Ed paper was due only a few weeks after the hiding-out paper but doubled the mean length of intertextual events, suggests that genre expectations may be entangled with time in producing these results.

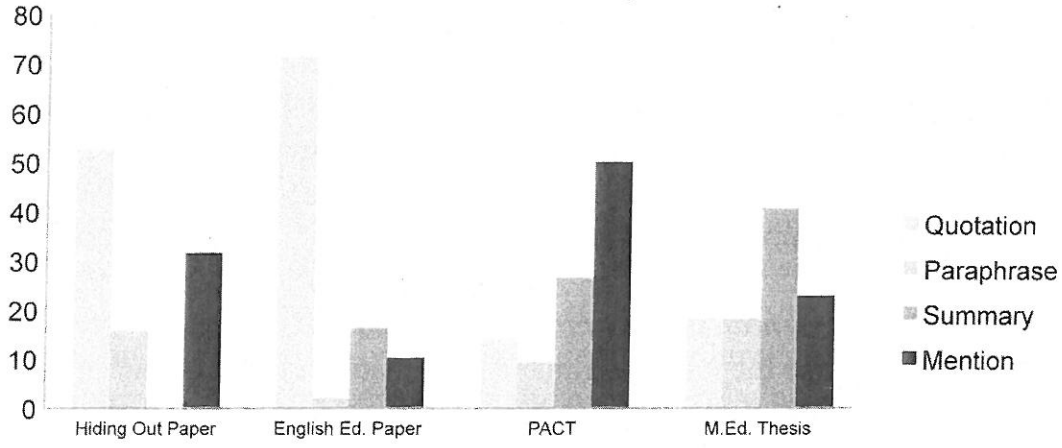

FIGURE 8 *Discussion codes across all papers (percentages)*

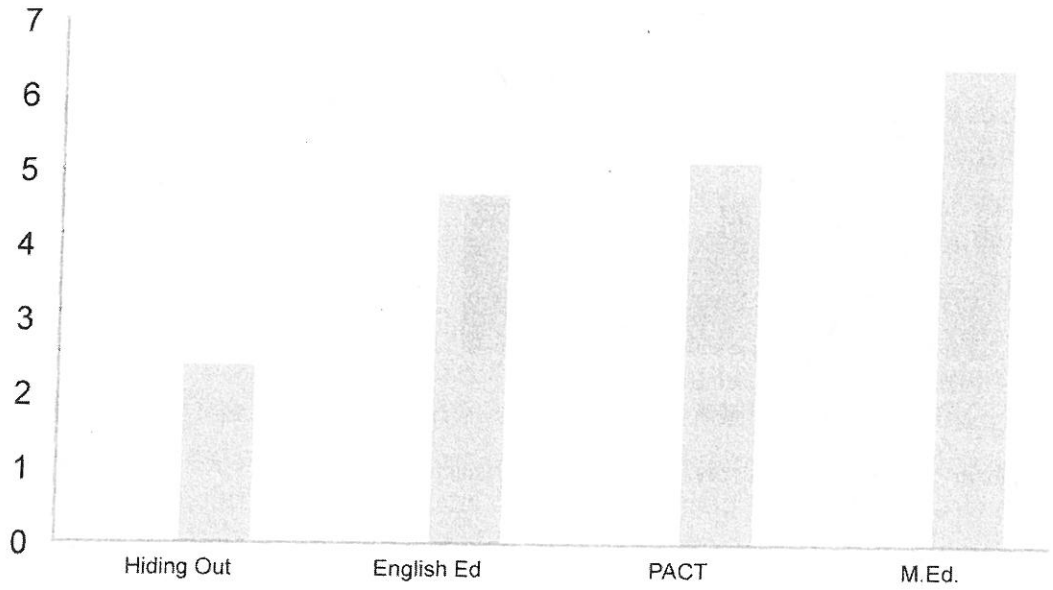

FIGURE 9 *Mean lengths of intertextual events over the year*

The distributions of the event lengths were positively skewed for the PACT and MED genres. One outlying intertextual event length (i.e., more than 3.0 *SD* from the mean) was removed from the PACT genre and three outlying event lengths were removed from the MED paper. The Levene's test of error variances indicated that the variance of intertextual event lengths were unequal across the four genres, $F(3, 153) = 7.60$, $p < .001$. Due to the violation of the equal variance assumption, a Welch one-way analysis of variance (ANOVA) was performed to compare the mean intertextual event length across the four genres. The results of the more conservative (i.e., robust) test for comparing means indicated that there was at least one mean difference across the four genres, $F(3, 63.89) = 21.49$, $p < .001$. All pairwise comparisons were examined using the Tukey HSD tests. The mean intertextual event length for the Hiding-out paper ($M = 2.38$, $SD = 0.96$) was significantly shorter than the mean for length for the English Ed paper ($M = 4.61$, $SD = 1.67$; $p = .04$), the PACT ($M = 4.82$, $SD = 2.52$; $p = .01$), and the M.ED. paper ($M = 5.23$, $SD = 2.66$; $p < .001$). There were no other significant differences.

