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What Writing Processes do Teacher Candidates Use? Findings from a Think-Aloud Protocol

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What Writing Processes do Teacher Candidates Use? Findings from a Think-Aloud Protocol

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In recent years, standards guiding K-12 education and university-level teacher education have placed increased emphasis on the importance of writing. The Common Core State Standards (CCSS) include writing in standards for English Language Arts, and for Literacy in History/Social Studies, Science, and Technical Subjects. These standards specify that students should engage in writing three types of texts: argument, informative/explanatory writing, and narrative (National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010). The standards also highlight the need for students to engage in a variety of writing tasks that vary on timeframe to complete, purpose and intended audience to broaden and sharpen writing skills. The standards for Council for the Accreditation of Educator Preparation (CAEP, 2013) include content and pedagogical knowledge, referencing the ten standards of the Interstate Teacher Assessment and Support Consortium (InTASC, 2013). The InTASC standards note written communication as a cross-disciplinary skill, and two standards (Application of Content and Instructional Strategies) address the need for teachers to engage students in writing for a variety of purposes. As it applies to advanced writing, institutions of higher education are placing a greater emphasis on writing to better prepare graduates.

As it relates to the preparation of students, we investigated writing processes as part of a larger effort to understand and improve writing among teacher candidates in initial preparation programs in one college of education. This was an important endeavour as all teachers are teachers of writing. Understanding their writing processes will help teacher candidates develop as teachers who use writing as a learning tool. The teacher candidates in this study were recruited from an introductory middle grades course, so the setting for the study was a course on pedagogy, not a specific course on literacy. This general pedagogy course was selected purposefully because of the importance of

writing across all content areas. It is important that teacher candidates engage in the content, practices, and processes they will teach. The International Literacy Association (ILA) published a 2018 brief on “Transforming Literacy Teacher Preparation” advocating that “practice-based work is a part of every course experience” (p. 5); teacher candidates need to engage in disciplinary literacies and to see literacy as a “tool” rather than as a “subject”. In a recent research brief, the ILA (2019) similarly drew on previous research to note how teacher candidates need opportunities to practice and apply what they are learning. This study was designed to complement and build on the literature on teacher candidates and writing. The National Council of Teachers of English (NCTE) also has position statements on teaching writing that relate to this study. A 2016 position statement titled “Professional Knowledge for the Teaching of Writing” (NCTE, 2016) includes several guiding principles that relate to this study and the course that was the context for this study: writing has many purposes, occurs in multiple modalities, is a process, and has a relationship with speech/talk. Also is the important principle that writing can be taught and that teachers can support students in strengthening their writing (2016). The 2018 position statement, “Understanding and Teaching Writing: Guiding Principles”, echoes many of these ideas and includes the important statement that “Everyone is a writer.” These documents offer support for the structure of the course, to support the development of writing experiences and writing skills among teacher candidates, so that they in turn engage in types of writing that they will be able to adapt for their future teaching career.

Relevant Literature

This study took place in a middle grades pedagogy course; this course focused on curriculum in general and not specifically on literacy or writing. To establish a foundation for the study, we drew on literature related to two main areas: writing and teacher preparation, and disciplinary literacy and writing across the curriculum.

Writing and Teacher Preparation

Researchers have asserted that teacher preparation programs often emphasize reading over writing (Myers et al., 2016; Morgan & Pytash, 2014; Norman & Spencer, 2005). As evidence of this point, Brenner and McQuirk (2019) examined the titles and descriptions of literacy courses in more than 40 programs across seven states. Of the 155 courses they located, only five included *writing* in the title, and 38 included *writing* in the course description. There is also less research on teacher candidates and writing compared to teacher candidates and reading. Morgan and Pytash (2014) reviewed the research on preparing teacher candidates to teach writing and located 31 applicable studies. They noted how a review of research on reading teacher education by Risko and colleagues (2008) yielded 82 studies with parallel parameters and a similar timeframe. The 31 studies on writing were grouped by

Morgan and Pytash into four “thematic clusters”: preservice teachers’ attitudes and beliefs toward writing, preservice teachers’ interactions with students and student writers, influential experiences in methods courses, and methods applied in teaching. They advocated that all teacher candidates need “pedagogical knowledge for teaching writing” and noted the need for more attention to the ways that teacher candidates learn to teach writing. In a more recent review, Bomer et al. (2019) located 82 studies on writing teacher education; these researchers clustered studies according to different discourses, drawing on Ivanič (2004). Relevant to this study is a process discourse, which involves both cognitive and practical processes (Bomer et al., 2019). Also relevant is the idea from Morgan and Pytash (2014) on teacher candidates’ experiences in coursework, and how those impact their knowledge of content and of teaching content (cf. Shulman, 1987) but also their attitudes, experiences, and beliefs.

Teacher Candidates’ Attitudes, Experiences, and Beliefs about Writing

Several studies have investigated teacher candidates’ experiences with writing or their beliefs about writing. For example, Morgan (2010) examined the experiences of early childhood teacher candidates in a writing methods course. Those candidates identified strategies and experiences beneficial to their developing senses of themselves as writers and as future teachers of writing; these strategies included writing regularly and having choices in topics. Norman and Spencer (2005) similarly researched teacher candidates’ views of themselves as writers. Given that teacher preparation programs often have limited attention to writing and writing pedagogy, they stated that it is “essential that teacher educators provide learning experiences that are supported by research in effective teacher preparation and make maximum impact in the time available” (p. 26). Within literacy methods courses, they used autobiographies to bring to light teacher candidates’ theories about how to teach writing and the value of writing. They found that teacher candidates overall had positive self-concept as writers; candidates preferred personal and creative writing but described experiences with expository and analytical writing less positively.

