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Perspectives of Middle School Science Teachers and College Instructors Regarding Preservice Writing Pedagogy Preparation

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This is to certify that the doctoral study by

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and that any and all revisions required by
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Walden University
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Abstract

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Amanda Merritt Stewart

MS, University of Maryland, Eastern Shore, 1999

MEd, Bowie State University 2007

Project Study Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Education

Walden University

May 2024

Abstract

The local problem explored in this study was the barriers and challenges facing middle school teachers in integrating and assessing writing in a science classroom. The purpose of this basic qualitative study was to explore the perspectives of college instructors and middle school science teachers regarding how teacher education programs provide the pedagogical skills necessary to integrate and assess writing within the classroom. Grounded in the Shulman's pedagogical content knowledge framework, research questions were designed to ask college instructors to describe how they prepare their students to integrate and assess writing as well as how the teachers described how their teacher preparation program provided course experiences needed to integrate and assess writing in the science classroom. Using a basic qualitative design, data were collected from 13 teachers and five college instructors via semistructured interviews. Thematic analysis was used to identify patterns and report themes. The final themes were minimal writing pedagogy skills acquired during teacher education program, collaborative and dynamic learning experiences about writing pedagogical writing skills are acquired after college and during teacher professional development, teacher education programs are designed to provide foundational learning not writing pedagogical skills, discussion on writing pedagogical skills is inconsistent and marginal in the teacher education program, and understanding the assessment process is integral in a teacher education program. The results of this study may have a positive impact on social change by bridging the gap between college instructors and middle school teachers' perspective on how well teacher education programs prepare teachers to integrate and assess writing in the classroom.

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Dedication

I am profoundly grateful for the unwavering support and encouragement that has sustained me throughout this journey. Alvin, your encouragement fueled my determination. I am grateful that you encouraged me to finish this program. Miya, this is the second journey we have started together. Your words of wisdom and encouragement were instrumental in guiding me towards this achievement. Your belief in my potential never wavered, and I am grateful for your guidance and friendship.

Alan, your understanding during this time has meant the world to me. Remember, my dear, that with dedication and passion, there are no limits to what we can achieve. To Patrina, I am forever grateful for your support and encouragement.

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To all of you who have shared in my journey, who have wiped away my tears and celebrated my victories, I extend my heartfelt gratitude. This research study stands as a testament to the love, support, and belief that you have all bestowed upon me.

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Section 1: The Problem

The Local Problem

Following the passage of the Race to the Top legislation in 2009, the federal

government published *Our Future, Our Teachers*, an innovative roadmap promoting

teacher training reform (U.S. Department of Education, 2019). Teachers were required to

receive extensive training preparation opportunities as part of the Race to the Top

program to improve their analysis skills of performance data to support and improve

student learning. Coursework and student-teaching experiences are critical for teachers to

provide quality instruction (Yang et al., 2021). Teacher preparation programs provide

aspiring teachers with the knowledge of core subject matter and pedagogy to become

effective teachers.

Signed into law in 2015, the Every Student Succeeds Act required states to

improve student academic standards by focusing on several factors, including the

relationship between teacher development and instructional effectiveness (Troppe et al.,

2020). Troppe et al. (2020) and Murad et al. (2022) argued that professional teacher

education is crucial for improving the quality of education. Legislators have required that

higher education institutions include professional competencies in their teacher training

programs (Slanda & Little, 2020). The goal of this requirement is to guarantee that

teacher candidates have the information and abilities needed to instruct students

effectively. These studies support the idea that teacher development and student academic

achievement are related.

The U.S. Department of Education mandated teacher professional development and student assessment across content (Gotch & McLean, 2019; K.T. Stevenson et al., 2019). The science assessment has various selected and constructed response items that require students to provide a written response based on writing prompts. The results of these assessments suggested that students are not mastering writing in science (U.S. Department of Education, 2011, 2019). For teaching to be impactful, it is vital to investigate the nature of teachers' pedagogical thinking because it provides a better understanding of what teachers do, how they do it, and why they do it (Loughran, 2019). Loughran (2019) also demonstrated that not understanding teachers' best practices could result in poor student performance. Evidence from multiple studies suggested that teachers' knowledge and practices are most often a direct reflection of student success (Konig et al., 2021; Kuriloff et al., 2019; Reddy et al., 2021).

Northern Community College (a pseudonym), located in the Mid-Atlantic region of the United States, has a 2-year teacher education program that does not include a writing pedagogy course in its course sequence. The only courses at Northern Community College that offer writing instruction are ENG-1010 and ENG-1020, Composition and Rhetoric, respectively. These courses teach students to plan and develop argumentative compositions but not how to integrate or assess student writing in a K–12 setting. Near Northern Community College, where many teachers from the study site completed their teacher training, high school students must take and pass a science assessment as part of the criteria for obtaining a high school diploma.

According to a science teacher, even though students must provide written responses on assessments, teachers often lack the instructional training necessary to facilitate this in a science classroom. Mason et al. (2022) investigated the writing teaching strategies used by teachers in middle school social studies and science classes and reported that a teacher stated,

> I feel accountable to them [students]. I want to take care of them, and I want to give them as much as I can. That is why I am saying, please, if I can get any training, I will take it because I am here to help. (p. 122)

Lesley et al. (2021) investigated writing instruction in an underperforming school and found that the writing instruction provided to students was of minimal benefit. A teacher who took part in their study offered her view on writing instruction and noted that monthly professional development sessions provided little assistance in improving the teaching of writing. Additionally, the teacher expressed the need for more guidance on writing pedagogy during professional development sessions.

The failure of students to respond successfully to questions that call for narrative responses was the local problem investigated in this study in which I explored how teachers believe their training prepared them to teach their students the writing skills needed to complete writing tasks. This study addressed a gap in the literature by examining how teachers' exposure to writing pedagogy courses influences their willingness to integrate and assess writing in a science classroom, potentially resulting in low student performance. I conducted participant interviews to determine how writing

pedagogy course experiences affect teachers' practices and help guide professional development opportunities for teachers to enhance their writing instruction.

Rationale

Northern Community College's 2-year teacher education program does not include a writing pedagogy course. The only courses at Northern Community College that include writing are ENG-1010 and ENG-1020, Composition and Rhetoric, respectively. These courses require students to plan and develop argumentative compositions; however, they lack direction on teachers' best practices in integrating and assessing student writing. Comparatively, the Department of Education course requirements for Southern State University (a pseudonym), a 4-year degree institution, include English language arts and reading courses, but they do not offer a specific writing pedagogical course either.

The science assessment includes 30 selected-response questions and six constructed-response questions designed to partially fulfill graduation requirements within the state of the community college and university. According to a report from the Department of Education of the state where the study site is located, out of the total score of 54 points, the six constructed-response questions are worth 18 points. Questions that require a written response make up 33% of the overall score. The assessment's points come from questions requiring written responses from students. In the latest data reported by the state, only 34.7% of high school students earned a proficient score on the science assessment, resulting in less than half of students meeting expectations. The 2019 12th grade National Report Card science data results indicated that 55% of the students who

attempted to answer the Earth and Space Science constructed-response questions scored unsatisfactory or incomplete, and 2% of the students' scores showed that their response was off task (U.S. Department of Education, 2019). Both studies provided national, state, and local evidence that student assessment scores were unacceptable. The results demonstrated that teacher training impacted student achievement; however, the studies did not investigate preservice training history or how frequently teachers included writing in their classes.

Poch et al. (2020) found that teachers reported that their preservice teacher preparation program did not prepare them to integrate writing or address the gap in student writing process knowledge. Like Poch et al., other researchers have discovered that teacher preparation programs, particularly those leading to science certification, lack a writing pedagogy course even though students are expected to express their understanding of scientific concepts through writing (Kim & Kim, 2021; Myers & Paulick, 2020; Sanders et al., 2020; Scales et al., 2019). Sharp et al. (2018) argued that research showed concerns regarding teacher preparation programs' need for more effort to implement literacy throughout K–12 instructional practices. Kind and Chan (2019) found that teachers' content and pedagogical science knowledge needed more attention from researchers, further suggesting that additional research is needed to understand the connection between teacher training and student achievement.

Another stakeholder to consider when discussing teacher education programs is the college instructor. Solheim et al. (2018) and Sharp et al. (2018) reported a need for more research on how pedagogical instructors assist teachers in learning and transferring

their knowledge into practice in the classrooms. Few teacher education programs concentrate on writing pedagogical courses, and there needs to be more research in this field (Sharp et al., 2018).

Despite the paucity of research, Graham (2019) found that teachers who embed writing into their lessons found the task complex, challenging, and required a large amount of instructional time to master. Premont (2022) and Hodges et al. (2019) contended that many teachers perceived that they needed to be more qualified and prepared to provide students with writing instruction. These studies showed that teachers felt unprepared to include writing in their instruction; contrastingly, education reform included writing elements as a criterion used as evidence to support the promotion of students.

The Longitudinal Study of American Youth 2017 found that 18.3% of seventh grade teachers said they placed only a tiny priority on plans to incorporate educational goals that would help students improve their scientific writing abilities (Miller, 2017). Meanwhile, 4.3% and 11.7% of teachers said they place a significant and modest focus, respectively, on fostering students' ability to write scientifically. The results of this study support the idea that teachers refrain from including writing in their instruction.

Current literature on teacher education preparation programs has primarily focused on process and has lacked reporting on the association between the features of a teacher program and success in the classroom (Goldhaber, 2018; Kuriloff et al., 2019). Assessment data and the limited number of preservice teachers' writing pedagogy course experiences that foster the development of pedagogical skills needed to integrate and

assess writing within a science classroom support the existence of the local problem identified in this project study. In this study, I sought to close the gap in understanding and practice regarding writing pedagogy course experience and the willingness of teachers to integrate writing into their science lessons and assessments. The purpose of this basic qualitative study was to explore the perspectives of college instructors and middle school science teachers regarding how teacher education programs provide the pedagogical skills necessary to integrate and assess writing within a science classroom.

Definition of Terms

Common Core Standards: A collection of educational standards for English language arts and mathematics that describe what K-12 students should understand (Geer, 2018).

Instructional practices: Techniques teachers use to create a learning environment that supports the development of independent and strategic learners (Francisco & Celon, 2020).

Middle school teachers: Educators who work with 10- to 15-year-olds and whose schools may be labeled as intermediate, middle, or junior school (Ruppert, 2020).

Pedagogical instructors: Instructors charged with teaching college students the methods and practices of teaching (Floden et al., 2021).

Preservice training: An instruction for aspiring teachers that strives to provide individuals with technical skills and knowledge of curriculum, content, and pedagogy. (Hodges et al., 2019).

Professional development: Any program, activity, or training where teachers actively analyze effective instruction, student work, and the alignment of school and district policies and practices (Juuti et al., 2021).

Secondary education: Grades 6 through 12, which starts when students are typically between the ages of 11 and 13 (Siakalli et al., 2022).

Teacher education: Education that focuses on teaching and learning to prepare future teachers (Floden et al., 2021).

Teacher preparation programs: Higher education programs where aspiring teachers gain core knowledge in subject matter and pedagogy (Yang et al., 2021).

Significance of the Study

The results of this study offer higher education leaders a better understanding of preservice teachers' experiences in writing pedagogy coursework regarding how teachers integrating writing into their science lessons and justifying the need for program instructional design improvements. I found a connection between limited experience in writing pedagogy courses and teachers' integration and assessment of writing in their instruction. The findings indicated that school leaders at Northern Community College could use the results of this study to justify a request for an additional course or program changes requirement that includes an innovative writing pedagogical course that can help teachers gain knowledge that would positively impact their instructional practice.

The results of this study contribute to research-based and data-driven decisions made by higher education leaders and K–12 school leaders when transforming professional development activities. Transforming teacher education programs to include

writing pedagogy courses could potentially effect positive social change within higher education institutions and, eventually, the K–12 education system and lead to higher levels of education and achievement in the school community and society.

Research Questions

Northern Community College, a 2-year teacher education program, does not require a writing pedagogy course for education majors. The only courses at Northern Community College that provide writing are ENG-1010 and ENG-1020, Composition and Rhetoric, respectively. These courses require students to plan and develop argumentative compositions, not to learn how to integrate or assess student writing. The local problem addressed through this study was that teachers' limited writing pedagogy course experience may reflect their willingness to integrate and assess writing in their science classrooms, which may negatively affect student success. The purpose of this basic qualitative study was to explore the perspectives of college instructors and middle school science teachers regarding how teacher education programs provide the pedagogical skills necessary to integrate writing within the science classroom. Two research questions guided this study:

RQ1: How do college teacher preparation instructors describe their preparation of future secondary science teachers regarding the pedagogical skills necessary to integrate and assess writing in the science classroom?

RQ2: How do middle school science teachers describe how their college teacher preparation program provided course experiences that provided pedagogical writing skills needed to integrate and assess writing in the science classroom?

Review of the Literature

I conducted a comprehensive analysis of the current research regarding teacher education and the development of pedagogical writing skills and organized the literature review into four sections. The first section is focused on the study's conceptual framework. In the second section, I discuss teacher education programs, and in the third, I discuss teachers' attitudes toward their preparedness. The fourth section is focused on professional development. The main keyword search terms used for the literature review were *teacher education, educators' perception, writing in science, instructional practices,* and *the Shulman pedagogical content knowledge (PCK) framework*. Several databases, accessed through the Walden University Library, were used to locate literature for this review, including ProQuest, ERIC, and SAGE. Most of the primary research studies included in the literature review were published between 2018 and 2023, but the review also includes seminal works published in 1987. The review provided context for the local problem and justified the research gap addressed in this study.

Conceptual Framework

Various frameworks were researched while preparing for the current study. After considering several frameworks, I determined that Shulman's (1987) pedagogical content knowledge (PCK) framework was appropriate for this study. In the PCK framework, the importance of teachers studying subject matter content, pedagogy knowledge, and how to blend both elements to teach effectively is emphasized (Shulman, 1987). Shulman's PCK framework provided me with the necessary framework for developing interview questions that were used to explore the perspectives of college instructors and middle

school science teachers regarding how teacher education programs provide the pedagogical skills necessary to integrate writing within the science classroom.

Shulman's (1987) PCK framework aligned with the purpose of this project study. PCK is a particular type of teacher professional knowledge that is highly regarded as a fundamental indicator of teacher quality (Reynolds & Park, 2020). Shulman investigated the test scores of teacher candidates who were seeking teacher certification, reasoning that preparing teachers with only content or pedagogical knowledge is insufficient and that a blended learning approach was needed. Reynolds and Park (2020) noted that Shulman conceptualized that content and pedagogy should intersect in practice. Barendsen and Henze (2019) agreed that teachers' knowledge is a synthesis of content material and pedagogy that enables teachers to understand how content-specific topics and teacher practices are linked. Barendsen and Henze (2019) found that understanding how to write as well as the teaching method and practice of writing are critical when developing effective teaching practices.

