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Apprenticeship in academic literacy: Three K-12 literacy strategies to support Higher Education students

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The purpose of this paper is to outline ways in which early and adolescent literacy strategies can guide the instruction of academic literacy practices for undergraduate and graduate-level students. First, we used guided reading elements to assist higher-education students' exploration of research texts. Second, we used "writing-aloud" practices and mentor texts to guide the synthesis of research and the construction of literature reviews. Finally, we implemented Writing Workshops to support apprenticeship in inquiry-oriented instructional design, data collection, and research writing. Using formative and design experiments as an approach to pedagogical improve-ment, we modelled and adapted K-12 literacy strategies for our teacher education students to guide their development into literacy practices with academic texts. We describe each instructional innovation and the resulting modifications across various iterations of the interventions.

Key Words: apprenticeship, guided reading, guided writing

1. Introduction

As teacher educators, we strive to provide and demonstrate effective instruction in our literacy education courses. Like our counterparts in university departments across campus, we have concerns regarding the reading/writing strategies and levels of our undergraduate and graduate students (Rachal, Daigle, & Rachal, 2007). Students also reveal concerns about their own abilities as they begin to consume and produce academic texts (James & Okpala, 2010; Martinez, 2011). Literacy teacher educators, long admonishing content-area teachers to be more deliberate in their instruction of specialised literacies (e.g., Langer, 2012; Readence, Bean, & Baldwin, 2004), need to look within themselves to determine whether they are operating within an ethical curriculum that equips preservice teachers with the specialised literacies required within the university and beyond (Wolffensperger, 2010).

Our students come to us as literate. However, many lack the critical literacies inherent in academic work. For example, preservice teachers may be able to summarise a single text, yet they may be reluctant to synthesise across texts. Graduate students may be able to participate in discussions about texts, but they may be reticent to critically challenge their co-discussants or the authors of those texts. We acknowledge that the examination and creation of academic texts are culturally-organised practices with specific rules and routines for participation; and we see a need to support students' transition at all levels of higher education into this new culture. To this end, we integrate strategies from college composition and reading (e.g. Flippo & Caverly, 2008) with strategies that support literacy development of children and adolescents. In modelling and adapting these strategies for adults, we simultaneously guide their apprenticeship into literacy

practices with academic texts while demonstrating the strategies they should use to teach K-12 learners. The purpose of this paper is to outline ways in which early and adolescent literacy strategies can guide the instruction of academic literacy for undergraduate, Masters, and Doctoral-level students.

2. Rationale for using K-12 literacy apprenticeship strategies in higher education

Bartholomae (1985; 2004) unpacks the complexity of ushering students into reading and writing in unfamiliar (e.g., academic) discourses, emphasising that the discussion and writing of such discourses will be exercised long before the skills are learnt. We have experienced first-hand the complexity of which Bartholomae speaks and are interested in ways to support our students as we apprentice them in these unfamiliar ways of knowing. We position our current work within a social constructivist perspective (Vygotsky, 1978) of teacher education in which the novices' (e.g., our students') participation in cultural activities with the guidance of more skilled partners (e.g., the faculty) allows the novices to internalise tools for thinking and taking more mature approaches to interacting with texts. Northredge (2003, pp. 172-178) proposes a structure for scaffolding this process that encompasses three instructor responsibilities: (1) lend students the capacity to frame meaning within a new discourse; (2) plan students' excursion from familiar to specialist linguistic contexts; and (3) coach students to speak and write the discourse. Northredge asserts that within this type of instruction the teacher's expertise is central to the teaching/learning process, and yet learning happens only when the teacher is able to use that expertise to frame meaning for students; guide them through the transition from known to new; and finally, usher them into the unfamiliar knowledge community as active, critical participants.

Central to our perspectives are the key concepts of academic literacy and apprenticeship. Academic literacy requires knowledge and acknowledgment of the social, political, and linguistic contexts and systems that are at play within and across the multiple discourses of (a particular) academic community (Lea & Street, 2006). In brief, teachers learn to interact like teachers; scholars learn to interact like scholars; and ideally, all of them interact as teacher-scholars. According to Pugh, Pawan, and Antomarchi (2000), successful engagement in academic literacies requires the ability to navigate texts and genres of academic traditions. These texts may include textbooks, tradebooks, curriculum guides, K-12 assessments, and journal articles dedicated to discussions of pedagogy, theory, and development. Equally important texts include daily communication and reflection with peers, faculty, and field-based mentors as well as the canon of academic texts (e.g., dissertations, research manuscripts, conference proposals).