At the middle level, Hodges et al. (2019) investigated teacher candidates’ beliefs about writing and writing instruction. They surveyed 150 candidates in programs across the American Southwest; almost half of the participants were seeking certification in Language Arts, and the remainder were seeking certification in another content area. Survey items related to three areas: self-efficacy for teaching writing elements, self-efficacy for writing, and self-efficacy for writing instruction (p. 6). The researchers found that many candidates strongly agreed with statements that writing instruction should be integrated into daily instruction (92 out of 150), and that writing instruction was important for their certification area (84 out of 150). Candidates reported that they were “neutral” about their abilities to teach certain aspects of writing; the researchers discussed this finding in terms of candidates’ lack of confidence “in successfully using these elements in their own writing” (p. 10) and in “writing

for various purposes and audiences” (p. 11). Together, these studies showed that teacher candidates value writing but may not have had positive experiences with non-narrative writing, or with using a range of writing elements, or processes, in their own writing.

Our focus on writing processes that teacher candidates use themselves is one avenue to explore how to better support them as future teachers of writing. We explored this one element to get a sense of actual processes teacher candidates use for their own academic writing. Similarly, McQuitty and Ballock (2020) focused in on one aspect of the relationship between writing and teaching writing by exploring how teacher candidates wrote narratives and then responded to a child’s narrative.

Some studies of teacher candidates and writing are conducted within the context of coursework. The review of Morgan and Pytash (2014) concluded that experiences in methods courses allowed teacher candidates to gain “a new perspective” on writing (see also Morgan, 2010; Norman & Spencer, 2005). Another example is a study by Grisham and Wolsey (2011) that followed teacher candidates over multiple courses. They reviewed candidates’ lesson plans and found more evidence of process writing after the candidates took a literacy methods course. Sample processes in the lesson plans included prewriting, drafting, and editing. That study is germane because of its focus on writing processes, an area of inquiry for the present study.

It is important to research teacher candidates’ writing not only within literacy methods courses but also beyond literacy methods courses since all teachers will be teachers of writing. The teacher candidates in the study by Hodges and colleagues (2019), for example, were enrolled in a range of courses and were seeking certification in different content areas. Because middle level teacher candidates prepare to teach a range of content areas, it is important to investigate these candidates’ beliefs about and experiences with writing. Writing should occur in a variety of contexts within education—not only in a Language Arts classroom (NCTE 2016, 2018). Teacher candidates in the present study were enrolled in an introductory middle grades education course; it was not a literacy methods course. Thus, the context of the study adds to the literature on teacher candidates and writing.

Literacy Integration and Disciplinary Literacy

The current study also drew on research related to literacy integration and disciplinary literacy. The participants were enrolled in an introductory middle grades course. Standards for teacher preparation developed by the Association for Middle Level Education (AMLE, 2012) emphasize the interdisciplinary nature of knowledge. A research agenda sponsored by the Middle Level Education Research SIG of AERA includes a section on curriculum integration (Bennett et al. 2016); one component of curriculum integration is literacy integration across content areas. The emphasis in these documents on literacy integration aligns with the ILA brief (2018) that literacy is a “tool” and not a “subject”. Within the middle grades curriculum course where the study took

place, candidates learn about ways to integrate literacy—specifically, writing—across the curriculum. At the same time, candidates engage in several writing tasks throughout the course to practice, apply, and synthesize knowledge. Both the content and the pedagogy of the course are structured in part to disrupt the notion that reading and writing education are the sole domains of literacy methods courses. Research in middle and secondary schools had focused on ways teachers and teacher candidates enact disciplinary literacy and literacy integration in content areas beyond English and Language Arts (Leckie & Wall, 2016; Moje, 2008; Shanahan & Shanahan, 2008; 2015). In a recent review of research, Graham et al. (2020) investigated whether disciplinary writing in math, science, and social studies enhanced learning. Through a meta-analysis, they found that disciplinary writing does facilitate learning in each of these content areas at the elementary, middle, and high school levels. In implications for practice, Graham et al. noted that, when implementing new writing strategies, teachers need to watch and adapt to best meet their own instructional goals. They also cautioned that some teachers are under-prepared to teach writing (2020). The present study grew out of efforts within our College to better prepare teacher candidates to write and to teach writing so that they can implement and adapt disciplinary writing in their own future classrooms.

Previous research has identified that writing merits further attention as a component of teacher education. Some studies have investigated teacher candidates' beliefs, experiences, and attitudes toward writing and writing instruction, while others investigated types of writing teacher candidates did or planned in their lessons. This study expanded research on teacher candidates and writing in two ways: it focused first on writing processes that teacher candidates used, and not strictly written products; it also took place in a teacher preparation course that did not have a specific focus on literacy or writing methods. The course emphasized writing as a means for candidates to practice, apply, and synthesize their own knowledge as a framework for ways they could incorporate writing in their own planning and teaching, regardless of content area.

Theoretical Framework and Research Questions

The theoretical framework for this investigation of writing processes was an influential cognitive-psychological model of writing developed by Flower and Hayes (Flower & Hayes, 1981; Hayes, 2012; Hayes & Flower, 1980). In this model, writing is considered a problem-solving activity where the act of writing solves the problem of communicating a message or specific information to an intended audience. The model (Flower & Hayes, 1981) has multiple, interactive components that has a social component to it given that writing is for others (Flower, 1990). The primary determinants of how well writing processes are executed are the task at hand (e.g., the directions given for the writing assignment) and the relevant knowledge of the task or the topic held in the writer's long-term memory. These elements, in turn, influence how well

each of the primary writing processes are executed: planning, translating, and revising. Metacognition becomes a particularly important element of the cognitive model of writing given the primary goal of most college-level writers to synthesize information or to present their knowledge in a novel way. Bereiter and Scardamalia (2014), established researchers in the area of writing, purported that, as writers become more advanced, their writing goals and writing processes move from “knowledge telling” to “knowledge transforming”. Metacognition is important for knowledge transforming, that is, presenting knowledge in a novel way, given that synthesis and reflection of one’s knowledge in writing in order to convey information to a target audience is necessary. Many researchers agree that metacognitive knowledge of writing influences not only each stage of writing but also self-regulation strategies (e.g., Hayes & Flower, 1980; Wong, 1999). Thus, understanding the role of specific writing and metacognitive processes as outlined in Flower and Hayes’ work, and their connection to quality writing and how it develops, was crucial to explore in this study.