Shulman's (1987) framework was developed based on the idea that comprehension and reasoning, transformation, and reflection are attributes teachers need to transform student learning. Shulman justified the need for this approach based on evidence that society ignored the holistic needs of teachers. The logical connection between the framework and the current study is that when teachers do not receive a blending of content and pedagogical learning experiences, teachers are unprepared to integrate and assess writing within a science classroom.

In the PCK framework, Shulman (1987) emphasized that effective teacher training should encompass content and pedagogical course experience. Considering this, I classified the interview questions into three categories: content, pedagogy, and teaching. By employing this framework, insights were gained into the experiences and perspectives of science teachers who have completed a teacher education program, particularly about their capacity to proficiently integrate and assess writing in a science classroom and the college instructors charged with equipping future teachers with the necessary pedagogical skills. During the data analysis process, I considered these three categories while condensing codes and themes.

Shulman's framework conceptualized a new way of thinking about pedagogical practices and was the groundwork for education reform (Mayer, 2021). Shulman's PCK framework has been expounded on by other researchers who incorporated various attributes to customize the framework in consideration of different topics. For example, Koehler and Mishra (2009) proposed a novel approach to teacher education programs and evaluation by incorporating technology into Shulman's PCK framework. Their technological pedagogical content knowledge was an innovative approach that offered a new perspective on designing teacher education programs that could enhance teachers' pedagogical skills and enable them to effectively incorporate technology in their teaching practices. The authors affirmed Shulman's concept that the complex integration of pedagogy and content knowledge is essential for effective teaching while integrating technology to support student learning.

In support of PCK, Reynolds and Park (2020) found that teacher education program creators should design specialized courses that intentionally connect content and pedagogy to help teachers develop instructional skills. Magnusson et al. (1999) reasoned that a significant contribution to teacher education reform was highlighted by research that supported the idea that subject-specific content and pedagogical knowledge are essential to effective teaching. On the other hand, Barendsen and Henze (2019) specifically compared the relationship between PCK and science teachers' classroom practices. Even though there was evidence of the importance of a blended learning approach, these researchers found that science teachers needed to display more integration between PCK training and classroom instructional practices. Their study results were not aligned with the PCK framework, and they suggested that additional research is needed to understand the challenges in blending PCK and teacher instructional practices. I used Shulman's PCK framework to address the gap in practice and guide the exploration of how the limited writing pedagogy course experience of teachers may be reflective of their willingness to integrate and assess writing in their science lessons.

Review of the Broader Problem

In this section of the literature review, I delve into the broad topic of teacher preparation by emphasizing three distinct areas: professional development, teacher education programs, and teachers' perceptions of their preparedness. A deeper investigation into teacher training revealed possible organizational challenges that the research community may consider significant. In this analysis, I explored sufficient

teacher preparation's significance and illustrated how resolving the highlighted concerns could improve instructional and educational outcomes.

Teacher Education Programs

By fostering learning environments that promote growth, development, and success, teachers play a crucial role in influencing the lives and futures of their students. When looking at education as a system, teachers are the primary source that enables the system's operation (Celik et al., 2021). The authors found that teachers are the primary facilitators in ensuring that the educational processes run smoothly and that desired outcomes are achieved. Yang et al. (2021) argued that quality instruction resulting in desired outcomes begins with teachers with content and pedagogy training. N. A. Stevenson et al. (2020) noted that high-quality teacher education programs are necessary to ensure teachers are prepared to teach. School leaders' most challenging responsibilities when developing teacher education programs are deciding which skills and information to include in the curricula (N. A. Stevenson et al., 2020).

A 2015 national survey found that at least one third of teachers in the United States did so without completing a teacher preparation program (Carver-Thomas & Darling-Hammond, 2017). In response to the teacher shortage, many states have implemented alternative teacher certification programs (Darling-Hammond, 2020). According to Floden et al. (2021), the objective of these programs was to train newly hired teachers and teacher candidates to help them obtain their teaching certificates.

The National Council on Teacher Quality (2021), a nonpartisan research and policy group, published the *State Teacher Policy Yearbook* to raise the country's teacher

workforce standard. Their research indicated that teacher education programs'
organization, content, and quality vary significantly between states. The council found
that numerous states have altered their teacher training programs in response to concerns
about the caliber and effectiveness of teachers.

Student teaching is a critical component of preservice teacher training because it
provides valuable opportunities for hands-on learning in real classroom settings (Jita,
2018). The National Education Association (2019) emphasized the value of student
teaching as a crucial element of preservice teacher preparation. According to their
research, preservice teachers can watch and learn from more seasoned educators, practice
teaching under supervision, and get feedback on their instruction through student
teaching. Jita concluded that student teaching aids preservice teachers in acquiring
various competencies, including assessment and instructional planning.

Jita (2018) and the National Education Association (2019) stressed that
compelling teaching experiences can enhance students' academic achievement. Likewise,
Celik et al. (2021) reported a positive correlation between student achievement and the
quality of the preservice teaching program. Teaching effectively requires information,
specialized abilities, and attitudes (Rahmadi et al., 2020). Hubbard et al. (2020) asserted
that teachers need engagement opportunities, to acquire knowledge organically and
holistically, and have opportunities to reflect and communicate lessons learned by student
teaching.

Celik et al. (2021) noted that preservice teachers could apply their learning from
teacher education programs through student teaching experiences. However, Cavanagh et

al. (2019) reported that some preservice teachers need help identifying clear learning objectives for their students, which can impede their ability to plan lessons effectively and assess student progress. These findings underscore the importance of supporting preservice teachers in developing strong pedagogical skills, including articulating clear learning objectives and aligning them with appropriate teaching strategies and assessment techniques. Tican and Deniz (2019) found that while preservice teachers completed their student teaching, they could not fully utilize their learning and teaching skills. Preservice teachers were able to identify challenges they were having early on while still enrolled in their teacher education program, which could lead to future research opportunities.

Teachers' Perspectives Regarding Their Preparedness

Preservice teachers acquire positive and negative attitudes regarding teaching before they begin their first year in the classroom (Ozdas, 2018). Willis et al. (2021) found that teachers benefited from teacher education programs, but their lack of confidence affected their ability to implement engaging lessons that promoted student learning. Al Sultan et al. (2018) found that preservice teachers needed to gain more confidence in their ability to teach science and scientific literacy during their teacher education programs to promote student success.

Henderson et al. (2018) found that out of 10 teachers surveyed, 36% reported needing additional help to implement writing into their instruction. At the same time, Poch et al. (2020) noted that teachers did not feel confident that they could teach writing and positively impact students' writing abilities. Graham et al. (2021) found that 46% of middle and high school teachers thought they were not adequately equipped to integrate

writing in their classrooms. They found that there were still considerable barriers and challenges to assisting teachers with their writing instruction, such as a lack of time and resources and insufficient professional development opportunities. The authors underscored the need for continual assistance and resources to help teachers become skillful writing instructors. Graham et al found that research indicated that tailoring teachers' training experiences and needs is multifaceted.

Udu (2021) conducted a study to understand if the attitudes of teachers and students would impact the achievement rate of students. The results indicated that students' academic outcomes were positive when teachers and students had positive attitudes regarding reading and writing. Based on Udu's results, when instructors say that they are not confident with integrating writing into their instruction, it can be presumed that a teacher's low confidence level may have a detrimental impact on student achievement because it can be argued that a teacher's confidence level is directly correlated to their attitude.

Professional Development

Professional development is an important activity that enhances a teacher's pedagogy, resulting in positive student achievement (Al Asmari, 2016). High-quality professional development can improve teachers' knowledge, abilities, and attitudes, which can improve students' learning outcomes (Heirweg et al., 2022). Professional development activities provide educators with knowledge, strategies, and skills to educate students. It is challenging to describe professional development because it incorporates

multiple dimensions and evolves throughout a teacher's career, and existing research has not succeeded in doing so (Sancar & Detyakulu, 2021).

Sancar and Detyakulu (2021) found that improving student outcomes depends heavily on the professional development of teachers and begins at the college level. In the current study, the exploration of pedagogy as a learning experience and teachers' willingness to integrate writing into a science classroom included interview questions that asked participants to share information about their college and work experiences and how their teacher preparation may have shaped their instructional practices.

Instructional leaders organize professional development opportunities to improve teachers' knowledge and skills (M. M. Kennedy, 2016). Johnson (2021) contended that enhancing student learning outcomes and raising the standard of classroom instruction depends heavily on professional development. Professional development sessions that are applicable, useful, and efficient should be planned and led by instructional leaders (Johnson, 2021). Effective professional development supports teachers in improving their instructional practices (Feldacker et al., 2017). No empirical evidence confirms what constitutes effective professional development programs or activities (Fischer et al., 2018; Murad et al., 2022). Professional development sessions are collaborative activities tailored to teachers' needs to improve instruction (Gupta & Lee, 2020). The authors reported that professional development allows teachers to collaborate while acquiring instructional strategies to improve instructional practices. Teacher professional development should be collaboratively designed based on teacher needs (Cavanagh et al., 2019).

School leaders and teachers must continuously support valuable professional development opportunities (Canaran & Mirici, 2020). Lang and Collins (2019) found that teachers and school leaders were not always attuned to teachers' perceptions of instructional support. Fokaidou and Loizidou (2019) reasoned that a teacher's resilience is the result of relationships between internal strengths and outside support rather than referring to inborn strengths, freedom, or individualism. When school leaders better understand teachers' experiences and perspectives regarding professional development, they can transform teachers learning to impact instruction.

Almost every school district in the United States requires teachers to participate in professional development (M. M. Kennedy, 2016). The National Center for Education Statistics reported that teachers and principals reported that almost all public school districts (99%) required their teachers to participate in professional development activities, with the most common types of professional development being workshops, courses, and conferences (U.S. Department of Education, 2021). Traditional professional development sessions are a 1-day passive activity that reviews content or teaching strategies and leaves no time to implement strategies (Randolph et al., 2020). Research has shown that teachers' professional development activities are complex and multi-dimensional and require additional study to be able to have a positive impact on student outcomes.

Legislators have mandated teachers' participation in professional development to improve student achievement (Martin et al., 2019). Fischer et al. (2018) and Murad et al. (2022) argued that without sufficient evidence regarding the effectiveness of professional

development, it is unknown whether teacher education programs help teachers gain the

pedagogy skills needed to teach effectively. The research evidence supports the need for

additional research regarding addressing the gap between teachers' learning and their use

of best practices in the classroom.

Lee (2022) and Doubet and Southall (2018) investigated how professional

development impacted teachers' perspectives and instructional practices. Doubet and

Southall found that teachers admitted that they lacked the knowledge and skills to

integrate writing into their instruction and needed more professional development that

modeled how to integrate writing literacy into their lessons. Lee also argued that

professional development is essential for teachers to develop their teaching techniques.

Lee found that professional development positively impacted teachers' instructional

practices. Teachers reported feeling more confident and knowledgeable about modern

teaching techniques following effective professional development activities.

Cleary et al. (2022) found that effective professional development may improve

teachers' attitudes toward their professional growth. The purpose and benefit of

professional development are not always clear and straightforward to teachers, even

though the key stakeholders of professional development are teachers (Ivanova, 2017).

Loughran (2019) investigated how teachers perceive professional development and found

that teachers often lack a clear understanding of the goals and advantages of professional

development. The author reported that the findings indicated that professional

development should be planned with teachers' perspectives in mind and tailored to meet

each teacher's unique requirements and objectives (Loughran, 2019). Researchers note

that little information is known about how teachers develop the skills necessary to impact

student outcomes effectively. Understanding teachers' perspectives can help school

leaders improve professional development strategies, which is why Loughran's findings

support and justify the significance of this project study.

McChesney and Aldridge (2021) found that teachers believed that individualized

professional development approaches to promote student learning required relevant

information, skilled presenters, and more time. Popova et al. (2018) found that 22% (4

out of 18) of teachers shared that they disliked the time required to complete the

professional development program. Similarly, Layton (2015) argued that a critical issue

with professional development is that teachers believe it wastes money and time.

Cleary et al. (2022) concurred that professional development is important.

However, teachers' perspectives indicated that professional development wastes time and

money. Their study looked at the barriers to effective teacher professional development,

which included a lack of flexibility and follow up. Their study made the case that

teachers' needs and interests should be considered while creating professional

development. The authors concluded that stakeholders must have a sustained

understanding and commitment to professional development to overcome these obstacles

successfully. Their research and other reviewed studies provided a split perspective

regarding teachers' opinions of professional development. However, they offered little

evidence of science teachers' perceptions of implementing writing into science lessons.

Cleary et al.'s study supports the need for this project study.

Another critical issue with professional development activities is that most school leaders nationwide failed to assess professional development sessions (Hubbard et al., 2020). Hubbard et al. (2020) argued that the problem with designing meaningful professional development opportunities is the lack of professional development assessments. Fokaidou and Loizidou (2019) reported that the teacher professional development learning process is complex and multi-dimensional and should include the assessment of teachers' understanding and knowledge before designing and delivering professional development workshops.

Papanastasiou and Evagorou (2018) insisted that a positive correlation exists between student success and the quality of professional development. Without intentionally assessing professional development activities, the worth and quality of the sessions are unknown, and student success can be impacted. In summary, if school leaders assess professional development sessions and implement a quality professional development program that systematically trains teachers, students' success could improve. Having a quality professional development program means that teacher education programs are responsible for implementing a program with courses that will systematically train science teachers to implement writing instruction.

Doubet and Southall (2018) conducted a study to determine if teachers' professional development impacted student success and concluded that school leaders must understand the teacher to develop a professional development program that meets the needs of teachers. Thomas and Drew (2022) found that middle school teachers expressed concerns that professional development did not align with Common Core

standards and did not offer transferable skills in the classroom. The findings Doubet and Southall and Thomas and Drew provided evidence of a gap in practice between teacher development and the demonstration of best practices within the classroom.

Implications

It was once believed that an evidence-based approach would look to science for solutions; however, it is now believed that the relationship between science and practice is much more complex (Busygina et al., 2021). Improving teachers' practices and pedagogical approaches used in classrooms is not easy (Juuti et al., 2021). Higher education leaders can bridge the divide between research and teaching by using evidence-based practices, ensuring a closer alignment between research, and teaching best practices (Diery et al., 2021).