Our pedagogical approaches emanate from our efforts to usher our students successfully into the discourse of the teacher-scholar community by identifying key processes of the discourse, then modelling, demonstrating, guiding, and engaging students in authentic events involving these approaches. We frame our actions (demonstrating, modelling, and engaging) as apprenticeship (Rogoff, 1991). At the same time, we recognise that apprenticeship is more complex than just a series of actions; that the actions themselves become defined and meaningful only through the *transactions* that take place within the apprenticed conversations. Perspectives shift through interpersonal and intrapersonal dialogue resulting in appropriation (Bakhtin, 1981).

As educators, specifically, *literacy* teacher educators and literacy *researcher* educators, we draw on three research-supported K-12 strategies to inform our teacher education literacy apprentice-ships. We do so following a logical sequence of the research process using (1) guided reading elements (Fountas & Pinnell, 1996; Iaquinta, 2006; Massengill, 2004) to assist students' exploration of academic texts; (2) "think-aloud" strategies in the form of "write alouds" (McCarrier, Pinnell, & Fountas, 1999) and mentor texts (Graham & Perin, 2007) to guide the construction of literature reviews; and (3) Writing Workshop strategies (Fletcher & Portalupi, 2001) to support inquiry-oriented data collection, and writing.

3. Formative and design experiment methodology

To understand the effectiveness of instructional interventions, we approached our study as a formative and design experiment (Reinking & Bradley, 2004). Formative research is directed by questions related to instructional design within guidelines of effectiveness, efficiency, and appeal (Reigeluth & Frick, 1999). Often following a case study approach (Yin, 1994), formative research is exploratory in nature, drawing on multiple forms of data to identify pedagogical goals that may prove to be useful for improving classroom practice.

The pedagogical goal of our work was generated from and driven by our efforts to provide effective instruction to our college-level students and to model K-12 instructional strategies. We selected three instructional strategies that serve as literacy interventions and we implemented them across three universities in undergraduate and graduate programmes in teacher education. University one was a small, private liberal arts university in the Midwest U.S.; university two was a large research-intensive university in the Southeast U.S.; and university three was a large research-intensive land grant university in the Midwest U.S. Students at all three universities were enrolled in Education programs. Some were undergraduate students seeking initial teaching licensure, others were Master of Arts students also seeking initial licensure, and still others were earning a Masters or Doctoral degree in reading. Because the goal of our exploration was to examine and refine our own teaching, this article focuses less on the evidence of student learning and more on how we used the aggregate findings to modify our teaching practices.

We collected multiple sources of data, including observations, field notes, student interviews and artifacts, e-mails, and surveys over successive iterations of each of our projects. Following each academic term we shared data and observations, conducting a pooled case analysis (West & Oldfather, 1995) to identify trends in strengths and obstacles to our practices. We used ongoing analysis of data to inform modifications that would then be tested in subsequent iterations. Implementation of modifications depended on teaching assignments, so the number of iterations examined for each practice varied; and we share a summary of these modifications in our discussions of what worked and what did not work.

4. Apprenticeship strategies

4.1. Guided reading of research texts

In guided reading (Fountas & Pinnell, 1996; Pinnell & Fountas, 2007), the instructor selects a text that is matched to students' reading strengths and needs, introduces students to the text by explicitly pointing out key concepts and needed strategies, then guides and observes as students engage in an independent, "whispered" practice reading. Following the practice reading, the instructor redirects the students to portions of the text with in-the-moment, student-specific teaching points in the context of authentic discussion.

4.1.1. Rationale

The practice of guided reading, rooted in early literacy theory and informed by Reading Recovery® (Clay, 1991), places scaffolding and apprenticeship (Rogoff, 1991) at the forefront of effective literacy instruction. Specifically, guided reading integrates explicit teaching, demonstration, guided practice and closely observed independent practice in carefully constructed lessons that draw on observed student behaviours to address reading challenges at developmentally driven points of need (Pinnell & Fountas, 2007).

Our purpose for using guided reading is to introduce students to formal research in literacy education and lead them toward critical application of this research in their own teaching. We believe that, to be effective teachers of literacy, these individuals need to be able to locate, read, and critique professional literature to inform their practices in the context of pedagogical challenges.

4.1.2. Implementation

In a Masters course in literacy education, Susan began with an explicit mini-lesson on research design. She provided students with a 10-minute overview on case study design. Following this 5-10 minute explicit lesson, she introduced students to a research article that reflected the same design, provided a brief overview, a discussion of key and/or unfamiliar concepts, and specific purposes for reading (see Figure 1).

Guided Reading: Case Study

In the Case Study you're going to read today, a group of researchers decided to look at multiple (6) high-performing, high-poverty elementary schools and describe the practices that appeared to promote early reading achievement. In this particular article they describe the reading program in one of these Elementary Schools.

Components of a Good Research Article

Statement of significance—All good articles start with a strategy to draw in the reader; to show the reader that they have something important to say.
- What do the authors do to make you think their research is worthwhile?
- How do they support the significance of their research?
- Do they draw you in? How? If not, why not?