9.5 *Discussion Type Varied across the Tasks*

The distribution of types of discussion varied from one assignment to the next, though not in any clear progression over time, as shown in Figure 10. Some of the differences were significantly different across pairs of assignments while others did not rise to the 0.05 level of significance. These results suggest that the nature of the discussion was an effect of genre rather than time.

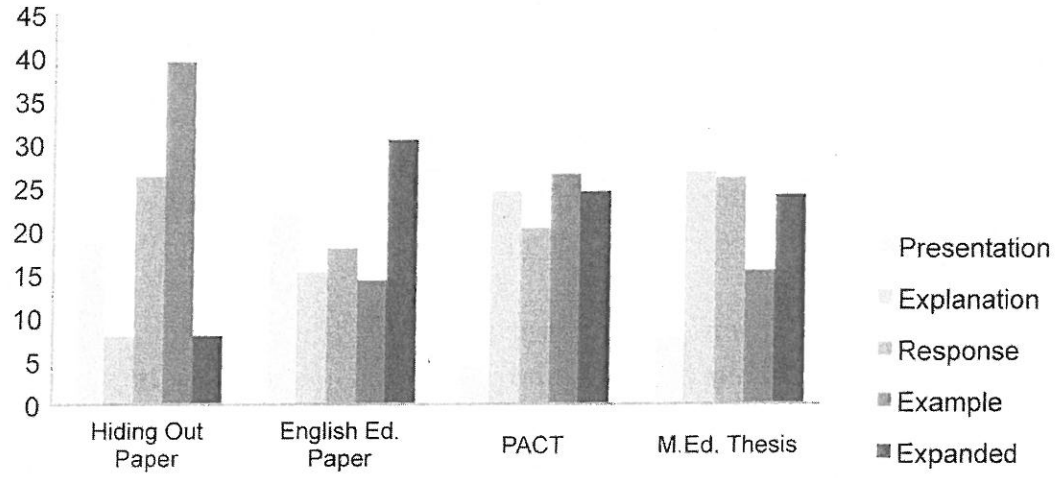

FIGURE 10 *Discussion codes over the year (percentages)*

Two sample Kolmogorov-Smirnov (KS) tests were conducted to test the equality of the distribution of discussion codes between genres. The distribution of discussion codes was significantly different between the following pairs of genres: PACT and MED (D = .12, p = .04); PACT and English Ed (D = .18, p = .02); and MED and English Ed (D = .14, p = .04). The comparisons between the distribution of discussion codes between Hiding-out and all other genres were not significantly different: Hiding-out and PACT (D = .17, p = .28); Hiding-out and MED (D = .16, p = .24); and Hiding-out and English Ed (D = .23, p = .08).

10 Discussion

As all students studied were graduates of good universities with undergraduate GPAs all over 3.4 and had sufficiently good records to be accepted in a selective graduate M.Ed. teacher credential program, it is likely this was not the first time students used sources or learned concepts from their writing, but this is the first time of their reading and learning in this domain of education. Thus, we cannot attribute the changes in writing about other texts to new learning about intertextuality, but we can more plausibly say these changes arose out of their increasing familiarity with a focused body of literature and concepts related to the field of education, and the application to a sequence of coordinated experience in their student teaching placements. Their thinking in the field of education grew in relation to their intellectual sophistication applied to the practical experience learned through student teaching and reflection on it. In short, students are thinking through new experiences with new purposes, using new domain-specific concepts introduced in their reading. They

use those concepts to bootstrap their own ideas and reflections on their experiences to a more sophisticated cognitive level. In the course of this process, as students become more conversant with those ideas they become less beholden to repetition of exact words from the sources of the ideas and are able to state the ideas in more compact and focused ways, while extending the discussions of those ideas at greater length. As framed by the expectations of the assignments, they were able to use those ideas to reflect on their experiences and develop their own arguments.

To see how these processes play out concretely, let us look at how one student comes to think about the role of student interest and perceived relevance in supporting learning through the year. Tricia (pseudonym) in the Hiding-out paper submitted in mid-November has just two brief intertextual events using the assigned source Brozo as a lens to identify student behaviors, as asked for in the assignment, as in this example:

> I tried asking Ray much more pointed questions in a second interview, to see if he did any of the strategies Brozo points out in his article.
>
> HO PAPER, INTERTEXTUAL EVENT #2

Though Tricia does show interest in making learning "relevant" to her students in the Hiding-out paper, she does not find Brozo a resource to advance this idea.