A study that investigates how teacher education programs prepare college instructors and middle school science teachers with the pedagogical skills necessary to integrate writing in the science classroom could contribute valuable insights to current educational research. Research findings and the intended audience can impact how the study results are communicated. Therefore, the findings and implications of the study were used to determine the most suitable format for delivery information. Such findings could help higher education institutions develop a curriculum plan for pedagogical writing coursework to better prepare teachers for this task. In addition, science classrooms could benefit from enhanced instructional practices by improving teachers' skills.

This means school administrators at Northern Community College and Southern State University may be able to use this study's findings to support a request for a policy change presented in a professional development plan and eventually a white paper that includes a pedagogical writing coursework requirement should the results indicate that it is an essential part of teacher preparation. On a larger scale, the findings of this study may help K–12 school leaders make research-based and data-driven decisions when preparing for professional development.

Poch et al. (2020) reported that weak writing skills in secondary schools are often associated with retention, dropout rates, and less opportunity to attend college. Professionals and employers regard the ability to write well as crucial and can stymie postsecondary growth (Poch et al., 2020). The results of this project study may provide school leaders with an opportunity to promote social change within institutions of higher learning and K–12 school settings by considering program changes that may improve writing instruction, raise achievement, lower retention, and dropout rates, and promote professional attainment. A professional development plan is an appropriate deliverable based on the findings.

Summary

The goal of this study was to explore the perspectives of college instructors and middle school science teachers regarding how teacher education programs provide the pedagogical skills necessary to integrate writing within the science classroom. Teachers' hesitance to instruct students in writing may be a factor in poor student science assessment scores. Students need effective teachers who are trained to know how to write

and integrate writing instruction in science lessons. Teachers must blend content and pedagogical knowledge to be effective. The need for continued research is based on the nation's need to improve the K–12 education system and the lack of literature reporting on the association between the features of teacher education programs and teacher success in the classroom.

This basic qualitative study was designed to address two research questions focusing on teachers' writing pedagogical preparation and demonstrating those skills in a science classroom. The conceptual framework and the literature review ground the research and show the interrelation between learning to do something and demonstrating the skill. Section 2 contains a description of how the design of the study provides a logical way to explore the local problem and research questions. The type of study is addressed and a description of why a qualitative study was most appropriate to address the two research questions is provided. The methodology subsection includes a review of how participants were selected, the number of participants, and a justification why a particular research methodology and design was followed. The data collection process subsection contains a description of the instrument used and an explanation of how data were collected.

Section 2: The Methodology

Research Design and Approach

A basic qualitative design is used when a study is generalized to one specific type of person or group (Creswell & Creswell, 2018). A basic qualitative design allows participants to describe their behaviors, beliefs, and perspectives (Butin, 2010; Rios-de-Deus et al., 2022). Qualitative research is used to evaluate people's experiences and is subjective and responsive to the biases of the researcher and participants (Tomaszewski et al., 2020). According to VanderStoep and Johnson (2009), qualitative research is an approach researchers use to describe a phenomenon using narrative expression by identifying major themes. In the current study, I derived themes from data that were gathered and thematically analyzed to explore the perspectives of college instructors and teachers regarding how teacher education programs provide the pedagogical skills necessary to integrate and assess writing within a science classroom.

The purpose of employing a qualitative approach in this study was to obtain and analyze participants' thoughts and experiences regarding teachers' readiness to integrate and use writing in their science classrooms so that students can successfully complete writing tasks. In response to today's educational needs, recent educational standards were written with the goal of equipping students to be skilled writers of explanatory texts by demonstrating knowledge of content and writing skills (Next Generation Science Standards Lead States, 2013). To research the correlation between teacher preparedness and students' ability to write effectively, I asked educators and college instructors to contribute their experiences and perceptions of their college course experiences that

offered pedagogical writing skills instruction focused on integrating and assessing writing in lessons.

A quantitative research approach is used to describe a phenomenon using numbers, and data are analyzed using a descriptive and inferential statistical approach (VanderStoep & Johnson, 2009). Therefore, a quantitative research approach would have been inappropriate for this project study because specific numerical data and statistical analysis were not used.

Several qualitative research approaches were considered for this project study, but I chose the basic qualitative design to address the research questions. Qualitative research designs not chosen included narrative, ethnography, and case study designs. A narrative approach was inappropriate because the project study did not include a chronological review of participants' experiences and data collection tools were not designed to document stories (see Cohen et al., 2018). Cohen et al. (2018) defined ethnographic design as a research approach focused on studying the critical dynamics of a group within their society or culture while in their natural setting. The participants' natural setting and culture did not relate to the research questions of the current study; therefore, this approach was not used. Cohen et al. reported that case studies blend numerical and qualitative data that use more than one data collection tool and many sources of evidence. A case study approach was not used in the current study because, other than the participants' demographic information, numerical data were not collected.

Researchers must consider research questions when determining which research approach to use (Creswell & Creswell, 2018). The first research question focused on

college instructors' descriptions of how they prepare future secondary science teachers with the pedagogical skills necessary to integrate and assess writing in the science classroom. The second research question focused on middle school science teachers' descriptions of how their teacher preparation program provided course experiences that provided pedagogical writing skills needed to integrate and assess writing in the science classroom. Both research questions and the project study goal led to the determination that using a basic qualitative study approach was the most appropriate for the current study.

Participants

I selected participants using homogenous purposeful sampling techniques for two groups. Homogenous purposeful sampling is a technique that allows researchers to select a sample of participants that would have the experiences and insight needed to answer research questions (Billups, 2021a). Using a homogenous purposeful sampling technique resulted in the selection of both middle school science teachers who completed a teacher education program and college instructors of such programs to participate in the interviews.

Homogenous purposeful sampling was appropriate for this study because it ensured that teachers and college instructors had the necessary experience needed to answer questions regarding pedagogical training experience as well as how teachers integrate and assess writing in their lessons and how college instructors provide support to aspiring science teachers. Recruiting participants with the required experience allowed for deep and rich discussions and data gathering.

Criteria for Selecting Participants

The criteria for selecting teacher participants included their being state-certified middle school science teachers, teaching Grades 6–8 in a mid-Atlantic state within the United States who were enrolled or had completed a teacher education program since the 2015 Every Student Succeeds Act was signed into law and holding at least a bachelor's degree. I recruited teachers from a school district that had issued authorization for site research. At least 25% of the teacher participants had completed an educational program at either Northern Community College or Southern State University. The remaining 75% of the teacher participants completed an educational program at a similar program within the same geographical area. I used the timeframe of having completed a teacher education program since 2015 Every Student Succeeds Act was signed into law to be able to connect the experience of the teachers with the change in requirements to include writing on assessments. To improve the likelihood of data saturation, the recommended number of teacher participants for this project study was 15 (see Cohen et al., 2018). To collect data from teachers of Grades 6 through 8, teachers from each of the three grade levels within the geographical research area were recruited and interviewed.

The criteria for selecting college instructor participants included current or previous employment at Northern Community College or Southern State University or a similar institution. Prior college instructors' previous employment must have been between the years of 2015 and 2023 to connect the experience of the college instructors with the change in requirements to include writing on state assessments. I aligned this timeline with the timeframe for teachers' participation in a teacher education program.

The instructors were assigned as instructors within the education program and taught

pedagogy skills. The number of instructor participants for this project study was five:

Two instructors from the 2-year program and three instructors from the 4-year program.

Creswell and Creswell (2018) indicated that one of the most challenging steps in

research is the recruitment of volunteers. Therefore, I used the snowballing sampling

technique was used to assist in the recruitment process. Participants were asked to share

the recruitment email with individuals they believe met the inclusionary criteria (see

Aleman-Tovar et al., 2022). Those who showed interest in participating went through the

normal recruitment process.

I used the Walden University Participant Pool database as an additional

recruitment tool. Participants who completed the interview were offered a $15 gift card to

a coffee shop or online retailer (i.e., Starbucks or Amazon). Following Walden University

Institutional Review Board (IRB) approval, I sent potential volunteers a recruitment

email (see Appendix B). Once the interested person responded to the email with

confirmation, then the interested participants were provided the multi-item demographic

questionnaire (see Appendix K) and the informed consent form (see Appendix C). The

questionnaire provided to teachers collected basic demographic information regarding

their education experience and professional experience, while the questionnaire provided

to college instructors collected basic demographic information regarding their

instructional experience at a 2- or 4-year institution of higher learning.

During the participant recruitment phase of the study, I set a goal of recruiting 25

teachers and 15 college instructors. Starting with a larger number allowed for participants

to drop out of the study and there still being an appropriate number of remaining participants required for data saturation. The small number of participants allowed for a richer collection of data. The collection of data ended when interviewing was not obtaining new information about pedagogical experiences and the integration of writing in the science classroom (see Merriam & Tisdell, 2016). Data saturation was reached with 13 teachers and five college instructors after they provided responses to open-ended interview questions that yielded rich data.

I sent out the recruitment email as a follow up to all potential participants who did not reply to the initial email when not enough participants were found following the initial round of recruitment. Still needing additional participants after the second round of recruitment emails, I utilized Facebook to solicit participants because there were issues with gaining site authorization or enough volunteers. The approval of group moderators was requested for Facebook groups that were established for the collaboration of middle school science teachers and college instructors of teacher education programs. Following Walden University IRB approval, as soon as each volunteer gave consent, data gathering began. The same demographic questionnaire, consent form, and interview questions were provided to all teacher and college instructor participants.

Participant Access

Once the study was approved by the Walden University IRB (#05-09-23-0176424), I sent a research proposal request to two school districts. Both school systems required my IRB to approve the study prior to considering allowing research within their school system. Both Northern Community College and Southern State University

approved the research proposal request (see Appendix F). If site authorization had not been obtained at the first two school districts, then Facebook would have been utilized to solicit participants within the same geographical region of Northern Community College and Southern State University.

I planned to use the Sona Systems research management system to assist with participant recruitment. Sona Systems provides web-based human subject pool management software for universities that is available through Walden University. Using the Sona Systems platform assisted in delivering the demographic questionnaire that was used to ensure the volunteers met the participant inclusion criteria (see Appendices D and E), for electronic communication, and to monitor participants agreement rates. If the Sona Systems platform was unavailable, I used the college email address for communication. Upon receiving written approval from the schools to conduct the study (see Appendix F for site authorization), I sent an introductory email with a copy of the site approval to the appropriate person or department based on the school's requirements. The introductory email included my contact information, a summary of the study, and a confidentiality statement. The participants' recruitment email included an approximate amount of time needed to complete the interview (approximately 45 minutes). Participants were informed that the preferred interview method was face-to-face; however, virtual interviewing would be available using Zoom if desired or necessary.

Oliffe et al. (2021) suggested that using a virtual platform to conduct interviews is beneficial. The authors found that the benefits included, but were not limited to, no travel needs, cost effective, extended recruitment reach, and convenience because participants

could interview from their home. Using a virtual meeting platform has many benefits;

however, there are a few challenges to consider. For example, participants may have

technological limitations or prefer not to communicate over the computer (Oliffe et al.,

2021; Thunberg & Arnell, 2021). According to Thunberg and Arnell (2021), it is crucial

to balance the advantages and disadvantages of using virtual interviews and recognize

that they vary from face-to-face interviews and call for special preparation and execution.

Researcher and Participant Working Relationship

The relationship between the researcher and participants was described from the

perspective of the researcher and then the perspective of the participants. The interaction

between the researcher and participants is central to producing valid research (Cheron et

al., 2022). Throughout the data collection process, I maintained a professional

relationship with all participants. It was important to build a rapport and make

participants comfortable (Anderson & Henry, 2020). Bell (2013) noted that the

participants' interactions with the researcher are likely to have a variety of facets and

goals. A researcher must make significant effort to explain the study's goals, maintain a

professional working relationship, and ensure participants that their participation is

voluntary.

My relationship with the participants was based on respect and professionalism.

Participants who were willing to be a part of the project study expected clear goals, an

estimation of the amount of time needed, and confidentiality. The participants received

information in a timely manner and their information was kept confidential. Pinnegar and

Quiles-Fernández (2018) argued that the quality of the researcher–participant relationship

is directly correlated to the quality of the research. To produce reliable and accurate results, the relationship between researcher and participants must be positive and productive.

I established a strong rapport with the participants while collecting data. To do this, communication was built on truth and clarity, participants were listened to, appropriate body language was used, and a comfortable atmosphere was created. All of this was done while expressing appreciation for their participation. By doing this, I provided participants with a warm and secure environment in which they could share their experiences and viewpoints, fostering a deeper understanding of their perspectives regarding how teacher education programs provide the pedagogical skills necessary to integrate writing within a science classroom.

Protection of Participants' Rights and Confidentiality

To ensure that each participant's rights were honored, and confidentiality was held to the highest standard, a consent form and research invitation letter was provided to each participant. The consent form provided the purpose, procedures, and the risk and benefits of the study. The form informed potential participants that it is the researchers' responsibility to protect their privacy and identity within the limits of the law. Specific identifiable demographic information such as name, birth date, and specific work location were not used. Teachers' identifying demographic information were not discussed in front of anyone. The consent form indicated that participants could withdraw from the study at any time. When meeting virtually or face-to-face, to conduct a structured interview, they were held one on one and in a private location to protect the identity of

the participants. Participants were provided with contact information so that they could follow up with any questions or concerns.

After the initial communication and approval of the schools or Facebook group moderators, participants were asked to use their personal email address. When documenting the participants responses, a numbering system was used. For example, the third teacher participant that submitted a consent form would be identified as T3. All information was saved on a personal electronic device that was password protected and not used by anyone other than the researcher. To protect the identity of each participant their personal information was stored separately from their interview responses. All data will be securely kept on an encrypted file for 5 years following the completion of the study and will then be securely destroyed in accordance with university protocols.

Data Collection

Traditionally, there are two types of research methods, qualitative and quantitative research (Varma et al., 2022). In qualitative studies, a researcher is the primary instrument of data collection and analysis (Merriam & Tisdell, 2016). Merriam and Tisdell (2016) asserted that the process is inductive and leads to the collection of data that could improve the practice of a particular discipline. Before deciding which data collection techniques to use, researchers should first assess their research objectives and make sure they are clear on what they want to learn (Glesne, 2011). For this project study, collecting data by observations would not be appropriate because the research questions asked participants to provide information about their experiences over time and not their day-to-day experiences. Interviewing participants aids in acquiring a deep

insight of each participant's lived experiences and social realities, resulting in a reflective analysis of the dialogues (Azungah, 2018; Roberts, 2020).

VanderStoep and Johnson (2009) found that interviewing is the most popular qualitative research data collection tool and there are three main types of interviews. The authors explained that the three main types of interviewing include informal, structured, and guided with a few iterations. An informal interview approach allows the researcher to be impromptu and a guided approach allows the researcher to deviate from the original set of questions (VanderStoep & Johnson, 2009). A review of this project study's research questions led to the determination that the best data collection method was semi-structured interviewing.