Review of Literature

A good researcher goes into research with a strong understanding of what has already been learned in the field. This information is presented in a brief review of literature. A good review of literature synthesizes patterns and idiosyncrasies across studies to provide a concise and informative overview of the field.
- What patterns do these authors identify in the research?
- What evidence is there that they are familiar with the current research on their topic?

Purpose for Reading

As you read, think about and mark:
- Evidence that this is a "good" study (drawing from your notes on the Case Study methodology).
- Identification of what part of the paper you are reading (is it, for example, the introduction? Statement of significance? Literature review? Implications for classroom use? Other?)
- Strategies that the Authors use to make this reading interesting, readable, organized. What do they do to guide their reader through the article?

Figure 1. Guided Reading Directions.

4.1.3. What worked and what didn't work

Three components of the academic guided reading practice emerged as critical for college-level readers – time, text and talk (Allington, 2002).

Time. During implementation, the greatest challenge Susan faced was lack of time for authentic engagement with the reading activity. The lesson took place in a 45-minute time period, during which the modified guided reading required a mini-lesson, a guided reading introduction, opportunities for guided practice, and a discussion of critical reactions to the article. Susan had difficulty completing lessons because the research articles were lengthy. Initially she tried starting the article together in class then asking students to finish it for homework; however, this approach was problematic because the "guided practice" part of the lesson always ended up focusing on the beginning of the article – and the students were sent away to read the "methodology," "findings," and "implications" on their own without guidance. The following excerpt from field notes reflected the problems inherent in this instructional plan.

- Once again, we didn't get past the literature review. We always run out of time before we get to the methodology. No wonder their annotations are better at the beginning of the articles and sort of fizzle out at the end! [field notes, 2/11].

Susan's attempts to remedy this problem included "jigsawing" the article (Aronson et. al., 1978; Johnson & Johnson, 1999) and reading, as a whole class, short sections to highlight specific aspects of text. Both of these efforts, however, led to confusion because students quickly realised that, without reading the introduction and the theoretical framework for the study, it was difficult to critically read the remaining sections (and vice versa). In student surveys these concerns were reinforced:

- *I had trouble if I was assigned a section of the article that didn't provide background knowledge of the study.*
- *I hated not reading the entire article. I felt completely lost.*

Susan went back to the early literacy literature to find the solution. Fountas and Pinnell (2000) suggest that intermediate level students should be introduced to new concepts within the formal guided reading lesson. To complete the text, students continue reading independently as homework. To apply this idea, Susan told students to mark their responses with sticky notes. As she taught a particular element of a research article Susan assigned that element to the students in subsequent articles for homework, also requiring them to annotate the assigned sections. The annotations enabled Susan to assess students' acquisition of the desired critical reading skills and provide them with an opportunity to interact thoughtfully with the text before continuing with a class lesson and discussion of its remaining components.

Text. Allington (2002) reminds teachers of the importance of selecting level-appropriate text for elementary student readers and the selection of text is a vital element of guided reading. As a literacy teacher educator, Susan felt embarrassed that the selection of "level appropriate" text was a challenge. The initial article selections were driven by her need for clear, powerful exemplars of the highest rigour. She was much more focused on academic quality than on the students' textual needs.

Students however, needed easier and shorter texts in order to successfully address these new key strategies and concepts in academic reading. In addition to initial articles being too long, texts were often dense and contained multiple unfamiliar (but key) concepts; too many to address within a guided reading introduction. Allington's (2002) assertion that students need texts they can read successfully was reflected in feedback:

- *The articles themselves were not really that exciting and I really didn't get a lot [out] of it.*
- *You should try guided reading with our [book club] books instead of the research articles. That's more our speed.*

Based on feedback, Susan replaced many of the research articles with practitioner articles. She was hesitant to *completely* eliminate the more challenging articles, as critical student comments echoed in her mind:

- *Scholarly articles are not the end-all-be-all-just because something came from the Harvard Review doesn't mean I can't read or comprehend it or that it's gospel.*

As difficult as they were, the "hard" texts empowered the students. Yet, text selection made a difference in their accessibility. As a result of deliberate choice to integrate more accessible articles, Susan addressed each component of the guided reading lesson within the 45-minute context. Furthermore, because the texts were not as concept-laden, students more readily identified clear, key foci. For example, in one of the early articles, students sought clarification on the terms *inter-rater reliability* and *triangulation* and discussed these in their annotations.

Talk. In his study of exemplary first and fourth-grade teachers, Allington (2002) noted that exemplary teachers fostered "much more student talk" than what is typically reported in classroom observational studies. Initially, in her hurry to "get through" an entire lesson in 45 minutes, Susan found herself doing most of the talking – highlighting a large number of unfamiliar concepts, explaining components of research, showing students connections between

other articles they had read, and explaining follow-up articles that they would read and annotate for homework. Much like a teacher who has chosen a too-difficult text might resort to *telling* students multiple unfamiliar words, the instructor was doing most of the talking – *telling* the students how to be critical rather than giving them opportunities to be critical themselves.