In the more open-ended paper for the English Education assignment submitted shortly thereafter in early December, she was able to focus more directly on issues of relevance and authenticity, including exploring one of the several resources that was previously assigned as a reading in this course. In this paper she has 4 events (averaging 5.75 sentences in length), all of her intertextual references are drawn from one self-selected source, and most are direct quotations, as in this example:

> The first thing that a teacher must do, I believe, in order to successfully make the connection between all of their students and the reading and work that is done in the English classroom, is appreciate how much each student brings. Appropriating a line from Purves, I argue that since we know "readers are not naïve; that they have something in their heads that has been put there by past experiences," it is essential that we draw from students' prior knowledge and current *habitus* to appeal to students (349). My exploration of relevance in the English classroom hinges upon that fact that each student has personal aspirations, passions, understandings and perspectives. I feel that it is my job as the teacher, in exploring relevance, to inquire at length into this sort of understanding of ourselves

> so that we may guide our English curriculum toward that which is useful for each of us.
>
> ENGLISH ED INTERTEXTUAL EVENT #2

In this discussion of four sentences, Tricia uses Purves to help articulate a thought she is already committed to concerning students prior experience as the basis for relevance. Following the quotation Tricia elaborates the idea and applies it to her role as a teacher.

In the PACT portfolio, Tricia further develops her ideas related to authenticity and relevancy, but drawing from more sources. Nonetheless, she still mostly relies on direct quotation. There are more episodes (6) of greater mean length (8,166 sentences). The intertextual references, however, still give her a lens for interpreting and justifying classroom events.

> As a foundation for much of my teaching, I am invested in making my classroom a space of authentic learning. I want my students to be able to see that the tasks we are doing in the English classroom apply to their daily lives outside of the English classroom. In "Authentic Pedagogy and Student Performance" Newmann, Marks, and Gamoran, in the American Journal of Education, define authentic academic achievement through three criteria: "construction of knowledge, disciplined inquiry, and value beyond school" (282). Students are meant to "strive for in-depth understanding rather than superficial awareness" and their achievements should have "aesthetic, utilitarian, or personal value apart from documenting the competence of the learner" (283, 284). In my classroom, after learning a skill or academic language and/or depth to their prior knowledge, students construct personal reasons for how what we have learned in the classroom connects to life outside of English class. I believe it is important that they are not only memorizing facts, but also using them and the skills that envelop them in order to create work that has value beyond just their grade. For many of my students, English will not be their college major, if they end up going to college—there has to be a better reason for them to want to engage in our classroom activities. To me, everything that we learn in English applies directly to the outside world and I am working in the classroom to make this directly evident to my students by incorporating authentic learning tasks and assessments and making them provide personalized reasons for how what we have learned connects to them outside of our classroom.
>
> PACT TEXT EVENT #1

In this extended discussion of eight sentences, Tricia uses her source to articulate thoughts she was inclined towards, but the resource elaborates more fully. After the quotation, she explains how she applies the principles from the resource to understanding her classroom and directing her teaching.

By the time of her M.Ed. thesis Tricia recognizes that different authors take different stances, and she must adjudicate between them to work out her own thinking about authenticity. She sees authenticity as a complex and contested concept, and places different resources in relation to each other, rather than positioning her discussion as dependent on a single dominant source. She is able to articulate independent views that sometimes conflict with her sources, and is able to take control of the conceptual argument, situating herself inside of conversations in the field related to authenticity and relevancy in learning. She relies less on direct quotation, and integrates the intertextual references more fluidly into her own discussion and interpretation of learning. The discussions tend to be more extended (with a mean intertextual event length of 7.1875) and rely much less on direct quotation to represent the ideas of the authors. The following example, explaining her intellectual path, is both explicit about her intellectual path and demonstrative of her intellectual mastery of the domain.

> I found the term authentic learning while researching and accredit the discovery to Joseph Petraglia's book, *Reality by Design: The Rhetoric and Tehnology of Authenticity in Education* (1998). My beginning hesitations to change my inquiry from a focus on relevance to a focus on authentic learning came because of conflicting definitions of authentic learning in the field. Brown, Collins, and Duguid (1989) and Barab, Squire, and Dueber (2000) argue that authentic learning requires activities in the classroom that are similar to those that are done out in the community by members with professional roles, such as scientists, doctors, editors, and novelists. Because I do not believe that only activities that are relevant are those that are actually being done by community members out in the community, I shied away from this terminology and association in most of my inquiry.
>
> However, after finishing my placement this year and reflecting on the literature, I have now found a definition of authentic learning that I can align myself with by Newmann, Marks, and Gamoran (1996). They argue that the components of authentic learning include: student construction of knowledge, disciplined inquiry and value beyond school (Newmann et. al, 1996). Their definition explains that in authentic learning students are actively working to create and produce their own understanding of con-