The writing processes examined in this study were: researching, drafting, reflecting, collaborating, revising, and editing. These processes align with the model of Flower and Hayes (1981) in terms of planning (researching, drafting), translating (revising, collaborating, and editing), and the metacognitive component of reflecting on writing to see that it achieves a purpose. A think-aloud method was employed in this study to determine the writing processes teacher candidates used at the beginning of the course compared to the end. Additionally, teacher candidates’ reflections on their writing after they are finished writing, that is, post-writing strategies, and the final products of writing were collected to explore how the processes each one used related to the final written product.

This study builds on previous work by investigating the writing processes teacher candidates use in real time while writing on a disciplinary topic and how their skills and strategies changed from the beginning to the end of a course. The literature reviewed in the previous sections highlight the importance of the topic as teacher candidates need to be well-prepared to become teachers of writing in all subjects they teach. Teacher candidates have beliefs about their writing that indicate further development and engagement in writing is necessary – and using the framework described to investigate their writing processes – will give insight into how teacher candidates’ beliefs manifest in their actual writing practice. Therefore, in this study we addressed three questions pertaining to the writing processes teacher candidates used:

- (1) What writing processes do teacher candidates use?
- (2) What self-reported post-writing strategies do teacher candidates use?
- (3) How does quality of writing change from the beginning of the course to the end?

The first question focuses on how teacher candidates write, or the processes. The second question focuses on how teacher candidates reflect on their writing; this question also relates to processes and strategies they would use to continue their writing. The third question focuses on what teacher candidates write, that is, the final product of writing in terms of how well it addresses the writing task, explicates a purpose, uses evidence, etc. Connecting writing processes with written products or outcomes also allows us to understand which writing processes are less frequent, more frequent, and which ones are related to writing quality (Escorcía et al., 2017). Knowledge of the processes of writing adds to the literature and assists teacher educators in implementing writing experiences in coursework that will position teacher candidates to write and to better teach writing.

Materials and Methods

What was needed for this study of the writing processes teacher candidates use was a research method that captures writing processes as they are being performed so that improvements in the final writing product can be better understood. The introspective think-aloud method is appropriate for capturing cognitive processes “online”, that is, cognitive processes as they are happening when performing complex tasks. The think-aloud method has been employed to examine the cognitive processes used by college-level learners to comprehend and recall expository texts (e.g., Linderholm & van den Broek, 2002; van den Broek et al., 2001), engage in problem solving tasks (Ericsson & Simon, 1993) and synthesize research literature in writing (Escorcía et al., 2017). The basic procedure of the think-aloud method is to ask participants to verbalize what they are doing as they engage in a complex task. Verbalizations reflect the cognitive and metacognitive processes and strategies participants engage in to complete the task. The think-aloud method is ideal for capturing what happens during writing and aligning specific processes with the quality of the final product.

This study used a concurrent nested mixed methods design (Creswell & Plano Clark, 2007). Specifically, the design calls for one methodology to serve as the primary data analysis technique and a second methodology to supplement the analysis (Creswell & Plano Clark, 2007). For this study, the quantitative analysis of teacher candidates’ writing processes before and after taking a writing-enriched course was the primary quantitative data analysis and we further explicated and explored those findings using qualitative analysis (Creswell et al., 2006). After quantitative data analyses were complete, the research team identified exemplary cases (Yin, 2009) for further qualitative analysis. Exemplary cases were determined on the basis of results of the quantitative analysis where writing scores on the measures of essay quality showed the largest difference from the first to the second session.

Context for the Study

The participants in this study were undergraduate teacher candidates enrolled in a middle grades curriculum course as part of their coursework to prepare for middle grades licensure; the setting was a regional university in the Southeastern United States. This course was also designated as *writing-enriched* as part of a larger university-wide initiative. Drawing on educational and professional factors at the local and national levels, a university committee had identified undergraduate writing as a campus-wide initiative. To improve undergraduate writing, instructors across campus engaged in the high-impact practice of Writing across the Curriculum with two student learning outcomes (SLOs) on the use of writing processes and on disciplinary writing. Courses across campus that were part of this initiative were designated as *writing-enriched*. Instructors of writing-enriched courses adapted the campus-wide SLOs to their own disciplines and courses. A group at the university level collected data to analyse the effectiveness of this writing initiative. These data included written samples from students in writing-enriched courses and student questionnaires about the processes they had used while writing. The research team for this study decided to focus on the writing processes teacher candidates used in a specific writing-enriched course in a middle grades curriculum course. This study was an attempt to investigate writing processes beyond the self-report data on the student questionnaires. Since the context of the study was an education course that was writing-enriched as part of a university initiative, it was important that the research team evaluated the university-wide initiative at the course level. However, the primary purpose of the present study was to investigate what processes teacher candidates used, how those related to their written products, and how they reflected on their writing process. The research team for this study included the associate dean for the college of education, with expertise in educational psychology and think-aloud methodology; the course instructor; a researcher with expertise in program assessment and evaluation, and a graduate research assistant.

Participants

Ten teacher candidates enrolled in a middle grades education program participated in this study. At the time of the study, each was enrolled in an introductory middle grades curriculum course that was designated as writing-enriched. The research team set out to recruit participants in an introductory course in the elementary education program that was also writing-enriched. Since participation involved two individual hour-long meetings with Author 1 during the semester, there was a small number of complete data sets due to the time commitment and scheduling constraints. All ten complete data sets corresponded to participants who were enrolled in the middle grades education course.