Improvements in text selection lessened teacher domination to some extent; however, students still appeared hesitant to contribute their own critiques in the class forum and learned that if they waited long enough, Susan would provide them with a few critiques of her own. Furthermore, she was still struggling to "get through" the article and prepare students for the expectation that they would then read yet another one (framed in the same methodology) for homework.

To resolve the issues surrounding talk, Susan presented the methodology to students through the mini-lesson format, then introduced them to an article and highlighted some of the key and potentially challenging components. Following the guided reading lesson, she added a ten-minute period for them to begin reading and annotating the homework article silently. At the beginning of the subsequent class, students broke into small groups to discuss the article that they had read, using their own annotations as reflection guides. This format changed the balance of discussion in the class in that (1) the guided reading lesson focused on preparing students to read the text successfully; (2) students were given time to begin engaging with the text but were not expected to process it immediately in a public way; (3) students had time outside class to prepare their reactions and engage in critical reading in a truly independent format; and (4) students were expected to discuss the article with their peers, then reflect their findings about article strengths and weaknesses back to their peers.

Susan's job during these follow-up discussions was to *listen to* and record student comments within their small groups. Following the small-group discussions, as students reported their critical analyses to the whole class, she identified teaching points based on their understandings. Susan consciously quieted herself when she heard a potentially powerful conversation emerging. She began to see the "listen-don't-intervene" approach pay off. For example, in the discussion below (of Black's 2005 article):

- S1: *I don't think the authors really told us what this had to do with the classroom, I mean, are we supposed to actually MAKE our students do fanfiction in the classroom?*
- S2: *Well, I don't think the point of the article was to tell us to do fanfiction in the classroom. They're just saying, look at the positives of this and how can we make the same positive things happen in our writing instruction in the classroom?*
- S3: *Yeah, like they talk about supportive communities, and how important it is for developing writers to have the support within a writing community. How do we create a writing community in our classroom?*

In the above interaction, students collaboratively constructed understanding of the research-based article and continued to shift fluidly between the roles of critical scholarly responder and thoughtful practitioner. By listening to the entire interaction, the instructor seized the opportuneity to draw on students' analyses to construct a lesson for the entire group on multiple and powerful roles of research for practitioners.

4.2. Modelled writing and mentor texts

With the synthesis of mentor texts as the goal, in the modelled writing strategy, the instructor thinks aloud during the process of composing – capturing and tracking the decisions made as each sentence, paragraph, and/or section is written. The instructor pauses to discuss options and to weigh the ramifications of each choice made during text development, providing meta-composing commentary about the text and its effect on the anticipated audience. Often called "thinking aloud" (or in this case, "writing aloud" or "modelled writing") the teacher's explicit discussion of the composing process is a recommended instructional strategy to support writing development (McCarrier, Pinnell, & Fountas, 2000).

4.2.1. Rationale

In the field of compositional studies, "think-aloud" protocols were introduced by Emig (1971) and later used by Flower and Hayes, (1981) to ascertain students' cognitive processes during the act of composing. By asking students to stop writing and to explain their thinking, these researchers and others were able to access the *process* of composing; whereas previous research focused only on written products. Since that time, the process of composing has been central to literacy instruction in the K-12 classroom, and students' meta-cognitive (or in this case, meta-composing) thoughts are the focus of literacy instructional practice (e.g., Caldwell & Leslie, 2010; Fisher, Frey, & Lapp, 2011; Morgan & York, 2009) as well as disciplinary practice (e.g., Martiniello, 2008). Following a model of gradual release of responsibility (Campione, 1981; Tharp & Gallimore, 1988), teacher emulation of "thinking aloud" is the crux of writing instruction.

4.2.2. Implementation

In acknowledging the very specific genres of academia, Jenifer used modelled writing to apprentice graduate students in the act of consuming research and synthesising across texts because these are foundational research skills. As Boote and Beile (2005) state, "a substantive, thorough, sophisticated literature review is a pre-condition for doing substantive, thorough, sophisticated research. ... To advance our collective understanding, a researcher or scholar needs to understand what has been done before, the strengths and weaknesses of existing studies, and what they might mean" (p. 3). With the literature review as a pivotal structure for surveying any field of study, it was paramount for Jenifer's students to be able to engage in the process. Essential to conducting a literature review was the students' ability to select a topic, narrow the focus of the inquiry, access relevant literature, read and understand the texts, and then synthesise across texts to determine trends and to gain new insights. The result was an increased understanding for the students, a text that captured the review process and results, and a document that informed others.