A brief demographic questionnaire was sent to participants along with the consent form. The questionnaire was used to verify that the participants were qualified to participate in the research project. The demographic forms were sent to participants by email because I was unable to gain access to the Sona Systems. To protect the privacy of the participants, a password protected computer was used.

To collect meaningful data to understand a teacher's pedagogical course experience and their willingness to integrate and assess writing in their lessons, semi-structured individual interview questions were designed so that the responses were comparable and aided in the analysis of the data. The key data collection tool used for this project study was semi-structured individual interviews, which were offered either virtually or face-to-face using an interview protocol. Billups (2021b) explained the benefit to having structured interview protocols are that they are personalized while still

having a standardized interview process which ensures the same information is collected

from each participant. Interview protocols were a key component of the interview

process. The teacher interview protocol (see Appendix G) included the process for setting

a welcoming environment, a script to be used to open and close interviews, a time

schedule, and 10 interview questions that took on average 44 minutes to complete.

The college instructor interview protocol (see Appendix H) included the process

for setting a welcoming environment, the script to be used to open and close interviews, a

time schedule, and 11 interview questions that took on average 38 minutes to complete.

Interview questions were derived from the framework. Each interview question was

followed by the element of the framework in parentheses that the question was designed

to elicit a response for, although it was expected that many of the responses may provide

data pertaining to more than one element. In addition, the prompts "Please tell me more

about...," "What did you mean by...," and "Please give me an example of...." were used to

elicit additional information or to elaborate on responses.

A research instrument is a tool that varies in complexity and can be used to

gather, quantify, and evaluate information and is associated with the research design

(Pandey & Pandey, 2021). The authors noted that a few examples of a research tool

include an interview, rating scale, an observation technique, or a questionnaire. For this

project study, a rating scale, an observation technique, or a questionnaire would not offer

the opportunity to collect data that answers the research questions fully.

A questionnaire is a systematic way to obtain data from a population in which

information is desired (Pandey & Pandey, 2021). Therefore, the instruments used were a

brief demographic questionnaire and an interview protocol. Understanding the

perspectives and beliefs of participants is a goal of qualitative studies and can be

effectively achieved by using interviews (Ravitch & Carl, 2016). To ensure that

participants meet the inclusion criteria for teachers and college instructors, a

questionnaire was used to collect demographic information to confirm that each

participant met the necessary criteria for inclusion in the study. The interview protocol

was the primary source of data collection for this study, as it provided an in-depth

understanding of participants' pedagogical experiences. The same interview protocol was

used for each group of participants (instructors and teachers) in individual, face-to-face

interviews that were expected to last approximately 45 minutes. By using the interview

protocol, a comprehensive understanding of the participants' experiences and

perspectives provided valuable insights into the research questions at hand.

      The interview data collection tool was an interview protocol. The script included

an introductory statement thanking the participants for their cooperation and a statement

regarding confidentiality of their personal information and responses. Participants were

reminded about their informed consent and that they were free to not answer any

questions, or to conclude the interview at any time they wish. Also included was an

explanation of the topics that were discussed, obstacles, and strategies to solve any

challenges, which may come up during the interview (Cheron et al., 2022). The questions

were structured to be open-ended to collect rich responses that helped to understand the

experiences of the participants. Each participant was asked the same questions in the

same order. The use of the predetermined questions helped to support the reliability and

validity of the research findings (Cheron et al., 2022). The last part of the interview protocol included a closing statement that thanked the participants for their involvement and informed them that a follow-up email would be sent once their responses are electronically summarized so that they could member check the transcript.

During interviews, a reflexive journal was used to note the interviewer's thoughts and responses. Interviews were audio recorded and an electronic transcript was produced. The printed transcriptions notes were used in conjunction with analysis notes. To enhance trustworthiness, participants members checked (reflexive participant collaboration) their data by reading, making corrections, and verifying the information for correctness (Motulsky, 2021). Following the interview, participants were emailed a summation of the interview and given the opportunity to make changes as needed. Participants were asked to return any changes within 5 business days, after which the data would be considered accurate as transcribed. This member checking step also helped to decrease the chances of bias or misunderstandings and help to strengthen the accuracy and reliability of the study.

To further decrease the likelihood of bias, teachers that I worked with were not interviewed to ensure that relationships did not impact the results of this project study. My experience as a science teacher could affect the data collection process based on my knowledge of science curriculum and experience. This was mitigated by documenting themes based on the participants' statements without projecting individual biases (Braun & Clarke, 2006). The only personal thoughts included in the conversation during interviews were from the participants. Creswell and Poth (2018) suggested that

qualitative researchers are considered the manager of the data collection process by bridging the gap between data collection tools and the data. My role as the researcher was to only collect and analyze data, not create data.

Data Analysis

The data analysis process for this study consisted of an inductive thematic analysis of interview transcripts. Thematic analysis empowers a researcher when dealing with themes that emerge from research data (Ampratwum et al., 2021). Braun and Clarke's (2006) six-phase theme analysis process were employed to elicit the underlying meaning of respondents' experiences, thoughts, or behaviors. Inductive data analysis was used to ensure that the data fully directs the analysis process (Braun & Clarke, 2006). A thematic analysis was regarded as a desirable method to use (Varma et al., 2022). The analysis was broken down into six distinct phases. Because the aim of the project study was to explore college instructors and middle school science teachers' perspectives regarding how teacher education programs provide the pedagogical skills necessary to integrate writing within a science classroom. Braun and Clarke stated that the six-step thematic analysis process includes: data review, generate initial codes, search for themes, review of themes, define and name themes, and generate a descriptive report.

Braun and Clarke (2006) presented the steps that researchers should follow when conducting a thematic analysis. To familiarize the participants' responses, the transcription of the audio recordings was the first step in the data review and analysis process. After three participants were interviewed, the first phase in topic analysis took place. The remaining participants were interviewed, and time was set aside to undertake

data analysis concurrently. After participants had been interviewed, a preliminary data review was performed to determine if data saturation had been reached. At this stage, teachers and college instructors' data were kept separate and were not analyzed together.

For Step 2, once data saturation was detected, the interview notes and transcripts were reread to find relevant pieces and generate initial codes. During the third step, the data were evaluated to identify categories between codes and began to search for themes that were relevant to the research questions (Gamage et al., 2022). During the fourth step, initial themes were identified. During the fifth step the themes were finalized. During Steps 1 through 5, the college instructor and teacher data were analyzed separately.

The last step of the thematic analysis process was the reporting of themes. Braun and Clarke (2006) reasoned that documenting and following the process is paramount when producing research that is trustworthy and reliable. Once themes were revealed, a narrative was produced that provided a concise point of view of the college instructor's and teachers' beliefs, but also the common threads or differences between the instructors' and teachers' beliefs. Analyzing and reporting the information separately allowed for a greater understanding of specific concerns of instructors and teachers while helping to address a limitation of study by reporting information separately. To ensure that this project study data review and analysis was conducted correctly, all the documented steps were followed as described below.

Data Analysis Results

The problem that inspired this qualitative project study was the barriers and challenges facing middle school teachers in integrating writing skills in the science

classroom, which may be connected to students' performance. The purpose of the study was to explore college instructors and middle school science teachers' perspectives regarding how teacher education programs provide the pedagogical skills necessary to integrate writing within the science classroom. Middle school science teachers and teacher education college instructors who met the participant criteria were invited to share their thoughts and feelings regarding the preparation of teachers in integrating and assessing writing in the science classroom.

After sending invitation emails requesting college instructors and middle science teachers to volunteer to participant, 13 middle school science teachers and five teacher education college instructors consented to be interviewed. Participants were assigned a code to protect their identity. Middle school science teachers' code began with the letter T and college instructors' code began with the letter C. The semi-structured interviews were conducted one-on-one virtually. No participant asked for a face-to-face interview. The following research questions were used to guide this project study.

RQ1: How do college teacher preparation instructors describe their preparation of future secondary science teachers regarding the pedagogical skills necessary to integrate and assess writing in the science classroom?

RQ2: How do middle school science teachers describe how their college teacher preparation program provided course experiences that provided pedagogical writing skills needed to integrate and assess writing in the science classroom?

Descriptive Data

For this study, a Google form was used to obtain demographic data. Once participants submitted the Google form, participants who met the interview criteria were sent an email asking them to schedule a time during which they were available to be interviewed. Tables 1 and 2 depict the demographic data for the middle school teachers and the college instructors, respectively. Pseudonyms and codes were used throughout the project to protect the identity of participants.

Table 1

Interview Participants Demographics: Middle School Science Teachers

Participant code	Grades taught	Education level
T1	6–8	Bachelor's degree
T2	7	Bachelor's degree
T3	8	Bachelor's degree
T4	8	Bachelor's degree
T5	7	Master's degree
T6	7	Bachelor's degree
T7	6–8	Doctorate degree
T8	6–8	Bachelor's degree
T9	6–8	Bachelor's degree
T10	7	Master's degree
T11	6–8	Doctorate degree
T12	6	Bachelor's degree
T13	7	Bachelor's degree

Table 2

Interview Participant Demographics: College Instructors

Participant code	Type of school	Education level
C1	2-year community college	Master's degree
C2	4-year university	Master's degree
C3	4-year university	Doctorate degree
C4	2-year community college	Master's degree
C5	4-year university	Doctorate degree

Interview Data

Following the university's IRB approval (see Appendix F and contacting potential participants (see Appendix I), 13 middle school science teachers and five college instructors consented to participate in semistructured interviews. Semistructured interviews were scheduled by using Sign-up Genius. The Sign-up Genius link was password protected. Once participants consented to participate, they received an email with the meeting link and password (see Appendix J). All participants who confirmed an interview date and time were sent a confirmation email.

Interviews lasted from 17 minutes to 78 minutes. Each middle school science teacher was asked the same questions using the interview protocol (see Appendix G). Each college instructor was asked the same questions using the interview protocol (see Appendix H). The average middle school science teacher's interview lasted 44 minutes. The average college instructor's interview lasted 38 minutes.

The communication platform used for interviews and data collection in this project study was Zoom. Zoom videoconferencing software was used as a mechanism to

record and transcribe all interviews. This option was used to accurately collect the participants' responses and to streamline the transcript process. Table 3 presents the duration of interviews and the corresponding transcript lengths for both middle school science teachers and college instructors. The transcripts were composed in Courier New font, double spaced with an 11-point font size.

Following the interviews, data were drawn from responses by conducting an inductive thematic analysis. It is worth noting that the middle school teacher and college instructor's data were not combined during the analysis process. Next, the procedures used to analyze the data for both the middle school science and college instructors' data will be described.

Table 3

Interview Time and Data Collected: Teachers and College Instructors

Participant	Interview duration	Pages of transcripts
T1	17 minutes	7
T2	26 minutes	10
T3	30 minutes	19
T4	32 minutes	14
T5	59 minutes	18
T6	38 minutes	18
T7	57 minutes	19
T8	64 minutes	23
T9	56 minutes	15
T10	78 minutes	25
T15	40 minutes	18
T12	46 minutes	12
T13	23 minutes	8
C1	29 minutes	12
C2	34 minutes	17
C3	34 minutes	24
C4	42 minutes	36
C5	53 minutes	30

Data Analysis Procedures

The data analysis process for this study consisted of an inductive thematic analysis of interview transcripts. Braun and Clarke (2006) developed the six-phase theme analysis procedure to determine the underlying significance of respondents' experiences, thoughts, and actions. Inductive data analysis was performed to ensure the data properly controlled the analytical process (Braun & Clarke, 2006). Six stages were used to analyze

the data. Braun and Clarke stated that the six-step thematic analysis process includes data review, the generation of initial codes, the search for themes, reviewing the themes, defining, and naming the themes, and reporting the findings. The findings are reported in two separate paths in the finding section. Findings will be divided based on the role of the participant. Therefore, the findings section will include findings from middle school science teachers and college instructors.

The interview transcripts were digitally transcribed using the Zoom platform. The analysis began with becoming familiar with the data by reading each interview transcript multiple times. While reading, notes were taken when language overlapped with similar phrases, research questions, and thought-provoking ideas occurred. Overlapping phrases were identified as patterns between participants. Next, a systematic analysis of each interview transcript was performed. As previously mentioned, teachers and college instructors' data were kept separate and not analyzed together.

A spreadsheet was used to separate responses into categories. The spreadsheet was used to organize the transcript data by assorted colors. This strategy was used to organize and code the data for both the middle school science teachers and the college instructors separately. The thematic analysis process that was used followed the steps outlined in Section 2. The steps are discussed below.

Data Analysis Procedures: Teachers

Phase 1: Familiarization With the Data. The first step of the inductive thematic analysis process was to familiarize the participants' responses by reading the interview transcripts and by listening and comparing the transcript and audio recordings for

accuracy. While listening to the audio recording, the transcript was corrected for transcription errors, spelling, and grammar. The transcript was then updated based on listening to the audio recordings. The information was read critically to digest the data while determining how the participants' responses were relevant to the research questions (Braun & Clarke, 2006). After interviewing the participants, a preliminary data review was performed to determine whether data saturation had been reached. Data saturation was reached when middle school science teachers' interview data continued generating common information threads. Therefore, saturation became evident when no new information emerged after the 13th interview.

Phase 2: Generating Initial Codes. When generating codes, a systematic data analysis was conducted (Braun & Clarke, 2006). The second step was a multiple-step process to organize the data into initial codes. The initial codes were created by identifying words and phrases that conveyed meaning in response to the interview questions. This process of reading and re-reading the transcripts, looking for meaningful codes, was repeated multiple times and resulted in 712 initial codes emerging from the data (see Appendix L).

After identifying the initial codes, these codes were analyzed to identify duplication and common threads of information. Similar languages were grouped based on their relationship with each other. For example, academic reading and academic requirements were combined into one code, and academic and writing skills development, enhancement, and writing skills were combined into one code, writing skills.

The words and phrases of the initial codes were alphabetized, and the tool WORD feature was used to see if duplicate information needed to be condensed. For example, when asked Question Number 6, teacher 3 (T3) shared that to get students to write, students must have "engaging and enjoyable" topics. Meanwhile, T1 stated that they use "rhymes and linguistic techniques" to get students to write. Additionally, T7 stated that they do not use a "cookie-cutter approach" and "fit topics" to what "students like" and want to learn about. The initial coding process identified meaningful patterns between T7 and T3. The initial codes, engaging, enjoyable, and student-like, were color-coded the same color and labeled "student interest" based on the combined words and phrases found in the transcripts. The initial codes were thus condensed into 233 secondary codes (See Appendix M).