Participants were 10 undergraduate teacher candidates. There were four males and six females; all spoke English as their first language. Participants took part

in a data collection session both at the beginning of the course and at the end. The amount of time that passed between sessions one and two were dependent on participants' individual schedules and, thus, ranged between 11-13 weeks. Author 1 recruited teacher candidates in each course and ran the data collection sessions for all participants. The course instructor did not know who participated in the study until the end of the semester after grades were posted.

The introductory middle grades curriculum course included topics informed by middle grades research and theory: young adolescent development, middle level philosophy, and introductory curriculum and planning for students in grades 4-8. Each middle grades teacher candidate selected two content concentrations from Language Arts, Math, Science, and Social Studies. The course included a field component but did not require teacher candidates to plan and teach their own lessons. Author 2 was the instructor. The course included a range of writing tasks including reading reflections, classroom observations, and lesson planning assignments. Additionally, Author 2 structured some assignments to support candidates with writing processes including planning, researching, providing evidence, and revising; these assignments also supported candidates in connecting theory with practice. One example assignment was a shadow study of a young adolescent (cf. Lounsbury, 2016). About 4-5 weeks into the course, each candidate spent a day following a student's schedule and recording running observations. In class, the candidates used a planning page to analyse the student's day in terms of course concepts such as young adolescent development and developmentally responsive teaching and learning practices. Then each candidate wrote a paper analysing the student's experience, connecting their focus student to concepts in theory and research, and reflecting on their own teaching in response to the experience. Candidates typically revise their first shadow study; Author 2 in feedback generally guides candidates to provide more examples from the running observations and more connections to theory and research. Then candidates complete a second shadow study around week 12 in the term. Thus, candidates spend several weeks engaged in the writing processes with this assignment: gathering evidence, analysing evidence, connecting theory to practice, and revising their writing. In another assignment, candidates write a short paper explaining their emerging teaching practices and vision to an imagined audience of parents of their future students. Candidates need to be able to translate course concepts into accessible, everyday language for an audience of non-educators, and they need to provide concrete examples to explain topics like interdisciplinary curriculum and developmentally responsive teaching and learning. These two assignments especially exemplify principles for teaching writing from the NCTE (2018) position statement related to the ideas that writers grow within a culture of feedback (3.1), and that writers grow when they have "a range of writing experiences and in-depth writing experiences" (3.4). These two assignments, which span several weeks apiece, engage teacher candidates in critical thinking and writing processes to support their expanding knowledge for teaching and provide them with example

processes and practices for teaching writing processes within their future classrooms. Specific practices include peer debrief, peer feedback, drafting and revising, in addition to those named above.

Data Sources

Writing processing categories

During the think-aloud task, participants verbalized their writing processes as they responded to a writing prompt. The first two authors then sorted the verbalizations into one of six writing processing categories. The categories used to sort think-aloud verbalizations aligned with the university-wide writing initiative. One student learning goal of the university's writing initiative was to increase the percentage of undergraduate students who used the writing processes of researching, drafting, reflecting, collaborating, revising, and editing. We adopted these six categories for analysis in this study. Definitions for each category were: (1) Researching is gathering and evaluating relevant information; (2) Drafting is outlining and creating a preliminary first draft; (3) Reflecting is how closely the text so far matches the task or the needs of the intended audience; (4) Collaborating is seeking feedback and input from others such as friends and teachers; (5) Revising is creating multiple versions to address reasoning, logic, audience, and flow of ideas; and (6) Editing is correcting grammar and mechanical errors (from University Quality Enhancement Plan for Effective Writing, 2015-2020). If a verbalization did not fall in to one of the six pre-established categories used for analysis, then it was placed in a category marked "other". The first three authors discussed how sample verbalizations might fit into one of the six pre-established categories to ensure all had the same understanding of the definitions prior to analysing the data. For example, it was determined that if participants went back to previously written paragraphs to revise and improve the comprehensibility of an essay that was defined as revising (category 5) as opposed to editing (category 6). Editing (category 6) was reserved for superficial corrections to writing that occurred on a local level (e.g., correcting grammar in the same sentence that the participant was currently working on).

Writing rubric

To assess the quality of participants' writing, an established rubric was adapted from a Common Core writing rubric and a college-level rubric used by DePaul University to evaluate the participants' completed essays produced in both session one and two. This rubric was selected because of its established use to assess writing quality and because it aligned with the student learning outcomes of the university's writing-enriched program. The elements of writing that the rubric assessed were: (1) Mechanics, (2) Focus, (3) Evidence, (4) Organization, and (5) Audience. Each essay was scored on these five elements and given the following ratings of 1 = unacceptable; 2 = marginal; 3 = competent; and 4 = exemplary. These elements are also parallel to the 6+1 Traits Rubric (Education

Northwest, n.d.) that candidates learned about during the course. See the Appendix for the rubric.

Procedure

In this section, we review the data collection procedures followed. To allow the researchers to study the writing processes as they unfolded, participants engaged in the think-aloud task (Ericsson & Simon, 1993) while they were writing an assignment that was similar to one they would do in their undergraduate teacher education course. The think-aloud task required participants to verbalize aloud what they are thinking as they engaged in a complex task. The think-aloud task has been used to examine cognitive processes and strategies college-level learners use as they engage in tasks such as reading, problem solving, and writing (Linderholm & van den Broek, 2002; Ericsson & Simon, 1993; Escorcia et al., 2017). Given the unique nature of the think-aloud task, participants in this study were given a chance to practice it before the official data collection began (see Linderholm & van den Broek, 2002) on a short writing prompt about their ideal vacation. After practicing the think-aloud task for 10 minutes, participants were asked to write a short essay based on the following writing prompt (adapted from Oppenheimer et al., 2017): “A friend is interested in a topic you are learning about in a college class. Write out an explanation of the topic in one of your classes so that your friend (who has no experience with that topic) can understand it.” We adapted this prompt because it is similar enough to some writing tasks in teacher education coursework without duplicating specific course assignments. Participants were given 30 minutes to respond to the prompt. If a participant didn’t constantly verbalize what they were thinking, Author 1, who collected all data, reminded them to keep talking and thinking aloud.