Modelling the writing process of a literature review required Jenifer to actually write a literature review as a public act. This was difficult to do in the moment because writing requires thinking and time; and waiting for someone to think is not interesting for students. Therefore, Jenifer composed the text outside of the class space and provided the "writing-aloud" instruction in three ways: live re-enactment, textual track changes, and video documentation.

4.2.3. What worked and what didn't work

The academic processes surrounding a literature review are both numerous and complicated and they require a great deal of new learning on the part of students. For example, how do students know which journals to search? How do they retrieve and store texts? How do they judge methodological rigour when their understanding is still developing? How do they know when to stop searching? Jenifer borrowed Susan's structure for guided reading and led her own students in discussions related to library and data-base access, selection of articles, reading, interpretation, and methodological rigour. In modelled writing, Jenifer considered issues of scaling down, modelling, and remodelling.

Scaling Down. When demonstrating the process of writing a literature review, the most critical components were the needs and experiences of the students. Using individual article critiques (i.e., guided reading), Jenifer judged the level of support students needed and adjusted her "writing-aloud" procedures accordingly. Specifically, she manipulated the extent to which she scaled down the process, the form of modelling she provided, and the ways in which students revisited the "modelled writing" instruction. In Jenifer's first attempts to use "modelled writing," she selected three mentor texts based on her own topic of interest. She asked students to read the texts so they had a shared understanding of the content. Then she wrote a short mini-review, synthesizing across the three texts. During class, Jenifer displayed the literature-review text, read it aloud, and talked through decisions made during the composing process. In other words, she read through the paper, paragraph by paragraph, and recounted the decisions she

made while writing. Students responded to Jenifer's first attempt at modelled writing instruction.

- *I was a bit confused about the expectations for the research portion of the course and the literature review project.*
- *I would find it helpful to receive more guidance regarding assignments. I thought our focus was to compare/contrast the three documents.* (Student survey)

In reading students' comments, Jenifer was reminded of Clay's (1975) observations of young children in whole-class situations. Clay described the common teacher practice of whole-group reading in which children watch a teacher engage in literacy instruction, yet each child may attend to different features of text other than those to which the teacher is pointing. Jenifer felt her students exhibited the same confusion. With so much new learning, the students could not simultaneously (1) attend to the instructor's "write alouds", (2) process the expected behaviours, and (3) transfer the learning to their own texts. As the student surveys revealed, the modelling was helpful, but they needed something more.

Modelling in Text and Talk. In the next iteration of modelled writing, Jenifer followed the same process of reading three research articles and writing a short "literature review". She read the text aloud and shared meta-composing thoughts, answering students' questions about her writing decisions. She provided copies of the Literature Review Scoring Rubric (Boote & Beile, 2005) and reviewed the components and criteria for quality literature reviews.

In addition, and prior to the class, Jenifer wrote explanatory statements in the margins of her mini literature review using comment boxes within track changes (see Figure 2). In this way, the students listened to her explanations in real time and they followed along with text samples that embedded specific markers to indicate the location of pivotal decisions in text construction.

Most students valued the addition of text with commentary:

- *This was my first experience writing a lit review for publication, a real purpose--you provided a format. Your examples worked.*

Yet, several students offered additional ideas:

- *Analysing texts would be useful too. Especially to analyse a text and make comparisons to my own writing to determine how I have done things similar and different and what works and doesn't.*
- *It would be helpful to follow a professor in their writing endeavor from beginning to publication.*

These students were correct. Jenifer could do more.

Re-modelling. The next iteration of the writing-aloud process involved creating the texts and talk in formats in which the students could revisit her writing rationales. In addition to the mini-literature review sample, the instructor posted the texts within the course software program (Blackboard Inc.), giving students unlimited access to the samples. Then, in order to provide a model of the entire process from beginning to end, and to include the analysis of mentor texts, Jenifer created a series of online tutorials that detailed the entire process.

Using mentor texts from *Review of Educational Research*, Jenifer selected four sample literature reviews and posted them for students to read. She created Keynote® presentations, outlining the various aspects of literature-review construction and the specific criteria for evaluating each section of the literature review. She posted the Keynote® slides online as well. Then Jenifer created videos for each part of the literature review. In each video she used images of the mentor texts and verbally and physically highlighted text features and authorial strategies. She used the Ken Burns effect to zoom in on small portions of the mentor text and she used special effects to draw attention to key strategies. Jenifer placed the videos online where students could revisit her "write alouds" – essentially re-modelling over and over again. Students responded favourably to these instructional changes.

Introduction

According to Prensky (2001), education is at a crossroads. In the U.S., our current students are part of the first generations of people to grow up in a completely digital environment. As a result, these "digital natives" think differently, behave differently, and are oriented toward the world differently. Prensky states,

> Digital Natives are used to receiving information really fast. They like to parallel process and multi-task. They prefer their graphics before their text rather than the opposite. They prefer random access (like hypertext). They function best when networked. They thrive on instant gratification and frequent rewards. They prefer games to "serious" work (p. 3-4).