Phase 3: Searching for Themes. The third step was a multi-step process used to construct themes from secondary codes. Themes are multifaceted data that come from central ideas (Braun & Clarke, 2003). Groups of data were organized by searching for similar and overlapping data within the 233 secondary codes. Data were then collapsed into groups when they shared similar features in the context of the study framework (Braun & Clarke, 2003). This information was then placed into different columns on an Excel spreadsheet. The find tool was used to search for duplicated information that was not identified when secondary codes were alphabetized. For example, rubric, educational rubric, and evaluation tools were grouped together under educational measurement. Educational measurement became an initial theme. The main goal was to identify initial themes and condense the number of themes based on similar comments. The list of initial

themes was condensed further by repeating this process several times which resulted in a condensed list of 29 initial themes:

- Assessment challenges

- Assessment issues

- Belief and aspiration

- Challenges and limitations

- Classroom challenges

- Colleague relationships

- Connection challenges

- Curriculum development

- Dedication

- Determination

- Diversity in education

- Effective communication

- Equity and inclusion

- Educational measurement

- Information processing

- Information sharing

- Job satisfaction

- Knowledge building

- Knowledge seeking

- Language learning

- Language skills

- Learning pathways

- Overcoming barriers

- Recognition and support

- Student engagement

- Teaching approaches

- Teaching strategies

- Writing issues

Phase 4: Reviewing Themes. In the fourth step, the 29 initial themes were evaluated multiple times to ensure that the groups were consolidated as much as possible. The initial themes were analyzed during this process based on the framework that guided this project study. The consolidation of the themes was guided by Shulman's (1987) pedagogical content knowledge (PCK) conceptual framework, which grounded this study. Therefore, Shulman's subject knowledge, content knowledge, and pedagogy guided further condensing the initial themes. Themes began to be organized and condensed based on their relevance and the conceptual framework. The list was refined several times, and then a list of four culminating themes were produced:

- Learning not now but later

- Foundational learning acquired

- Postcollege professional growth through collaboration

- Inconsistent and marginal

Phase 5: Defining, and Naming Themes. Braun and Clarke (2003) noted that Step 5 involves a revision process involving an analytical narrative encompassing the participant's overall feelings and thoughts. An Excel spreadsheet was used to manage the analysis process and provided the opportunity to understand and identify the themes. While revising the themes, an analytical review was completed to ensure the topics were aligned. A detailed analysis was conducted for each theme so the big picture could emerge from the data. This approach ensured that participants' thoughts and feelings were represented with each theme. As a result, four culminating themes emerged.

1. Learning Not Now but Later

2. Foundational Learning Acquired

3. Post-College Professional Growth through Collaboration

4. Inconsistent and Marginal

Table 4 presents an illustrative sample depicting the methodology employed to formulate the culminating teacher themes.

Table 4

Determining Culminating Themes: Teachers

Initial themes	Culminating themes	Sample response
Academic pressures, Aspiration, Assessment Challenges, Learning pathways, Limitations	Learning not now but later	"I took some education classes to help me decide to go into education, but the bulk of my learning was my science [courses]. I couldn't say there was writing. I wouldn't rank it as like I was well prepared to help teach [writing]. I could absolutely not say that. So, if there's a ranking system, put me down as low" (Participant T5).
Equity and inclusion, Language learning, Learning skills, Overcoming language barriers, vocabulary	Foundational learning acquired	"Before they [students] can be fluent writers, they really have to have a strong vocabulary and be able to know how to break down words. Know how to use them, how to apply them, and how to write." (Participant T11).
Commitment, Communication challenges, Building connections, Fostering colleague relationships	Professional growth through collaboration	"But when I got to this school, that's when I saw training, supporting co-workers or supporting teachers. Coordinators were insisting on supporting students and making a student write more. This helped me a lot and my preparation now are different compared to how it was before." (Participant T10).
Pathways, Knowledge seeking, Knowledge building, Time restraint, Experience, Strategies	Inconsistent and marginal	"I didn't feel like I was given specifics. Like strategies to gauge student writing. I wasn't given specific strategies to work with students on how to improve their writing." (Participant T12).

Learning Not Now but Later. Learning not now but later refers to the ability of a person to overcome academic challenges with determination and adaptability while demonstrating a commitment to learning by continuing their professional development after they finish their teacher education program. When asked how their college classes helped strengthen their understanding of scientific literacy, T3 spoke to this by saying, "just a little bit so other things I've gotten to know was based on individual learning." A common theme for teachers was what they had learned about integrating and assessing writing after they finished their teacher education program. Therefore, the approach can be described as "learning not now but later".

Foundational Learning Acquired. Foundational learning acquired refers to the basic supports that teachers were provided during their teacher education program that focused on embracing language diversity, equity, and the removal of learning barriers while fostering a comprehensive and inclusive environment where every learner is supported in their writing journey. When asked interview question one regarding how their teacher education program provided the instruction that prepared them to integrate and assess writing in a classroom, T17 shared that their teacher education program "gave them a foundation" of how to integrate and assess writing in the classroom however through their teaching experience they were able to learn how to integrate and assess writing in the classroom for all learners, especially ones with learning disabilities and barriers,

> Once I got in the classroom, I had to figure out how to make it work for my
>
> students of different learning abilities, such as those that maybe are special ed or

who has a learning reading disabilities, writing disabilities, whether that be

dyslexia or anything related to them hindering them from writing.

Postcollege Professional Growth Through Collaboration. Communication and

relationships are important when preservice teachers are learning at the college level and

during their career. This theme underscores the importance of professional development

that encourages teaming and learning how to integrate and assess writing in the

classroom. T11 was asked a follow-up question. They were asked to describe their

experience with respect helping other science teachers because of their background in

English language arts. T11 stated, "Absolutely, I have always chaired, led and supported

the science department." T11 shared that their training outside of the school and after

college provided them with the knowledge of how to connect science content to reading

and writing. Similarly, T10 spoke about how they saw interpersonal bonding between

teachers through professional development. T10 expressed,

> When I got to this school, that is when I saw training, and coworkers supporting
>
> other teachers, including coordinators. They were insisting on supporting students
>
> and making students write more. This helped a lot so now my preparation and
>
> planning are different from what it was before.

Inconsistent and Marginal. Inconsistent and marginal reflect the many ways

teachers were trained and how diverse learning routes promote inconsistency in teacher

knowledge and an uneasiness when integrating and assessing writing in the classroom.

Participant T10 spoke to this in saying, "I really do not really see the [writing]

preparation. Similarly, Participant 22 stated, "they could have taught us more like how to

create them [writing assignments] and how to rate students' linguistic skills." Whereas

participant T14 specifically stated that their teacher education program "did not deal with

student writing," and that," It was more about lesson planning."

Phase 6: Producing the Report. In phase six the findings are reported in a

comprehensive written document. This report serves as a structured and detailed account

of the analysis, highlighting the identified themes and providing context and evidence

from the dataset. The report will follow the analysis of the college instructor interviews.

Data Analysis Procedures: College Instructors

Phase 1: Familiarization With the Data. As with the interview analysis, the first

step of the thematic analysis process for college instructors was to become familiar with

the participants' responses. This was done by reading the interview transcripts and by

listening and comparing the transcript and audio recordings for accuracy. While listening

to the audio recording, the transcript was corrected for transcriptive errors, spelling, and

grammar. The information was read critically to digest the data while determining how

the participants' responses were relevant to the research questions (Braun & Clarke,

2006). The transcript was subsequently revised by incorporating information gleaned

from the audio recordings. Detailed notes were made whenever significant details made

an impression.

Phase 2: Generating Initial Codes. When generating codes, a systematic

analysis of the data was conducted (Braun & Clarke, 2006). The second step was a

multiple-step process used to organize the data into initial codes. Creating the initial

codes was performed by organizing and categorizing words and phrases for each

participant by looking through the interview transcripts for words and phrases that conveyed meaning in response to questions. This process was repeated multiple times and resulted in 761 initial codes emerging from the data (see Appendix N).

The words and phrases of the initial codes were then alphabetized, and the conditional formatting feature was used to see if there were duplicate information that could be condensed. The initial codes role modeling and skills development was condensed into teacher development. For example, College Instructor Number 6 stated, "I think we are required as teachers to be an example. And I think that having to instill the example of what it should look like is something that's needed." Similarly, College Instructor Number 4 (C4), stated "I think we are required as teachers to be an example. And I think that having to instill the example of what it should look like is something that's needed." Both college instructors spoke about their responsibility as role models and how they help to develop teachers' skills.

Similar words and phrases were grouped together based on their relationship with each other and by using the framework to drive this project study. For example, challenges, fear, doubt, frustration, and disapproval were combined into one code, doubt. Likewise, time, time duration, and time frame were condensed into time management. Writing planning, writing organization, and writing routine was condensed into writing pedagogy. Career choice, career exploration, and future-plans were combined into one code, employment planning. The initial codes were thus condensed into 77 secondary codes (See Appendix O).

Phase 3: Searching for Themes. The third step was a multi-step process used to construct themes from the codes. Themes are multifaceted data that come from central ideas (Braun & Clarke, 2003). Groups of data were organized by searching for similar and overlapping data within the 77 secondary codes. Codes were then collapsed into smaller groups when they shared similar features within the context of the study framework (Braun & Clarke, 2003).

This information was then placed into different columns on an Excel spreadsheet. The find and conditional formatting tool was used to search for duplicated and redundant information that was not identified when secondary codes were alphabetized. For example, diverse opinions and diverse perspectives were condensed to diverse and inclusion. Academic expectations, focus, goals, interest, level, performance, pressure, and workload were condensed into academic development. Professional experience, professionalism, and professional growth was changed to professional development. Lastly, ethical dilemmas and integrity were condensed into professionalism and integrity. The main goal was to identify initial themes and condense the number of themes based on similar comments in the context of Shulman's framework. The list of initial themes was condensed further by repeating this process several times which resulted in a condensed list of 18 initial themes:

- Academic challenges
- Academic development
- Challenges in education
- Communication and interaction

- Curriculum and content

- Diversity and inclusion

- Emotional aspects

- Expectations and standards

- Feedback and assessment

- Individual growth

- Interpersonal relationships

- Language and literacy

- Learning and motivation

- Professional development

- Professionalism and ethics

- Student engagement

- Teaching experience

- Time management

- Writing pedagogy

Phase 4: Reviewing Themes. In the fourth step, the initial themes were evaluated multiply times to ensure that the groups were consolidated as much as possible. During this process, the initial themes were analyzed based on the framework that guided this project study. The consolidation of the themes was guided by Shulman's (1987) PCK conceptual framework. Therefore, the overarching categories that were used why identifying themes were subject content, pedagogy, and the content and pedagogy. Themes began to be organized and condensed based on their relevance and the

conceptual framework. Once the initial themes were identified, the list was refined

several times, and four final themes for instructors were identified.

Phase 5: Defining, and Naming Themes. Braun and Clarke (2003) noted that

Step 5 involves a revision process that includes telling an analytical narrative that

encompassed the participant's' overall feelings and thoughts. An Excel spreadsheet was

used to manage the analysis process and provided the opportunity to understand and

name the themes. While revising the themes an analytical review was completed to make

sure that the topics were aligned. A detailed analysis was conducted for each theme so

that the big picture could emerge from the data. This approach was used to ensure that the

college instructors' thoughts and feelings were represented with each theme. As a result,

four culminating themes emerged.

1. Preparation by engagement and development

2. Preparation by engaging in dynamic discourse

3. Facilitate a supportive learning environment

4. The evaluation process is integral to skill development

Table 5 presents an illustrative sample depicting the methodology employed to formulate

the culminating themes based on the collection of the college instructor data.

Table 5

Determining Culminating Themes: College Instructors

Initial themes	Culminating themes	Sample response
Academic challenges, Academic development, Challenges in education, Student engagement	Preparation by engagement and development	"We have really focused on writing engagement in order to build on writing fluency and the desire to want to write" (Participant C4). "I see those programs are being developed and offered. And opportunities that, you know, that still in a developmental state" (Participant C2). "I have a lot of teachers who are career changers. So just understanding their content is paramount for them just being successful." (Participant C1).
Communication and interaction, Curriculum and content, Instructional strategies, Teaching experience, Writing pedagogy	Preparation by engaging in dynamic discourse	"To help their own students successfully complete writing assignments, we use modeling instructional strategies within your college classroom" (Participant C1). "I'm thinking that more emphasis is on communication and relationships that need to be built on the college level with the high school level to help." (Participant C2). "They only experience it [writing instruction] at the graduate level, my students have already decided on their content." (Participant C3).
Diversity and inclusion, Emotional aspects, Individual growth, Expectations and standards, Professionalism and ethics	Instructors facilitate a supportive learning environment	"Stop rushing it [teacher education programs length. I know it's a teacher shortage. I get it. But the fact that people are rushed into one of the most emotionally impactful professions there is." (Participant C1). "In the same way making myself aware of what I believe their anxiety levels and frustration levels are." (Participant C1).
Feedback and assessment, Language and literacy, Learning and motivation, Time management	The evaluation process is integral to skill development	"It's not something that's focused on, especially with the fast pace of the MIT program. You have students who are becoming teachers in a year and students who are becoming teachers in 2 years." (Participant C1). "So, let's say we're. Using a rubric. And they see that most of their students are developing rather than being proficient or exemplary." (Participant C4) The semesters just not long enough to cover all of that stuff and we don't do much in the way of assessment at all in my in my class except for what I've described already." (Participant C5)

Preparation by Engagement and Development. Preparation by engagement and development encompasses the problems, development, and active engagement that students/teachers experience in an academic setting. Specifically, academic development includes courses, objectives, and passions of an individual's educational journey. Additionally, the degree of involvement, interaction, and dedication that college instructors have with educational activities are also included. While navigating the complex interactions that arise between overcoming obstacles, pursuing academic objectives, and ongoing growth and development in a learning environment. For example, C4 shared their thoughts about how their course includes writing fluency lessons and stated, "we have really focused on writing engagement in order to build on writing fluency and the desire to want to write."

Preparation by Engaging in Dynamic Discourse. Preparation by engaging in dynamic discourse encompasses the entire learning environment, including all types of communication. Including the flow of information, interaction dynamics, and the general environment of a classroom. Therefore, the learning environment focuses on the larger setting in which education occurs, communication encompasses the diverse ways people express ideas, actively listen, and engage in discourse. As Participant C2 noted, "I'm thinking that more emphasis is on communication and relationships that need to be built on the college level with the high school level to help." This theme includes successful teaching techniques, communication tactics, and the process of learning how to create a welcoming environment for learning. This theme highlights the role that clear

communication, curriculum design, instructional strategies, and overall educational setting quality play in promoting successful learning outcomes.