In addition to verbalizations, we used recording software to fully capture the writing process during this study of teacher candidates. Camtasia software (<http://discover.techsmith.com/camtasia-brand-desktop/?gclid=COuFmai9rtQCFdU7gQodXyoCKQ>) recorded participants’ verbalizations as well as their writing, editing, and use of internet for searches on the computer screen as a video (see Birru et al., 2004, for example of others who have used Camtasia to record think-aloud responses). The use of recording software to capture participants’ verbalizations while writing as well as running record of what they wrote allowed us to view the participants’ writing processes in action. Since we were able to trace what participants wrote and also listen to their think-aloud, this procedure aligned with recommendations in Graham and Harris (2014) that studies of writing should include “real-world” contexts (p. 105), in this case, each candidate’s regular approach to writing. After completion of the think-aloud task, participants were asked to respond to a post-writing task, “What steps would you take to finalize the writing assignment so that it is ready to hand in to an instructor for a course grade?” The Camtasia software also recorded their responses to this question. The response to this question was sorted into the same six categories described previously (see

Writing processing categories section) but were identified as “post-writing processes” that occurred after writing was completed. This question was added to give participants a chance to discuss what additional strategies, such as collaborating, they would engage in if given the opportunity. Participants repeated this same procedure, including the same writing prompt, in the first and second data collection sessions.

Analysis Procedures

Essays

The first two authors independently coded the participants’ completed essays from sessions one and two using the writing rubric (see Appendix). Completed essays were those where the participant completed the writing task within the 30-minute timeframe. The authors were blinded to the session that the essay was from (either session one or session two). The coding process yielded a kappa score of .93. Agreement was defined as ratings within one-point difference assigned for a trait by two raters using the rubric (e.g., Stellmach et al., 2009; Tinsley & Weiss, 2000).

Categorizing think-aloud and post-writing task verbalizations

The recorded sessions were reviewed to complete transcripts that differentiated what each participant wrote, what they said while writing, and what they did, as captured by Camtasia. Figure 1 is an example from one of the transcripts used for analysis. Verbalizations made by participants during the think-aloud task and post-writing task were first parsed so that each unit consisted of a complete action or idea. The first three authors determined, by discussion, what consisted of a complete action or idea unit. Next, the first two authors categorized each unit into one of the six pre-determined writing processes (see section entitled, “Writing processing categories”). The first two authors independently categorized a subset of three participants’ verbalizations, which was 30% of the sample. A kappa score of .90 was achieved showing strong agreement. Differences for final categorization were resolved through discussion. The first author then categorized all the remaining participants’ verbalizations for both the think-aloud task and the post-writing task.

Results

We analysed data to address our three research questions. First, we present quantitative results on overall essay performance changes from session one to session two, as indicated by writing rubric scores. These results related to writing quality are presented as a context for results related to the writing processes that teacher candidates used. Second, we use both quantitative and qualitative approaches to analyse data from the think-aloud verbalizations and post-writing task.

Quantitative Results

A series of paired-sample t-tests were used to determine if essay writing quality improved from the first session to the second session as indicated by writing rubric scores (see Table 1 for means and t-test statistics). Statistical significance was set at a $p < .05$. Data were analysed with regard to each element and a composite score to learn if there were significant differences in average scores from session one to session two. As can be seen in Table 1, participants' writing significantly improved from session one to session two with respect to the elements of explicating the essay's purpose, use of evidence to back up points, and gearing writing to a specific audience. Participants' rubric scores also improved from session one to session two for the mechanics and organization elements but not significantly. Participants' composite rubric scores increased 15% from session one ($M = 12.25$) to session two ($M = 14.10$).

To understand what elements of writing might have driven the results of the writing rubric scores, we first explored the think-aloud verbalizations and post-writing task responses using descriptive statistics and paired-samples t-tests. We opted not to report paired-sample-t test results as none proved to be statistically significant likely due to the small sample size. See Tables 2 and 3 for the mean proportion of times participants employed the writing processes of researching, drafting, reflecting, collaborating, revising and editing during the think-aloud and post-writing tasks, respectively.

Reviewing the means from Table 2, which reflects the findings from the think-aloud verbalizations, there were no noticeable increases from session one to session two with regard to the proportion of writing processes participants used. In terms of frequency, across both sessions one and two, participants engaged in more editing and reflecting than other categories.

Reviewing the means from Table 3, when participants were asked to explicitly verbalize how they might finish up any writing assignment in general, via the post-writing task, the data were more varied from session one to session two. Based on an inspection of means in each category, Table 3 highlights that participants stated they would be more likely to engage in researching, reflecting, and revising in session two when compared to session one responses.

Qualitative Results

Think-aloud task verbalizations related to writing rubric results

Because the quantitative data from the think-aloud and post-writing tasks did not entirely explain why writing rubric scores increased from session one to two, qualitative methods were used to further explore writing process changes among individual participants. Using the writing rubric scores as a guide, we reviewed participants' think-aloud task verbalizations to determine how writing processes changed with regard to the rubric elements of purpose, evidence, and audience since these three elements were significantly different from session one to session two. We selected participants' verbalizations to highlight those that saw the most dramatic changes on the aforementioned elements of the

writing rubric. In other words, we looked for participant cases that had both quantitative improvement from session one to two on the rubric elements and whose verbalizations clearly exemplified the improvements. We use pseudonyms to represent the participants and protect their identity.