On the other hand, those who did not grow up in this environment (those who were born before the ubiquitous use of technology) are compared to immigrants, i.e. Digital Immigrants. In Prensky's opinion, Digital Immigrants may be able to assume the language of digital natives, but they will always carry an accent because they learned this language later in life. Yet, Prensky suggests that older educators must alter their methodologies and change the curriculum to accommodate the needs of Digital Natives because education can't wait for Digital Natives to grow up and teach themselves. Digital Natives need instruction that is fast and multi-mediated (King, Schneider, Kozdras, Minick, Welsh, 2007). Well who better to provide this new instruction than the Digital Natives themselves? The natives have grown up and they are enrolled in colleges and universities around the country. They are learning to teach the next generation of digital natives. These Native teachers' ease of use and agility with all forms of technology in their personal lives should undoubtedly create optimal candidates who demonstrate adroit skill in teaching with and learning through technology. Yet, this is simply not the case.

Pre-service Teacher Education

In an extensive study of over 2000 pre-service teachers, Guo, Dobson, and Petrina (2008) found that there was no statistically significant difference between the age of the pre-service teachers and their competency using information and communication technology. In other words, the age (or Native/Immigrant status) of the pre-service teacher did not appear to correlate with their abilities. Similarly, Lei (2009) examined the beliefs, attitudes, confidence, and interest of 55 pre-service teachers in a large teacher education program and found that although they have strong positive beliefs about technology and they exhibit proficient use of technology in limited contexts (e.g., social networking, web surfing), they are lacking experience and expertise in classroom technologies.

These discrepancies may be due to the fact that Digitally Native pre-service teachers are teaching a new generation of digital native—a generation that is faster, operates with more facility, and has used more technology for different purposes. In other words, current teacher education candidates can be viewed as the "Nintendo" generation who have grown up to teach the "iPad" generation. Today's pre-service teachers have used

Darling-Hammond (2010) proposes that pre-service teachers learn best from programs that have a clinical curriculum as well as a didactic curriculum. In other words, pre-service teachers learn through course instruction and practical application. She states, "the most powerful programs require students to spend extensive time in the field throughout the entire program, examining and applying the concepts and strategies they are simultaneously learning about in their courses" (p. 40). Yet, without clear instructional models and personal experience, it is difficult for many pre-service teachers to adapt. If pre-service teachers must be able to observe pedagogical applications within the contexts of classrooms in order to change their beliefs and practices (Boling & Adams, 2008) we are certainly in a conundrum. Pre-service teachers must observe effective technology integration within two contexts—the university course experience and the classroom field experience.

Dispositions Towards Fast Literacy

Part of the discrepancy between Digital Native teachers (both inservice and pre-service) and the students they teach is the continual changes in technology that occur in education and the marketplace. As King et. al (2007) state, new technologies cause literacies to transform at an ever increasingly fast pace.

> Maybe as a culture we are still in that first phase of being fascinated with the newness of this kind of instant access. Maybe "fast-literacies" describes a kind of societal first rush of excitement over the breadth of data and modes of expression available. Maybe in 50 years, culture will adapt to that condition and depth will be back to where we think depth should be. But, at the end of the day (virtual or otherwise), students (preservice teachers and children alike) will be faced with a blank canvas. Whether it's a piece of paper, a powerpoint slide, or the *record* button of an ipod, students will make authorial decisions as they read, write, D/design, craft, create, or compose (King, et. al. 2007, p. 27).

Zhao, Pugh, Sheldon and Byers (2002) found that teachers can adapt to technology-mediated instruction given that certain conditions are in place. Zhao et. al. conducted a program evaluation of 118 state technology grant recipients to determine the conditions under which the selected teachers implemented their projects. Using a case study approach, they interviewed, observed and surveyed 10 of the teachers who represented different regions in the state, different grade levels, and various subject matters. They found that 11 factors significantly effect technology integration and these factors can be grouped into three domains—the innovation, the innovator, and the context. The 11

Comment: My paper is starting to take shape so I'm going to play with some sub-headings to help structure the paper. When I switch to a new area, then I need a new header. Headings aren't necessary, but sometimes they are helpful. You have to make the choice.

Deleted: s—

Comment: I've decided that I'm not going to add anything more to this section for now. I think it sets up the issue pretty well. However, as the rest of the paper changes, I might have to come back and tweak the beginning. This part should introduce the reader to what's coming. So I have to make sure it matches the final version.

Comment: I changed from Youtube to Nintendo because I thought the Nintendo reference was better and reflected the out-of-school experiences of today's teachers more than Youtube.