Instructors Facilitate a Supportive Learning Environment. Instructors facilitate a supportive learning environment that includes topics on the range of viewpoints, experiences, and backgrounds that exist within an educational setting, along with factors pertaining to mental well-being. Diversity emphasizes the incorporation of many individuals, societal, and viewpoints to create a rich and diverse learning environment. The teachers' mental and emotional well-being addresses aspects such as anxiety and confidence, regarding personal development within the context of education. Participant C1 recognized this, and commented, "stop rushing it [teacher education programs length]. I know it's a teacher shortage. I get it. But the fact that people are rushed into one of the most emotionally impactful professions there is." This theme includes the relationship between people's moods and emphasizes how crucial it is to create an inclusive environment that promotes a supportive environment where individuals can learn and become successful teachers.

The Evaluation Process is Integral to Skill Development. The evaluation process is integral to the skill development of students and includes the related topics of the process of assessing student learning and offering support in a classroom. A systematic examination of information, skills, and advancement is called assessment, and the instruments and directions that are meant to improve learning chances are called support. This theme includes the mutually beneficial interaction between evaluation

processes in enhancing the effectiveness of instructional delivery and fostering continuous improvement in teaching practices.

Participant C1 summarized this in stating that, "It's not something that's focused on, especially with the fast pace of the MIT program. You have students who are becoming teachers in a year and students who are becoming teachers in 2 years." Additionally, this theme emphasizes the teamwork required to establish a setting in which evaluation is a tool for personal growth and where support systems are essential for enabling the whole learning process. Additionally, this category highlights the shared commitment to creating an environment where evaluation is used to drive personal development and acknowledges assessment as a strategic tool for identifying areas that need improvement.

Phase 6: Producing the Report. In the sixth phase, the results are documented in a comprehensive written report. This report functions as a structured and detailed narrative of the analysis, spotlighting the identified themes and furnishing context and evidence drawn from the dataset. After the examination of the interviews with college instructors, the outcomes will be presented in the sections that follow.

Reconciled Final Themes

The interviews conducted with middle school science teachers and college instructors resulted in the identification of a total of eight culminating themes, evenly divided between the two groups. Four culminating themes emerged from the discussions with middle school science teachers, shedding light on their perspective of their teacher education programs, challenges, and instructional practices. These teacher-centric themes

provide valuable insights into the unique experiences and considerations within the

middle school science teachers professional development. Simultaneously, the interviews

with college instructors revealed an additional set of four culminating themes, capturing

the perspectives, pedagogical approaches, and challenges encountered in the higher

education context. The collective findings from both sets of interviews are displayed in

Table 10 below and contribute to a comprehensive understanding of the commonalities

and distinctions in the experiences and perspectives of educators across different

educational levels and roles.

Table 6

Culminating Themes: Teachers and College Instructors

Middle school science teachers	College instructors
Learning not now but later	Preparation by engagement and development
Postcollege professional growth through collaboration	Preparation by engaging in dynamic discourse
Foundational learning acquired	Instructors facilitate a supportive learning environment
Inconsistent and marginal	The evaluation process is integral to skill development

The themes of learning not now but later and preparation by engaging and

development shared a common thread as they both underscored the dynamic interaction

between individuals and the academic journey of educators. Learning not now but later

embodied the ability to overcome challenges and navigate through the complexities of

academic pursuits, reflecting a resilient attitude toward obstacles. On the other hand,

preparation by engaging and development encapsulated the active involvement and

growth within an academic setting, emphasizing the developmental aspects of the educational journey.

The similarity lies in their focus on the proactive approach individuals adopt in response to academic challenges, showcasing resilience as a key component of preparation by engagement and development. Both themes highlight the interconnectedness of navigating academic challenges and actively participating in one's academic growth, portraying resilience as a driving force in fostering a positive and developmental academic experience.

The themes of postcollege professional growth through collaboration and preparation by engaging in dynamic discourse converged in their emphasis on fostering effective communication within an educational setting. Postcollege professional growth through collaboration highlighted the efforts to improve and enrich communication channels, emphasizing the importance of interpersonal connections. Similarly, preparation by engaging in dynamic discourse delved into the broader context of communication within the college and K-12 learning environment, encompassing instructional strategies, curriculum design, and overall learning atmosphere.

The commonality between these themes existed in their shared focus on enhancing communication dynamics to create a positive and conducive learning environment. Both themes recognized the pivotal role of effective communication in building positive relationships, facilitating a supportive atmosphere for learning, and contributing to an enriched professional development experience. The intertwining nature

of these themes underscores the significance of communication not only in personal connections but also in shaping the overall learning environment.

The themes of instructors facilitate a supportive learning environment and foundational learning acquired came together in their shared focus on fostering a comprehensive and inclusive educational experience. The instructors facilitate a supportive learning environment theme emphasized the importance of considering various aspects of learning, including diverse perspectives, and promoting an inclusive educational environment. Simultaneously, foundational learning acquired highlights the importance of a teacher education program that provides preservice teachers the opportunity to have a foundation of pedagogy skills that can address the needs of all students.

The commonality between these themes lies in their mutual recognition of the integral role that diversity plays in creating a positive and holistic learning environment. Both themes underscore the interconnectedness of inclusive practices and emotional well-being, acknowledging that a diverse and supportive educational atmosphere is essential for the development of individuals. The synthesis of the culminating themes emphasized the importance of recognizing and embracing diversity as a foundational element of teaching and learning, and produced the final reconciled themes that were used to answer the research questions in this study:

1. Minimal writing pedagogy skills acquired during teacher education program

2. Collaborative and dynamic learning experiences about writing pedagogical writing skills are acquired after college and during teacher professional development

3. Teacher education programs are designed to provide foundational learning not writing pedagogical skills

4. Discussion on writing pedagogical skills is inconsistent and marginal in the teacher education program

5. Understanding the assessment process is integral in a teacher education program

Results

The ensuing discussion investigates the identified themes and findings, offering detailed insights that support and refine each aspect of the study. The narrative attempts to enhance the understanding of study participants' experiences by providing an accurate account of their experiences, thoughts, and perspective. Incorporating descriptive quotations gathered during the interview process enhances the reliability of capturing participants' viewpoints regarding integrating and assessing writing in a classroom.

This approach ensures a comprehensive representation of the participants' perspectives, shedding light on the intricacies of both incorporating and training for the assessment of writing within an educational context. This information is integral in helping to answer both research questions posed in this study.

Research Question 1

Research Question 1 was, how do college teacher preparation instructors describe their preparation of future secondary science teachers regarding the pedagogical skills necessary to integrate and assess writing in the science classroom?

Research Question 1 was answered by final reconciled Theme 3: Teacher education programs are designed to provide foundational learning not writing pedagogical skills and Theme 4: Discussion on writing pedagogical skills is inconsistent and marginal in the teacher education program. Four out of five college instructors shared that their teacher education program provided their students with limited support and opportunity to learn how to integrate and assess writing in a classroom. In addition, although the fifth theme observed in the data did not directly correlate with Research Question 1, an intriguing trend surfaced among college instructors that warrants attention while discussing the results.

Theme 3: Teacher Education Programs are Designed to Provide Foundational Learning Not Writing Pedagogical Skills. Theme 3: Teacher education programs are designed to provide foundational learning not writing pedagogical skills helped answer Research Question 1 by shedding light on the limited practice and discussion that occurred during a teacher education program regarding writing. When C3 prompted their college students to journal about themselves, a considerable number of students experienced discomfort when addressing personal issues. The instructor explained that this exercise was designed to assist pre-service students in gaining insight into their future students' perspectives when asked to write. CI4 shared,

Writing about content is one thing. However, writing about who you are and who you are servicing is another thing. We need to remove barriers or remove anxiety that a lot of kids face with writing, because they are scared. They are scared of getting their thoughts out.

The writing task goal was to discuss how students may feel when asked to write about themselves. However, the task did not include a task that focused on teaching writing pedagogical skills.

Theme 4: Discussion on Writing Pedagogical Skills is Inconsistent and Marginal in the Teacher Education Program. Theme 4: Discussion on writing pedagogical skills is inconsistent and marginal in the teacher education program helped answer Research Question 1 by shedding light on the inconsistency and limited knowledge presented in teacher education programs that prepare individuals to be able to integrate and assess writing in a science classroom. Throughout the interviews the college instructors shared that the teacher education programs were not subject specific and offered limited support for writing instruction. However, the results highlight the variety of training methods that college instructors use to prepare teachers.

When it comes to successfully integrating and assessing writing in the classroom, many of the college instructors expressed an apprehension of how effective their programs focus, specifically on writing. However, C6 shared that the use of up-to-date topics is an innovated way they encourage teachers to get students to write. C1 stated, "Trying to make things as relevant as possible by using hot topics in the news to being able to use music; any of those things to use as a form of a hook."

C5 shared a pathway that they use with their students to help explore the art of teaching using innovated strategies that help individuals to be able to integrate and assess writing in the classroom. C2 shared how their teacher education program prepares teachers to integrate and assess writing in the classroom, "Student teaching: any of the students in the MET program or you know the education program where they get to student teach. Specifically, instruction dealing with writing across curriculum."

Similarly, to C1, CI4 explained that they teach their students that when they are in the classroom, they must find things that are relevant to children. To help model this idea, the CI4 expressed, "So, during the beginning of class when I asked them to tell me about who's showing up and to write those reflections in their journals. This gets them to write about themselves. I take notes as well."

Theme 5: Understanding the Assessment Process is Integral in a Teacher Education Program. While the fifth theme identified in the data was not directly aligned with Research Question 1, a compelling pattern emerged among college instructors that is worth noting in response to answering the research question. Despite its indirect connection, the collected data strongly suggests a prevailing attitude among college instructors. The data suggests a prevalent focus among college instructors on the importance of assessing student learning and providing classroom support.

The theme underscores the mutually beneficial interaction between evaluation processes and aid delivery, emphasizing the vital role of mentorship for teachers. Furthermore, it highlights the collaborative effort needed to establish an environment where assessment serves as a tool for personal growth, and support systems are crucial

for enabling the entire learning process. The shared commitment among instructors is evident in creating an environment where evaluation propels personal development and serves as a strategic tool in development that supports the success of teachers.

Research Question 2

Research Question 2 was: How do middle school science teachers describe how their college teacher preparation program provided course experiences that provided pedagogical writing skills needed to integrate and assess writing in the science classroom?

Research Question 2 was answered primarily by final reconciled Theme 1: Minimal writing pedagogy skills acquired during teacher education program, final reconciled Theme 2: Collaborative and dynamic learning experiences about writing pedagogical writing skills are acquired after college and during teacher professional development and final reconciled Theme 4: Discussion on writing pedagogical skills is inconsistent and marginal in the teacher education program. In addition, a review of final reconciled Theme 3: Teacher education programs are designed to provide foundational learning not writing pedagogical skills, is included because an interesting trend surfaced among the middle school science teachers that warrants attention while discussing the results. Out of 13 teachers, 12 teachers shared that their teacher education program did not adequately teach them how to integrate and assess writing in a middle school science classroom.

Theme 1: Minimal Writing Pedagogy Skills Acquired During Teacher Education Program. The data showed that 85% of the interviewed teachers reported that

their teacher education programs did not focus on strategies and skills needed to help teachers to integrate and assess writing in a science classroom. However, the teachers expressed that they understood the importance of integrating writing in the classroom and had opportunities to learn how to integrate and assess writing in their own classroom after finishing their teacher education program.

Out of 13 teachers, 11 teachers expressed that being in the classroom now helped them to recognize what skills they are or were lacking with respect to integrating and assessing writing in their science classroom when they completed their teacher education program. T7 shared that their teacher education program was 18 months long and did not provide the knowledge and skills needed to understand and assess writing scientific concepts and ideas. However, the teacher shared that once teaching they had been learning how to work with writing tasks within the science curriculum in their school system. Along those lines, other teachers expressed that after completing their teacher education programs, they knew that they lack the skills needed to integrate writing in their classrooms but knew that it was important to be able to integrate writing in their classroom. Similarly, T4 stated that they were not taught how to teach students how to write and they just do it [teach] on their own. Additionally, T10 expressed,

> I don't really see the preparation in terms of writing skills for students. For us to make a student a successful writer, we focused more on the content. We did not look a lot in terms of the process of writing but more on the knowledge of the content area.

T8 shared their experiences while completing teacher education classes and how it influenced her ability to integrate writing in lessons. There were only three teacher-specific classes, including an English as a second language class, a reading class, and a classroom management class. The classes were fully online with no face-to-face interaction with the professors. The classes focused on teaching specific skills and strategies that could be used for all students. The courses helped them to understand how to get students to read but there was no connection with writing within a classroom. When asked interview question one regarding how their program provided the knowledge and skills necessary to understand how to integrate and assess writing in their classroom, T8 shared,

> Yes, they did. So, it had elements of both [reading and writing]. We started off looking at how kids learn to read and techniques for teaching reading, differently. There was a lot of focus on teaching phonics and how beneficial that was. And then from there it went into how to incorporate writing as well.

T18 was asked a follow up question to help clarify their perspective. They were asked, How did their teacher education program provide the knowledge and skills necessary to integrate and assess writing specifically in their science classroom? In response, T8 stated,

> It didn't. It did not focus on science at all. I made some connections myself. And most of the assignments that I had to do. I tried to relate to what I already knew. But as far as specifically towards how to integrate writing and assess writing in science. It didn't cover it at all.

T6 reflected on opportunities they had during their course work, where they would review actual curriculum and sample writings from students. The goal of the exercises was to assess students' writing and seek to understand students' misconceptions and misunderstandings of the science content when writing. In contrast, T3 shared that their teacher education program helped them to personally write better. They expressed that they believed that before a teacher can help a student write, a teacher must know how to write.

T3 specified, "So, the program really also enhanced my writing skills. And it gave me so many things to work on, to also help." T3 was asked a follow up question. The follow up question asked the teacher to explain how their teacher education program specifically impacted how they help their students to write in their science classroom.

Yes, of course, as I said earlier, when I was answering the previous question, you cannot teach what you do not know. Yeah, you have to know first for yourself before you will be able to impact others. So, this is also applicable here. So, you have to know how to write effectively. You cannot [teach students] if you don't know how to write. You have to know how to write to teach someone else. That's how it works.

These teachers recognized the importance of being able to help students to write. However, their experiences of gaining the skills needed to be able to integrate and assess writing in the classroom were different. One teacher felt that they never learned how to integrate and assess writing in the classroom but have gained skills once they started teaching, while T8 and T3 shared that their experiences were different. One felt that

because they were taught to write they could help their students to write. While the third

teacher felt their program specifically taught them how to integrate and assess writing in

the classroom. The remaining teachers' perspectives were more aligned with T7 in

asserting that no preparation was provided in integrating and assessing writing in the

science classroom.