Purpose. Rhonda's responses were representative of writing process changes as reflected in verbalizations during the think-aloud task and the post-writing task. These changes were dramatic in terms of her ability to explicate a purpose and provide supporting evidence. In session one, Rhonda identified her essay's purpose as: "So I'm gonna summarize ... some of the things that adolescents are dealing with ... young adolescents, such as all the changes that're goin' on in their lives at once." Some of her evidence to further support the essay's purpose was verbalized as: "Okay, so I'm gonna Google the emotional changes now, and I'll just copy and paste it in my – the website I got that information from ... to do my citing later."

Rhonda's approach to identifying the purpose and focus of her essay changed in session two to being more precise and intentional. Here is a sample verbalization pertaining to Rhonda's purpose: "I'm choosin' the Indian policy in America and how the government has treated Indians over the years ... I'm just gonna summarize some of the main points ... deceit, corruption ..." Then Rhonda provided additional detail to how she would support the stated essay topic using a more analytical approach than in session one. In her critique of the United States' government policies toward Native Americans in the 1800s, Rhonda noted misguided thinking from that era: "So, Indians weren't expected to be around very long, so I'm gonna list what the government thought would happen, which is why there was so much deceit and corruption when it came to policy ... they were expected to assimilate."

Evidence. Barb's verbalizations showed more sophisticated use of evidence to back up written statements from session one to two. The focus of her first essay was: "Many people today don't see the issues that concern women, even if they are women." For much of the session, instead of providing strong evidence, she wrote broad, generalized statements such as: "there's a great deal of women still confined to the home ..." and "... maternity leave isn't possible for all occupations" at the beginning of her essay. After some time, she finally moved away from writing such wide-ranging statements and used clearer evidence to support her topic: "Still many generations believe that women have a place in the home and there are many cases ... cases in the news alone that show ... the perception, well ... that show how men perceive women ... there is little respect ... cases in the news alone that show how men perceive women."

In Barb's essay during session two, the purpose statement was clear and to the point as was evidence supporting her thesis. Her evidence was based more on resources rather than opinion or conjecture: "[Christine de Pizan] is arguably the first feminist due to her ... very open views on women." As evidence she

elaborated: “this could be from her unusual Upbringing by her father. He also believed that women were more than just being in the kitchen or house or ... strictly held to household duties. ... he had her learn to read and write from a very young age. In fact, there was a library in their house that she spent most of her time in.” Barb used evidence not from isolated news stories but from sources she read about in the literature – thus, her evidence became more robust and credible from session one to two.

Audience. In his think-aloud verbalizations, Simon showed improvement in his ability to write with a specific audience in mind. In the first session Simon said: “...it’s no experience with the topic. All right, I’ll pretend like it’s a cultural issue. So let’s see. Write out an explanation, all right.” In session two, Simon more clearly reflected on how to guide a naïve audience unfamiliar with the topic through his explanation of concepts throughout several points in his essay. In session two, he stated: “... so the topic I’m going to choose is constitutional theory ... So I’m taking constitutional history right now How do I explain that to one of my friends who doesn’t understand it?” Later in his essay he said, “ ... how do I transition from that to ... I already said that it affects our lives.” Further into the essay he paused again to reflect on his audience’s level of understanding: “So how do I continue explaining that?” And then towards the end of her essay he stated: “Alright. I’m explaining it. Can they understand it? Yeah. I guess an overview, so ... points of the Supreme Court, what they do, legitimacy.” In session two, Simon reflected throughout his entire essay how he could best explain something to an audience who is unfamiliar with the subject.

Post-writing task verbalizations related to writing rubric results

Because there was an overall improvement in the writing rubric scores from session one to two, we also inspected participants’ verbalized post-writing strategies for further insight into their writing processes. Two participants verbalized at the end of the semester comments that reflected changes in their writing with respect to more focused writing related to their purpose, use of evidence, and writing for an audience as described in the following paragraphs.

Purpose and evidence. Barb appeared to gain an understanding of the importance of the use of evidence for clarifying the purpose of her essay from session one to session two. In session one, Barb indicated that she would finish up a writing assignment by essentially revising the wording of her essay. She stated, “I’d like totally delete some things and then probably reword a couple of things ‘cause I don’t like how the wording was with the first one ... I’d totally fix the intro ‘cause I don’t like it at all and like fix that for starters.” In session two, the crux of her response of how she would finish up a writing assignment had to do with ensuring that the statements she made in her essay were backed up by evidence. Barb verbalized, “I would just look up ... paragraphs and the ideas and then get sources to go with any ideas that I have.” Barb seemed to

shift her original post-writing strategy from simple rewording to ensuring that her written assertions were focused on particular ideas/themes and also backed up by supporting evidence.

Audience. When asked in session one how she would finish up her writing project, Rhonda stated: “You kinda revise it then, and then I try to give myself enough time that I can wait a day or two, come back to it, read it again.” The idea of waiting a day or two directly echoes general writing and revising advice Author 2, Rhonda’s instructor, stated early in the semester in the writing-enriched course. In session two, Rhonda’s post-writing reflections on how she would finalize the assignment indicated a developing sense of writing for an audience: “... one thing that I have started doing this semester that’s really helped me is ... printing it out and reading it out loud to myself ... reading it on the computer screen, I overlook a lotta stuff.” This reflects an understanding that it is necessary to edit and revise one’s writing (as she acknowledged in session one), but to do so effectively, one must engage in active, reflective strategies such as reading an essay aloud. Reading aloud and making her writing more “public” in a sense also may indicate her developing awareness of the need to tailor writing for an audience. Rhonda’s desire to hear how her essay might sound to others may be an indicator of her developing focus on the audience in her writing.