Comment: This is a place where experience comes in. I know Darling-Hammond's work. When I got to this issue in the paper, I went right to her research for an answer. If I didn't know her work, I would have to do another literature search on pre-service teacher education programs.

Comment: These statements I am making will get outdated fast. For a topic such as this, I need to make sure that my research articles are current and rigorous. Interest in technology is growing and there are many people doing things with it. So in my search for relevant research I must identify the important people

Comment: Okay, so now I've opened a who can of worms. I have to discuss university faculty technology use as well as classroom technology use. I'm saving the faculty for next time.

Comment: These statements I am making will get outdated fast. For a topic such as this, I need to make sure that my research articles are current and rigorous. Interest in technology is growing and there are many people doing things with it. So in my search for relevant research I must identify the important people

Comment: Here is an example of a study that is cited in many articles. In addition, the article was published in Teachers College Record- a high quality journal. I have listed some of the best journals in the syllabus. Look on that list for examples.

Deleted: Digitally Native teachers are teaching a new generation of digital native— that is and has used more technology for different purposes. teacher education candidates are the generation teaching the iPad generation. ow will they adapt?

Figure 2. Modelled writing sample.

4.3. Writing Workshop to analyse field-based data

Many graduate programs include field-based inquiry courses. Writing Workshop (Atwell, 1987; Calkins, 1994) can serve as a context for teacher-education students to write about their field data as a form of analysis using recursive cycles of drafting, revising, conferencing, editing, and publishing. In this framework, course instructors use short, focused mini-lessons at the beginning and/or end of writing sessions to address the needs manifest in teacher-education student writing and data analysis (Graves, 1983). Conferencing about written work in-progress is a critical support to the writing process (Atwell, 1987; Fletcher & Portalupi, 2001; 2007).

4.3.1. Rationale

Writing Workshop is a context for teaching writing in which students learn and practice writing techniques for a purpose. In Carrie's *Research* Writing Workshop, she provided teacher-education students with a consistent structure that incorporated mini-lessons and conferencing strategies to guide and support students' use of research tools and techniques as they engaged in the process of (1) interpreting and analysing K-12 classroom data, (2) articulating children's processes, and finally, (3) constructing lesson plans to address children's strengths and needs informed by the data-driven analysis.

4.3.2. Implementation

In order for the teacher-education students to engage in cycles of inquiry-oriented instructional design, they first learned how to frame researchable questions within their teaching practice. Carrie implemented mini-lessons (Figure 3) to model how to critique, select, administer, score, and analyse formal and informal assessment tools/techniques. With the support of Carrie's mini-lessons, the teacher-education students practiced using K-12 classroom assessments and interpreted data to create hunches and searchable assertions (Figure 3). The teacher-education students searched across data resources and looked for confirming and disconfirming evidence. Then they wrote case studies using the features of the research genre (e.g., figures, appendices, tables, headings, etc.) to communicate findings with audience-appropriate style and voice.

4.3.3. What worked and what didn't work

Using feedback and reflective data from the teacher-education students, Carrie identified two "instructional moves" that were frequently discussed and ultimately most effective in the implementation of *Research* Writing Workshop: specific mini-lessons and conferencing.

Mini Lessons. Carrie conducted mini-lessons in each class meeting based on her assessment of the teacher-education students' drafts of K-12 student case studies. For example, Carrie determined that the teacher-education students needed support in using assessment tools, webbing and searching data (See Figure 3). She demonstrated these practices for the teacher-education students, giving them an opportunity to question her decision-making process. She also shared tricks or tips to support their practice. The teacher-education students implemented practices and then described their results by creating written case studies.

The teacher-education students provided Carrie with feedback regarding the effectiveness of her mini-lessons.

- *I liked how you modeled formal assessments and then gave us opportunities to practice them in class. This scaffolding allowed us to eventually be able to administer the assessments to our case study students.*
- *The mini lessons helped me to realize that it's ok not to have your main focus or big question when starting the inquiry process. Sometimes the process helps you to define the problem.*
- *The articles we read about language, and reading and writing development were helpful with my case study. I would read about children's writing development and then go to preschool and see in the children's work examples what I just read about.*

Carrie was reminded that effective research mini-lessons (a) provided guided practice with data analysis and research writing techniques; and effective mini-lessons also (b) revealed the logic

behind data analysis and writing choices. Perhaps the demonstrations helped education students "buy in" to the practical application of these tools.

Assessment Tools Mini-Lessons

In these mini lessons, teacher-education students were introduced to an assessment instrument such as the Concepts about Print Test (Clay, 1978). Teacher-education students would then follow a trial administration of the assessment via video tape marking their own copy of the assessment form. They would score and analyse the data in small groups. Finally we would reconvene as a class to share the analysis and discuss the instructional implications.