Theme 2: Collaborative and Dynamic Learning Experiences About Writing

Pedagogical Writing Skills are Acquired After College and During Teacher

Professional Development. Theme 2, which helped answer Research Question 2,

underscored the vital role of communication and relationships in teacher education

programs and school-level learning experiences, professional development, specifically

in integrating and assessing writing in the classroom.

A noteworthy finding highlights the need for professional development to address

gaps in teacher education programs. This collective approach aims to enhance effective

writing integration and assessment by emphasizing the interconnectedness of

communication, relationships, and ongoing learning. The acknowledged lack of emphasis

in college teacher education programs highlights the importance of these experiences and

emphasizes the need for teachers to actively pursue professional development separate of

their teacher education programs to develop skills in writing integration and assessment.

T8 shared that they recognized that they did not learn about how to integrate and

assess writing in the science classroom while taking education courses. However, once

they started teaching, their school district brought in an outside organization that

conducted professional development that included lesson planning that integrated writing

into the science curriculum. However, the main goal of that professional development was focused on reading not writing. T8 stated,

> When I got into the classroom, our main thing was reading in the classroom. We had to get reading scores up. So writing wasn't important. It was not important. They said let's get these reading scores up. And we go along with the reading scores. They also needed the science scores up as well too. Our school said let us focus on getting scores up. But writing was not important but reading comprehension was, and with that, they try to tie those reading scores to whatever done in math, social studies.

T8 shared that their school district was more focused on getting teachers into the classroom. The school district communicated that the plan was to provide professional development and that they could work with a teacher to improve [student] writing later. T5 shared that their teacher education program did not focus on what teachers would need to help students write. However, they did learn how to help students write and how to assess their students' writing assignments after they started teaching. T5 acknowledged,

> I would not say that the college education department deserves the credit for doing any of that. I think that my school, where I teach, prepares all students to be good writers, you know, and you were expected to do that.

Similarly, T11 stated that their teaching was shaped because they "learned as I went along." They participated in professional development programs that helped improve their teaching skills. T11 shared that they taught reading at the elementary level before

becoming a middle school science teacher. T11 served in the role of chair in the science

department at their school. Their fellow middle school science teachers leaned on them to

help to integrate writing in their classrooms. T11 explained, "the other science teachers

looked at me as a leader and with respect. So, we worked together when learning how to

integrate writing in the classroom."

T7 expressed a lack of exposure to effective strategies for integrating writing into

the classroom during their teacher education program. Despite this gap, they have

proactively sought alternative avenues for professional growth. Utilizing resources from

an educational organization with a dedicated website on writing content and professional

development for student writing, T7 had actively engaged in online learning to enhance

their teaching skills to support students in their writing process.

T9 shared that at their school their colleagues collaborate, especially because of

their background in English. The teacher serves as the department lead. Their team plans

lessons together. The teacher shared that some of the teachers struggle with integrating

writing in their classroom, especially the math and science teachers. T9 stated,

> My job is to basically give them resources to help them figure out ways they can
>
> incorporate writing in their particular subject. My team is made up of math,
>
> science, social studies, and reading but we all have to incorporate writing.

Theme 4: Discussion on Writing Pedagogical Skills is Inconsistent and

Marginal in the Teacher Education Program. Theme 4 helped answer Research

Question 2 by shedding light on inconsistent and marginal review of writing pedagogy

course experience. The results highlight the variety of training methods that college

instructors use, and they also show that different learning paths lead to variations in the information that teachers possess. When it comes to successfully integrating and assessing writing in the classroom, many of the teachers expressed an apprehension due to lack of knowledge, inconsistent professional development, not enough time, and school priorities.

Interview question nine asked teachers to share what advice they would give school leaders about developing teacher education programs that would effectively help teachers integrate and assess writing in the classroom. T7 suggested that teacher education programs should not rush students through their programs but feel that schools are just trying to rush people through the program to get teachers in the classroom. T7 stated,

> Let's stop rushing. Let's stop trying to rush us through. It probably won't happen because there's a teacher shortage out there. There just rushing us through just to get us certified. If you want quality, we need to spend quality time in the classroom as well as preparing programs.

T9 shared that future teachers and current teachers should receive training on specific strategies that can be used in the classroom that will help students understand how to write and to help teachers know how to assess writing in the classroom. T9 shared why scaffolding should be taught in teacher education programs.

> I think scaffolding is one of the most important things you can do in your classroom because that way whether you realize it or not when you scaffold,

you're hitting each standard more than once you're revisiting each standard more than once.

T6 stated that educational courses should offer students the opportunity to see examples of student work. College students should see what students do and how teachers evaluate their work. T6 believed that the best training comes from current or recent teachers. They expressed an apprehension to current professional development activities due to college instructors or facilitators being out of touch regarding what is happening in the classroom.

Some of the best PDs [professional developments] and training that I have had in the past have come from teachers that were either currently teaching or had recently left the classroom but had been doing it for a number of years. Because they understand, especially with modern day society now, what teachers are facing, but they also understand the educational piece still. They understand they have to be engaging and keep students' attention but also still teach the fundamentals.

Theme 3: Teacher Education Programs are Designed to Provide Foundational Learning Not Writing Pedagogical Skills. While Theme 3 identified in the data was not directly aligned with Research Question 2, a compelling pattern emerged among teachers that is worthy of inclusion in answering this research question. Despite its indirect connection, the collected data strongly suggests a prevailing theme among teachers. There is a shared perception that teacher education programs emphasize the importance of considering various aspects of learning, including diverse perspectives, and promoting an inclusive educational environment for all students by removing learning

barriers. This theme underscores a collective commitment to fostering a supporting, comprehensive, and inclusive learning environment, providing substantial support for every learner on their writing journey.

T8 stated that their ESOL class did not focus on just students' whose first language was not English. However, their college instructors recognized the importance of helping all students and that the strategies taught in that class were interchangeable. Specifically, T8 shared,

> As far as the actual classes that I took, the one that I think was the most practical and most useful was my ESOL class. It was mostly focused on students whose first language was not English, but they did focus on all students. The instructor would really make the point to say that these things will most definitely work for all your students. Also, it is a way to integrate kids who don't have the English skills into the general class population by using these techniques because they do work for everybody. I think that was really interesting to see because I had never heard that before.

While T4 reflected on how their teacher education program helped to understand how students may have a tough time to read because of the diverse needs, the program failed to prepare them to integrate and assess writing in their science classroom. T4 stated, `

> We were taught how to deal with diverse types of students. There are students who can read a certain paragraph and understand easily. There are others who

need to reread, and they still won't understand. However, I was not prepared to

teach writing in college, it was more focused on reading.

T3 shared that in their teacher education courses they focused on teaching diverse people,

"irrespective of whether they have written or speak in English." T3 spoke about how their

course focused on non-English speakers.

Summary

This chapter contained an analysis of the participants' responses, and a discussion

of how responses were used to answer the two research questions; employing five distinct

themes derived from semistructured interviews with middle school science teachers and

college instructors. The chapter was organized in alignment with the study's two research

questions. The themes that were identified shed light on the perspectives of both groups.

The findings indicate that a considerable proportion of college instructors (67%) believe

their teacher education programs offer opportunities for students to learn how to integrate

and assess writing in a classroom.

Despite the majority of the college instructors believing their school program

supports preservice teachers to integrate and assess writing in the classroom, there are

areas that need improvement. Notably, 85% of the interviewed middle school science

teachers expressed a lack of focus on strategies and skills in their teacher education

programs to aid in integrating and assessing writing in a science classroom. However, all

teachers affirmed their understanding of the importance of incorporating writing into the

classroom and actively seek alternative avenues to enhance their skills in integrating and

assessing writing.

The results indicated a disparity between the beliefs held by college instructors regarding the effectiveness of their programs and the actual preparedness of teachers to integrate and assess writing in the classroom. A notable majority of middle school science teachers expressed frustration with the inadequate training received during their teacher education program, particularly regarding instructional strategies and pedagogy related to the integration and assessment of writing in the classroom.

The next chapter will comprehensively explore the findings in connection with existing literature, delve into the theoretical framework supporting this study as it relates to the findings, acknowledge the study's limitations, and provide recommendations for future research and practice.

Section 3: The Project

Introduction

I designed this project study to explore the perspectives of college and middle school science teachers regarding how teacher education programs provide the pedagogical skills necessary to integrate writing within the science classroom. This basic qualitative study included interviews of both college instructors and middle school science teachers. The majority of middle school science teachers expressed that they were unprepared to integrate and assess writing in their classrooms. While many middle school science teachers reported receiving support within their school regarding writing, many also stated that they wished they had received the training while still in school. Most of the college instructors recognized that the teacher education preparation program could better prepare preservice teachers so that they may feel more prepared to integrate and assess writing in their classrooms.

I created a professional development plan (see Appendix A) designed for school leaders to systematically structure academic requirements and curriculum design, enabling preservice teachers to acquire comprehensive training in integrating and assessing writing in the classroom. This project was designed to confront the localized problem detailed in this project study.

I created a professional development plan for school leaders to make programmatic changes to improve teacher readiness. The purpose of the professional development plan is to serve as a valuable tool for school leaders in assessing the effectiveness of their current programs in equipping preservice teachers with the essential

skills for integrating and assessing writing in the classroom. I based the professional development plan on the perceptions of the college instructors and middle school science teachers in the current study. The professional development plan transcends subject-specific boundaries and can benefit all preservice teachers no matter the focus of their discipline.

The professional development plan is intended to provide school leaders and faculty with tools to prepare preservice teachers to navigate the intricacies of integrating and assessing writing within their classroom while fostering a comprehensive approach to educational preparedness. The goal of the professional development plan was to enhance the overall quality of teacher education programs and contribute to the success of educators in various subject areas.

Rationale

The local problem addressed through this qualitative study was how college instructors and teachers believed their teacher education program prepared preservice teachers to integrate and assess writing in a science classroom. The data from this study revealed a disconnect between the perceptions of the college instructors and the middle school science teachers. However, both types of participants recognized that additional training was needed to help address the local problem. Therefore, a professional development plan may provide an opportunity to address the overwhelming desire for middle school science teachers to receive additional training to help them integrate and assess writing in the classroom.

The rationale for using a professional development plan was determined based on a literature review, the research questions, and the results of data analysis. Professional development plans allow for targeted and systematic improvements (Amaro-Jimenez et al., 2022). Specifically, I designed the professional development plan for this study to improve teacher preparedness and skills, addressing the identified gap between what teacher education programs provide and what is needed for effective integration and assessment of writing in science classrooms. A professional development plan can offer tailored support and resources to address specific challenges. Therefore, my professional development plan addresses middle school science teachers' challenges, such as instructional strategies and pedagogy related to writing integration and assessment.

Garone et al. (2022) found that participants emphasized the value of positive collaboration experiences and appreciated the input and feedback from their peers and the sense of community that collaboration fostered. These findings align with Theme 1: Integrated academic growth and resilience. Therefore, it was appropriate to include ongoing collaborative learning for teachers in the professional development plan, promoting a culture of continuous improvement within educational institutions.

By engaging in the professional development activities presented in the plan, teachers can enhance their confidence and efficacy in integrating and assessing writing, leading to improved student outcomes in science education.

Review of the Literature

I conducted a secondary examination of the extant literature to explore the formation and implementation of a professional development plan, demonstrating how

scholarly findings endorse the utilization of such a plan to equip faculty members in enhancing student readiness.

Higher education institutions typically maintain a department dedicated to facilitating the professional growth of staff (Adamec & Krystof, 2022). Lewing (2020) stated that faculty development initiatives within higher education institutions have served as a fundamental means of training faculty for many years. Ragupathi (2022) asserted that effective faculty development hinges on robust engagement within teaching and learning communities. In alignment with these findings, Amaro-Jimenez et al. (2022) emphasized the transformative potential in the creation and implementation of a professional development plan. Over time, such strategies have the capacity to reshape instructional methodologies, providing college instructors with greater adaptability to address student needs and fulfill the overarching goals of higher education (Ragupathi, 2022).

Nonetheless, despite the undeniable value of disciplinary expertise among college instructors, a growing body of evidence has suggested that higher education institutions encounter obstacles in effectively integrating disciplinary knowledge with pedagogical skills through their professional development initiatives (Van Dijk et al., 2023). Therefore, there is ample evidence that indicates there is a need to develop a professional development plan that is designed to address the concerns of the participants in the current study. Such plans serve as catalysts for transformative shifts in academia, underscoring the significance of creating and implementing professional development plans (Ragupathi, 2022).

The findings from this project study showed an inconsistency between the viewpoints of college instructors and middle school science teachers. Nonetheless, overall, both groups acknowledged the necessity for further professional development to effectively tackle the identified local problem. Moreover, attention to individualized forms of faculty development programs and the incorporation of more informal approaches into the design and delivery of such programs are necessary (Kohan et al., 2023).

The conceptual framework of the current study was Shulman's (1987) PCK. I used several databases, accessed through the Walden University Library, to conduct this second literature review, including ProQuest, ERIC, and SAGE. Most of the primary research studies were published from 2019 to 2023. The keywords used to locate literature for this review were *professional development, design and planning, faculty preparation and development, scholarship and teaching,* and *academic development.*

Faculty Development

Reviewing existing research on professional development planning and implementation in higher education revealed a significant gap in the comprehensive literature regarding development methodologies (Ling, 2020). Despite the fundamental need for faculty development to enhance instructors' teaching quality, the wealth of general higher education research often remains disconnected from educational practice (Proctor et al., 2020). Predominantly, introductory-level professional development emerged as the prevalent approach observed in practice and literature (Lewing, 2020). Furthermore, Fassett et al. (2023) argued that additional research is imperative to provide

a better understanding of the professional development initiatives available to faculty members.

Abonyi et al. (2020) advocated that higher education institutions establish transparent policies and procedures to strengthen staff development. Higher education instructors often face constraints when seeking opportunities to refine their pedagogical techniques (Newton et al., 2020). In response to this challenge, Van Dijk et al. (2023) outlined three essential elements for effective professional development to strengthen college instructors' teaching proficiency by integrating their disciplinary expertise with pedagogical skills: purpose, design, and organization.

Professional Development Plan

A professional development plan is a document outlining goals, assisting with staying current with industry trends, acquiring new skills, and setting objectives for continuous improvement and career advancement in any profession (Shrivastava & Shrivastava, 2023). The professional development plan developed based on the outcomes of this project study may be found in Appendix A.