Discussion

The overarching purpose of this study was to investigate what writing processes teacher candidates used. This query is situated in a larger inquiry on how teacher candidates’ writing quality and writing processes relate in the context of a middle grades curriculum course that is writing-enriched. With regard to writing quality, the results showed that writing rubric scores improved from data collection session one, held at the beginning of the semester, to session two, held at the end of the semester. In detail, a mixed methods approach showed that teacher candidates’ writing improved with respect to explicating the purpose of their essays, use of evidence to back up claims, and writing with a particular audience in mind. Using a think-aloud method to collect data on writing processes as they occur during the act of writing, it was shown that the vast majority of writing processes teacher candidates used in both sessions overall were related to reflecting on the writing assignment and simple editing (e.g., correcting misspelled words). The think-aloud method allowed us to capture teacher candidates’ real-time metacognitive statements about their own writing. In terms of self-reported strategies in how teacher candidates approached a writing task, what we termed “post-writing processes”, descriptive statistics indicated that researching, reflecting, and revising were mentioned more often as writing strategies during session two compared to what they self-reported in session one. This indicates growth in positive writing strategies over the course of the semester they spent in the writing-enriched

course. In summary, there is some evidence that writing quality changed as a result of taking a writing-enriched course and that the think-aloud method was useful in seeing how patterns of writing processes lead to the improvement of the final product of writing. Writing processes that appeared to align with quality involved metacognitive processes such as reflecting more carefully on the purpose of the specific task, providing convincing evidence to better inform the intended audience.

Implications for Research

How do these findings add to the literature on writing instruction for teacher candidates? It provides additional evidence that teacher candidates benefit from writing experiences and instruction embedded within their teacher preparation program courses, as recommended by the ILA (2019) and Morgan and Pytash (2014). In this study, the participants were enrolled in a middle grades curriculum course; this indicates that courses in addition to literacy courses can be contexts for writing experiences and instruction. In this course, teacher candidates engaged in writing experiences to improve their own writing skills and to improve their skills in planning and teaching writing for their future students. These teacher candidates are preparing to teach a range of content areas where they will need to include disciplinary writing as a way for their future students to engage in content-area learning (cf. Bomer et al., 2019). These findings add to the literature that a variety of writing instructional experiences embedded within teacher preparation programs benefit teacher candidates as their pedagogy develops.

These findings also lend support to the cognitive-psychological model of writing of Flower and Hayes (Flower & Hayes, 1981; Hayes, 2012; Hayes & Flower, 1980). The findings support the idea that instruction, such as found in a writing-enriched course, can help writers engage in the metacognitive components of the model such as how to meet the demands of the task, as well as how to write and persuade using evidence for a particular audience. Specifically, Bereiter and Scardamalia (2014) described how metacognitive processes help move a writer from the knowledge-telling phase to a knowledge-transforming stage. This is done by tailoring writing to the audience and task in a more precise way. Taken together, the evidence from this study suggests that the teacher candidates became more astute at transforming their knowledge to help their audience better comprehend their written message.

Implications for Practice

Teacher educators, including Author 2, can build on these findings in courses that are part of teacher preparation programs. Our university-wide writing initiative focused on ways that undergraduates demonstrate critical thinking through argumentation, analysis, and synthesis through disciplinary writing; these areas correspond to text types specified in the Common Core standards (2010) which our teacher candidates will need to use to design instruction. The focus on writing processes in this study was important for us to see how teacher

candidates wrote and then reflected on, self-assessed, and then modified their writing. Author 2, inspired by the think-aloud findings, has implemented other think-aloud tasks as part of writing instruction in two courses. Expanded reflection prompts, adapted from the one used in this study, allow teacher candidates to reflect on their own writing and also to plan further writing. Thus, the think-aloud task may be used not just as a research methodology but as an instructional tool to enhance teacher candidates' writing. A think-aloud approach relates to ideas from the NCTE (2016) position statement on professional knowledge for teaching writing: writing is a process, is a tool for thinking, and has a complex relationship with talk. Our participants used think-aloud not only to check grammar and mechanics, but also to check and refine their ideas. This method thus enhanced their metacognitive strategies (Bereiter & Scardamalia, 2014). The method allowed the research to see how different participants engaged differently in writing: some wrote and revised sentence-by-sentence, while others tended to write more, step back, and then revise. Just as the participants varied in their approaches to the same task, they can structure space for their future students to approach writing in flexible ways. Additionally, Author 2 focused in class explicitly on the importance of audience and on the importance of synthesizing evidence in the example assignments described above. Based on findings from this study, Author 2 has developed additional ways to augment these focus areas within the course so that teacher candidates attend to such elements in their writing.

But will these teacher candidates apply what they are learning about their own process of writing to the benefit of their future K-12 students? There is some evidence that the writing instruction and writing experiences teacher candidates encounter in their teacher preparation program is eventually translated to their own classrooms (Grossman et al., 2000; Morgan, 2010). For example, Morgan (2010) asked teacher candidates to analyse the structure of writing and to read texts from a writer's perspective. This intensive reflection on writing gave teacher candidates specific ideas of what quality writing looks like and built their confidence in writing. The teacher candidates in this study also indicated that they would likely apply the skills learned to their own classrooms. Studies such as Morgan (2010) provides precedence that the writing skills teacher candidates learned in our writing-enriched course, particularly with regard to purpose, evidence, and audience, will become part of how they teach writing.