Webbing Hunches – Searching Data Mini-Lessons

As the teacher-education students learned a number of assessment tools and research techniques I conducted mini lessons on reading across data resources to construct researchable hunches or assertions and code data. To demonstrate the process I used case study data from a student I was currently tutoring. Given three pieces of data, we brainstormed hunches and questions that were recorded on chart paper.

Working in small groups, teacher-education students selected one of the hunches from the chart and searched the data set coding confirming and dis-confirming evidence. At the end of class groups shared their data analysis.

Teacher-education students were then invited to do the same process with an initial set of their own case study data. Initial hunches and data searches were then submitted in a written form for feedback. This move helped me gauge student progress and design subsequent mini lessons. Perhaps the process of webbing hunches and searching across data would be the research writing equivalent to drafting.

This type of mini lesson was repeated with different types of literacy learners featuring various research/assessment tools. For example "The Case of Casey" featured a reluctant Kindergarten student using Clay's Observation Survey (1978) assessment data while "Jake's I hate reading Case Study" focused on an advanced second grade reader, using Burke's Reader Interview, Miscue Analysis (Goodman, 1969), and The Developmental Spelling Assessment (Ganske, 1993) .

Figure 3. Mini-lesson sample.

Conferences. Across case study cycles, teacher-education students participated in two types of *research* writing conferences: Peer Data Analysis Conferences and Individual Research Writing Conferences. In Peer Data Analysis Conferences, teacher-education students shared one assertion and one sample of confirming/disconfirming evidence with a peer. Peer mentors raised questions and provided feedback on the nature and scope of evidence provided.

Teacher-education students scheduled Individual Research Writing Conferences with Carrie as needed. These conferences provided them with the opportunity to share a piece of research writing in progress or to discuss an aspect of their research work. As in elementary level conferencing, the Individual Research Writing Conferences often informed the direction of subsequent in-class mini-lessons. The plan to have teacher-education students write a series of case studies instead of one culminating case study gave Carrie opportunities to refine her practice over time.

This was also true for peer conferencing. After the first peer conferencing session, Carrie realised that the teacher-education students were not equipped to respond as critically to their peers as she hoped, minimising the productivity of those initial peer interactions. Two modifications were made to the conferencing process that increased its benefits for students. First, she developed a formal mini-lesson on peer conferencing in which she explained the task and its purpose, and demonstrated the elements of an effective peer conference. Then she guided teacher-education students through a practice round. Secondly, she brought teacher-education students back together as a group after the peer-conferencing sessions and had individuals and pairs share what was powerful about the review process. This whole-group reflection gave the teacher-education students the opportunity to view, through peer modelling, effective ways of interacting within the peer-conferencing dyad.

Within the context of the *Research* Writing Workshop, students were involved in complex research reading and writing tasks. Markedly absent from class discussions was the familiar question, "How long should this paper be?" The examination of the research writing processes and apprenticeship in those specific literacies helped students identify and accomplish expectations for the quality of the work.

5. Closing thoughts

The literacy strategies described in this paper – guided reading, "writing aloud", mentor texts, mini-lessons, and conferences – work because they are grounded in highly evolved theories of learning, specifically apprenticeship and gradual release of responsibility. Although these strategies are applied most frequently to K-12 instruction, they have relevance for adult learners. It is up to us as researchers and instructors to begin examining how these strategies transfer across contexts to effectively support higher-education students.

Our ongoing data-driven observations and discussions informed our evolving modifications that led to more effective outcomes for our students. Upon reflecting on the changes made, we realised that we found several commonalities across our instructional trial and errors.

5.1. Thorough and deliberate planning

Higher education faculty who want to provide high-quality instruction cannot discount the importance of thorough and deliberate planning. Although quickly thrown-together lessons and jovial discussions marginally related to content might make for happy students and popular teachers in the short term, truly outstanding teachers understand the need for a thoughtfully constructed series of lessons that can be implemented within a specific time span and provide students with highly relevant explanations, modelling, guidance, and opportunities for practice.

5.2. Ongoing evaluation of the process

A great advantage of formative research is that it enables teacher-researchers to make modifications in practice as they identify the need. By closely attending to and discussing in depth our own observations of the classes, the comments of students, and the overall classroom environment, we set ourselves, our practices, and our students up for success.

5.3. Formative assessment of student learning

In all three instances, we drew upon our observations of student learning to inform subsequent instructional decisions. In guided reading, "writing aloud", and Writing Workshop, we used our observations of students' oral and written work to guide subsequent lessons.

6. Summary

When children enter the primary grades, they need to learn "how to do school" (Dyson, 1984). When they enter the middle grades, they need to master the process of reading to learn (Readance, Bean, & Baldwin, 2004). When these children grow up to be young adults entering college, or adults entering academic contexts, they again need to resituate themselves and their identities within the academic community. Higher education faculty must recognise this adjustment and meet students where they are, then apprentice them into this new culture.

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