> cepts instead of reproducing the knowledge that they have been taught by their teachers (Newmann, Marks, Gamoran, 1996). The concept relies on students' prior knowledge, in-depth understanding, and an elaborated understanding and communication of concepts (Newmann et. al, 1996). Lastly, and most importantly, it requires "aesthetic utilitarian, or personal value apart from documenting the competence of the learner" (p. 284). This focus, of assignments and projects having student-perceived value, is at the heart of my inquiry. It was not until the end of my inquiry that I was able to align my research with this theory, but moving forward it will provide me with another strong base that I can build upon.
>
> M.ED. INTERTEXT EVENT #1

This ten-sentence event shows Tricia reevaluating concepts, evaluating the views of authors and seeing the limits of individual concepts. On the basis of her understanding the concepts presented in the literature, she changes her conceptual framework and reorganizes her inquiry.

Each student showed a unique path of intellectual development, making different uses of the sources to work out their own intellectual puzzles, but each showed similar growth in their ability to discuss ideas from sources and in the way concepts from sources worked into their thinking.

11 Conclusion

While these data represent only a small group of students enrolled in a single program over a year, they demonstrate that for these students referencing published texts serves to advance thinking expressed in each assignment. Further the data demonstrate that over the course of a series of assignments over the year that engage related professional texts, students both advance in their thinking in the domain and are able to engage in more focused and extended discussion of the ideas. The students reference texts largely for the conceptual content of the texts, and they then use the conceptual material to articulate their own thinking and the interpretation of their experiences, to bootstrap them into the kinds of thinking supported by the assignments, courses, and program.

This does not mean that citing texts in every situation will bootstrap student thinking and lead to cognitive growth, but it does demonstrate that under some conditions citing texts can have that function. The conditions that applied in this situation that may contribute to the value of citation have to do with the sources providing tools to think through problems students were trying

to solve in pursuit of their career goals and in relation to internship experiences. Additionally, the writing was embedded within a program that supported reflection on experiences and professional practices. Finally, students were able to select texts and issues they felt most relevant to their concerns; after the initial assignment, students could select texts they found most meaningful to articulate their thinking and were able in two of the assignments (the English Education paper and the M.Ed. thesis) to define the core issue to be argued.

In the series of writing assignments studied here, three mutually supportive factors seemed to work together to aid cognitive development: data from engaged experience, genre, and use of the professional literature. Students in this program through their classroom internships were gaining increasing amounts of challenging and engaged practical experience, which they were learning to describe and use as data in their writing in more detailed ways; the detail and specificity of their writing about experience also correlated with their cognitive development (see K. Simon, 2012). Further, the genres they wrote in provided intellectual challenges based on reflective interpretation of experience, seen through the lenses of concepts arising from the professional literature (see Bazerman et al., forthcoming). And, finally, as reported here, the professional literature provided intellectual tools to examine experience and address the challenges of the assigned genres. Results in this study and in like situations should be interpreted through the interaction of these three factors.

It should be further cautioned that the effects are not simply the result of learning to cite and write about sources as a general skill. Since these students had already obtained undergraduate degrees in other programs, where they presumably had writing courses and other courses demanding writing with disciplinary content, citation, and conceptual thinking, this is likely not their first encounter with using sources in their writing for conceptual or other purposes. Further, there was no organized instruction in the skills of citation and discussion of texts in this program. The effects more likely had to do with becoming familiar with a new conceptual domain of immediate and pressing practical significance, matched with a continued engagement with a set of personally selected set of issues.

The findings here argue for the value of having students read and write about conceptually relevant texts and engaging them over time in continued problem-solving, using conceptual resources in contemplating their own experience and gathered data. While many teachers have long acted on these principles, assigning disciplinary readings and having students write about data and experience using those texts, it is good to have some evidence to support and analyze such practices. Such evidence is particularly valuable in the face of

educational practices that sometimes separate academic reading from reflection on practice or experience, under the belief that the authority of texts can blind students to the details of their experience. We see here that using conceptual texts can under the right conditions help students articulate their experience and think about experience in more sophisticated ways. Only further research will determine if and under what conditions exposure to conceptual reading can suppress authentic and nuanced reflection. Such research can help us understand better the most appropriate ways of using readings and asking students to write using those readings to advance cognition, including which genres to assign to evoke desired reference discussion practices.

Finally, from a writing to learn perspective this study provides evidence that within an inquiry domain, writing about reading can be a means of learning to engage in more sophisticated domain-specific forms of reasoning. Continued writing practice over an extended sequence of writing activities incorporating reading in that domain can lead to deeper and more sophisticated thinking in that domain, particularly in the context of personally important problems and rich experience and other forms of evidence to ponder.