Limitations

But as with any piloting of a newer methodology, there were limitations to the study. The smaller sample size may have prevented the detection of significant quantitative patterns of changes to writing processes from session one to two. It would have been ideal to have enough statistical power to show a correlational link between specific writing processes and writing quality. This would have allowed particular writing processes to be targeted in future writing instruction for teacher candidates. Likewise, the writing prompt may not have been

complex enough to detect subtle changes to writing processes from session one to two. And some teacher candidates may have needed more time to revise their essays in the sessions given 30-minute limit on writing so it may be that these data are just a snapshot of writing processes teacher candidates engaged in with a simple writing prompt. A writing prompt that had additional complexity, and that challenged teacher candidates to demonstrate their writing skills, may have provided stronger evidence of the new skills teacher candidates developed as a result of taking a writing-enriched course.

Despite limitations, the evidence from the study collectively showed the benefits of the writing-enriched course for improving writing quality in our sample of teacher candidates. Writers became more cognizant of writing for a particular purpose and audience as well as the importance of backing up statements with evidence. Taken together, this study shows the usefulness of looking at multiple points of data – the final product of writing, writing processes, and explicitly described strategies to approach writing – to examine how teacher candidates develop as writers.

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Appendix

Description	Unacceptable (1)	Marginal (2)	Competent (3)	Exemplary (4)
Mechanics: Grammar and spelling	The readability of the essay is seriously hampered by persistent misspellings and/or grammatical errors.	The readability of the essay is somewhat hampered by frequent misspellings and/or grammatical errors.	The readability of the essay is minimally interrupted by some misspellings and/or grammatical errors.	The readability of the essay is not interrupted by errors. There are only a few misspellings and/or grammatical errors.
Focus: Thesis/purpose clearly identified	The purpose of the essay is not well defined. Thoughts appear disconnected and are not focused to support the thesis.	The central purpose of the essay is identified. Ideas are generally focused in a centralized way that supports the thesis.	The central purpose of the essay is clear and ideas are almost always focused in a way that supports thesis.	The central purpose of the essay is clear and supporting ideas are always well focused to support the thesis.
Evidence: The author appropriately interprets and analyses evidence and cites evidence in support of thesis.	The writer rarely analyses the evidence in support of an argument. Interpretation may be implausible.	The writer sometimes analyses the evidence in support of the argument. Interpretation is sometimes persuasive but rarely insightful.	The writer usually analyses the evidence in support of the argument. Interpretation is persuasive and occasionally insightful.	The writer always analyses the evidence in support of the argument. Interpretation is insightful and persuasive, and displays depth of thought.
Organization: The text uses appropriate transitions and clarifies the relationships among ideas presented in paragraphs. Logical progression of ideas.	Information and ideas are poorly sequenced. The audience has much difficulty following the thread of thought.	Information and ideas are somewhat presented in a logical sequence. The audience has some difficulty following the thread of thought.	Information and ideas are presented in a logical sequence which is followed by the audience with little or no difficulty.	Information and ideas are presented in a logical sequence which flows naturally and is engaging to the audience.
Audience: The author anticipates the audience's background knowledge of the topic.	The writer is not aware of the audience needs or background knowledge of the topic.	The writer is aware of, but not clear about, the audience's needs or background knowledge of the topic.	The writer is aware of the audience and sometimes accommodates to their needs and background knowledge of the topic.	The writer is fully aware of the audience and accommodates to their needs and background knowledge of the topic throughout the essay.

Note: Rubric is a modified version of two established rubrics: (1) Common Core State Standards Writing Rubrics (Grades 9-10) for Informative Essays, Turnitin (2012). Retrieved June 12, 2017, from http://www.schoolimprovement.com/docs/Common%20Core%20Rubrics_Gr9-10.pdf. and (2) Teaching Commons, DePaul University (2001-2017). Retrieved June 12, 2017, from: <https://resources.depaul.edu/teaching-commons/teaching-guides/feedback-grading/rubrics/Pages/creating-rubrics.aspx>.

Table
Means and T-Test Statistics for Writing Rubric Scores from Session One to Two

**Note: $p < .05$ was considered significant*

Variable	Session 1	Session 2	<i>t</i>	<i>P</i>
	<i>M</i>	<i>M</i>		
Mechanics	2.70	2.85	-1.15	.279
Purpose	2.45	2.90	-2.21	.054*
Evidence	2.40	2.85	-2.37	.041*
Organization	2.35	2.60	-1.62	.138
Audience	2.35	2.90	-3.97	.003*
Total/Composite	12.25	14.10	-2.88	.018*

Table 2
Mean Proportions of Writing Processes Employed During the Think-Aloud Task

	<u>Session 1</u>	<u>Session 2</u>
Variable	<i>M</i>	<i>M</i>
Researching	9.6%	8.3%
Drafting	0.6	0.3
Reflecting	35.3	27.7
Collaborating	0.0	0.0
Revising	2.1	1.1
Editing	32.0	34.6
Other	20.4	28.0

Table 3
Mean Proportions of Writing Processes Employed During the Post-Writing Task

	<u>Session 1</u>	<u>Session 2</u>
Variable	<i>M</i>	<i>M</i>
Researching	0.8%	10.0%
Drafting	3.3	0.0
Reflecting	51.2	56.8
Collaborating	7.9	3.7
Revising	4.0	9.2
Editing	11.8	8.7
Other	21.0	11.6

Figure 1. Example of transcript used for analysis of think-aloud session. Bold text is used to show what each candidate typed. Italicized text is used to show what each candidate said. Plain text in parentheses is used to show what each candidate did. Forward slashes (//) indicate how the verbalization was parsed into idea units.

I'm just gonna see where I'm at. So—//(Moves cursor to end of document. Hits enter and tab) *Um, so*//**Agencies such as he**//(backspaces to delete he)//**the Bureau of Inidan**//(backspaces to delete Inidan)//**Indian Affairs were put into place to give Indians**//(speaks everything they have typed aloud as they are typing)//*So, now, I'm just gonna talk about the pros and cons of the agencies that were put into place once Indians were moved to the west. Um,*//**some sort of a voice. Unfortunately, there was...**