Gupta and Lee (2020) conducted a comprehensive mixed-methods study to examine the efficacy of professional development initiatives in enhancing both teachers' knowledge and student learning outcomes. Building on this research, Garone et al. (2022) highlighted the objective of professional development initiatives for college and university leaders and instructors, aiming to offer an efficient method of imparting knowledge and skills to enhance student learning outcomes. This effort, as explained by

Gupta and Lee, underscored the significance of assessing instructors' prior knowledge as a precursor to effective professional development endeavors.

Not only does an instructor's prior knowledge matter, but Amaro-Jimenez et al., (2022) argued that instructors' preferences must be considered when planning. For example, instructors wanted professional development sessions that provided readily accessible learning strategies that did not require substantial preparation and could be incorporated easily into their courses. The researchers' findings underscored the intrinsic value of this assessment process, shedding light on its role in informing tailored intervention strategies outlined in a professional development plan.

Academic Growth and Resilience

Closely aligned with the current study, Peters-Burton et al. (2022) emphasized the critical role of PCK in the professional development journey, particularly within the domain of science education. Their findings underscored the heightened significance of this knowledge, particularly in navigating complex processes, such as argumentation within science writing. Building upon this notion, Shrivastava and Shrivastava (2023) advocated for the inclusion of training sessions in professional development planning that integrate content aligning rigorously with pedagogical principles, providing ample opportunities for active participant engagement within the domain of science education. These approaches not only foster Theme 1: Minimal writing pedagogy skills acquired during teacher education program but are also facilitated by the creation and implementation of a professional development plan that supports these ideas.

Inspired by the extant research, I created the professional development plan proposed in the current study drawing upon the guiding principles revealed in their works. A cornerstone of this plan is its action-oriented framework, enriched by a design-based research approach, which was designed to prompt school leaders to carefully evaluate participants' existing proficiency levels and deliver course work that will eventually help to improve student achievement in writing.

Collaborative Discourse

Parr and Jesson (2020) investigated how professional collaboration can improve learning and teaching. Their results offered valuable insights into the efficacy of professional collaboration in enhancing learning and teaching practices, particularly in the domain of writing pedagogy and contributed valuable information towards understanding the relationship between teachers' writing pedagogy and how to support student writing so that school leaders can develop a plan to prepare preservice teachers. Their findings underscored the intricate nature of teacher development, highlighting the importance of structured programs aimed at fostering continuous growth and improvement.

The challenges identified by Parr and Jesson (2020), such as varying perceptions of feedback sessions and the difficulty of collaboration, impress the need for structured support mechanisms, such as a professional development plan. To better prepare preservice teachers for their future roles and effectively address the challenges that emerged in this project study, I constructed a professional development plan that integrates the key insights gleaned from this study. For example, Theme 2: Collaborative

dynamic discourse pre- and post-program underscored the importance of professional development that encourages collaboration and learning how to integrate and assess writing in the classroom. Incorporating collaborative learning experiences and feedback mechanisms into preservice teacher training programs can help familiarize school leaders with the complexities of peer observation and feedback processes. Additionally, incorporating the needed areas of focus highlighted by Parr and Jesson's study, such as integrating content and writing pedagogy, into the curriculum of preservice teacher education programs can ensure that future educators are equipped with the necessary skills to support student writing effectively across various subject areas. Leveraging the insights from Parr and Jesson's study can inform the design and implementation of professional development plans tailored to prepare preservice teachers for the dynamic challenges they will encounter in the classroom, particularly in facilitating writing instruction and supporting student writing development.

Supportive Foundational Learning

Thirza et al. (2022) emphasized that leaders play a crucial role in facilitating effective professional development by addressing barriers and promoting inclusivity, effective learning design, and equitable resource distribution. However, research has shown that professional development programs primarily prioritize enhancing the end user's achievement and only indirectly address the well-being of participants themselves (Even-Zahav et al., 2022). By producing a professional development plan based on analyzed data and emerging themes, the professional development plan proposed in this study is aligned with their assertion. This approach removes obstacles and guides the

design of a professional development plan that maximizes the impact of learning and development.

In accordance with Theme 3: Teacher education programs are designed to provide foundational learning not writing pedagogical skills, teachers prioritize language diversity, equity, and the removal of learning barriers. Thirza et al. (2022) stated that addressing such factors in professional development planning is important. Guignard and Shepard (2023) argued that a professional development plan that involves collaboration among faculty from diverse backgrounds to enhance curriculum and teaching strategies can accelerate the cultural transformation needed to serve diverse learners effectively. Therefore, to be able to create a comprehensive and inclusive environment where every learner is supported, a school's professional development plan must align with Theme 3 which focuses on how to empower school administrators and college instructors to effectively address diverse needs and foster equitable learning opportunities.

Within Theme 3: Teacher education programs are designed to provide foundational learning not writing pedagogical skills, which encompasses various aspects related to the range of viewpoints, experiences, and backgrounds present within an educational setting, along with factors concerning a supportive learning environment, it is imperative to recognize the significance of incorporating diverse individuals and perspectives to foster a rich and inclusive learning environment. Through engagement in the professional development plan, college, and university administrators, as well as instructors, will have the opportunity to enhance the learning experience by considering and listening to different viewpoints, backgrounds, and experiences. This part of the plan

includes the stage needed to create a committee. This process will enable the professional development plan to be implemented to prepare teachers and improve confidence and effectiveness in integrating and assessing writing, leading to improved student outcomes in science education.

Inconsistent and Marginal

The professional development plan outlined in this project study offers a suitable framework for addressing participants' concerns, particularly within the realm of Theme 4: Discussion on writing pedagogical skills is inconsistent and marginal in the teacher education program. It takes an innovative approach, diverging from conventional one-hour sit and go session. The traditional method of attending brief monthly sessions may fall short in meeting educators' needs or fostering student learning (Ruppert, 2020). Similarly, Bifulco and Drue (2023) contended that one-day sessions may be easy to organize, but they found that weaving together a series of workshops and activities provides for a more productive learning environment.

Higher education instructors who teach and conduct research may not have received training in the art of teaching and those who have received training may still find it challenging to teach (B. L. Kennedy & Dana, 2022). Thus, it is critical to develop a plan that is designed to support ongoing engagement, fostering reflection on teaching practices and encouraging exploration of innovative teaching practices based on current needs and research.

Korkko et al. (2022) delved into the intricacies of implementing a professional development plan as a catalyst for teachers' ongoing professional growth. Their objective

was to dissect the factors influencing this developmental journey through the lens of a design-based research methodology, with a keen focus on identifying prospective avenues for future growth and refinement.

It has been acknowledged that adult education professional development remains under-researched, with a significant portion of available literature focusing predominantly on student perspectives rather than investigating the experiences and needs of higher education administrators or instructors (Harrison & Patterson, 2023). This gap in research not only underscores the importance of further exploration into the professional development needs of higher education instructors but also highlights the potential benefits of understanding the unique challenges and opportunities faced by those guiding and facilitating learning in colleges and universities. The professional development plan developed in this project study was designed to encourage school leaders to reflect on the apparent challenges and opportunities present within their organization. Participating in the professional development session could culminate in a research approach to tackling and leveraging the challenges and potential opportunities that exist at the school.

By undertaking the development of a professional development plan designed for college and university administrators and instructors, this research project holds the potential to enhance the preparation of future middle school science teachers. As highlighted by Harrison and Patterson (2023), 15% of higher education administrators and 11% of college instructors expressed that they had never participated in professional development activities, but believed they should have had the opportunity to do so.

Furthermore, participants emphasized the positive impact of providing administrators with professional development opportunities on improving instructors' experiences. Additionally, they underscored the importance of offering instructors professional development to enhance the overall student experience.

Kelly and Sommers (2023) emphasized a common obstacle inherent in in-person professional development: the necessity of travel, which can significantly impede participation, particularly for those living at a distance from the event location or facing financial constraints related to travel expenses. In contrast, a virtual delivery model offers a remedy by facilitating the engagement of educators across diverse geographic regions, thereby enriching discussions with a spectrum of rural and urban perspectives. This project study was designed to incorporate the perspectives from participants that were associated with Northern Community College, in a rural geographical area and Southern State University, in an urban geographical area. Furthermore, the digital format enables the recording and preservation of session content and chat interactions, thereby enhancing collaboration documentation and allowing absentee educators to seamlessly reengage. Consequently, the need for this approach is evident, particularly considering Theme 2: Collaborative and dynamic learning experiences about writing pedagogical writing skills are acquired after college and during teacher professional development, which emphasizes the importance of embracing novel strategies for professional growth and knowledge dissemination through various means of communication.

The professional development plan detailed in this study attempts to achieve a balance between in-person and virtual approaches, with a central focus on promoting

inclusivity and accessibility for all participants. Consequently, existing research underscores the suitability of a comprehensive professional development plan in bridging research gaps and formulating strategies that encompass both in-person and virtual activities.

Professional Development Plan That Fosters Evaluation

It is crucial to emphasize the importance of having a professional development plan at the higher education level to ensure that future teachers acquire the essential skills needed to integrate and assess writing in the classroom. Effective implementation of professional development initiatives in higher education requires thorough planning and consideration of several factors (Garone et al., 2022), including evaluation. Evaluation involves systematically gathering data and using it to enhance a program or project (Iftikhar et al., 2022). Consequently, the evaluation of professional development programs is essential in measuring effectiveness and to plan for future activities (Tampubolon et al., 2023). Evaluation and accountability have been included in the design of the professional development plan presented in this project study so that colleges and universities have the opportunity measure how well they are doing with equipping educators with the necessary tools integrate and assess writing instruction into their teaching practices.

Every student deserves access to a challenging, engaging, and equitable education that fosters their growth and success. It is the collective responsibility of all educators to ensure that students receive the necessary tools, resources, and support to thrive academically. However, to fulfill this commitment effectively, educators must also be

equipped with ongoing professional development opportunities tailored to enhance their teaching effectiveness (Massar, 2022). Therefore, many parts of the professional development plan could be used by K–12 school leaders not only to empower teachers to meet the needs of their students but also reinforce the foundation of a robust and inclusive learning environment.

These findings underscore the critical need for structured professional development plans within teacher education programs, particularly those that prioritize integrating writing pedagogy into the curriculum. Through the implementation of comprehensive professional development plans, educators can be equipped with the necessary skills and knowledge to effectively support student learning and success in writing. This targeted approach ensures that instructors are adept at integrating writing instruction smoothly into their teaching practices, enhancing the overall educational experience for students.

Peters-Burton et al. (2022) investigated the experiences of three participants involved in a professional development program focused on scientific argumentation (science writing), utilizing the self-regulated learning framework. By analyzing their learning processes and outcomes concurrently, the research goal was to assist teachers in offering targeted support to enhance both the content knowledge and teaching skills of teachers. Peters-Burton et al. argued that metrics for adult learning should be prioritized to improve the success of professional development programs and provide appropriate support to science teachers. Therefore, the professional development plan proposed in this project study was developed under the guidance that a comprehensive assessment of

content knowledge and pedagogical content knowledge is essential for evaluating professional development plans.

Project Description

The project produced for this project study is a 3-day professional development presentation accompanied by supporting documentation. The professional development plan was designed to provide school leaders a structured approach that will assist in their preparation and implementation of specific professional development initiatives that will provide students with the opportunity to gain knowledge of how to integrate and assess writing in a K–12 school setting.

The project was developed based on data collected from college instructors and middle school science teachers. Its purpose was to provide school leaders in higher education with insights into the perspectives of instructors and teachers regarding their readiness to incorporate and evaluate writing within classroom settings.

The professional development program offers participants opportunities for collaboration, data assessment, survey participation, and feedback collection. Through this initiative, school leaders will gain valuable insights into areas they should prioritize when discussing and designing coursework requirements to ensure that preservice teachers are adequately equipped to integrate and evaluate writing skills in their classrooms.

Resources and Supports

The necessary resources for *Beyond Boundaries: A Plan for Writing Integration in Teacher Education* requires the input of, and support from, college of education

leaders and faculty, building services, human resources, and essential technology such as computers, internet connectivity, and either an overhead projector or a Smart Board. Additionally, resources include the professional development PowerPoint presentation and the professional development planning document. Supplementary materials may also be required, such as chart paper, pens, post-it notes, markers, and handouts. These materials will enhance the learning experience and facilitate interactive sessions.

The professional development plan is designed to accommodate various formats, including in person, virtual, or a hybrid approach. In-person sessions should be conducted in a setting equipped with necessary technology, such as a conference room or classroom with access to a Smart Board or projector, to facilitate effective delivery of the content.

Potential Barriers and Solutions

Successfully implementing the professional development plan necessitates collaboration across multiple departments and requires allocation of both time and budgetary resources. Without buy-in from stakeholders and sufficient budgetary and time allocations, the three professional development days and the program's effectiveness may be compromised. Strategies to overcome potential barriers have been outlined below and in the planning document.

School leaders should view this initiative as an opportunity to cultivate educators who are better equipped to facilitate student learning. To mitigate the time constraint, it is recommended to incorporate dedicated professional development sessions into schedules and emphasize planning during team meetings. Addressing budgetary concerns requires

the individual responsible for budget allocation to prioritize this initiative and ensure that

sufficient funds are earmarked to support its execution.

Project Implementation and Timetable

   The finalized professional development plan will be presented to the

organizations that have granted approval for my site authorization agreement. These

organizations encompass a community college, 4-year institutions, and a K–12 school

system. Upon approval from a particular school to deliver the presentation to their staff, a

customized PowerPoint page will be incorporated into the presentation. This page will

spotlight the school's specific statistics, potentially including writing scores if they are

available.

   The first day of the professional development session includes a comprehensive,

involving a self-assessment process. This assessment delves into various aspects,

including analysis of course requirements and descriptions, current collaboration

expectations, as well as timelines and resource needs. Furthermore, stakeholders'

reflections and evaluation initiatives will be addressed during this session to ensure

alignment with the overarching objectives of the professional development plan. The

findings of the project study will be shared with participants. Data from the college

instructors and middle school science teachers will be discussed and feedback will be

collected.

   On the second day of the professional development session, participants will

engage in strategic planning geared toward fostering improvement in writing instruction

course work. This comprehensive approach involves several crucial aspects. Firstly,

school leaders will work towards developing a deep understanding of how important writing pedagogy is and how it can be included in course work. Additionally, attention will be given to adding strategies for seamlessly integrating writing across different subject areas, acknowledging its significance in diverse academic contexts.

On the last day, participants will discuss how to facilitate student growth by providing them with many opportunities to develop skills in integrating and assessing writing. This will encompass formative and summative writing techniques that align closely with specific learning objectives. Moreover, school leaders will discuss how to include opportunities to tailor writing instruction to meet the unique needs of individual students. This involves considering diverse learning styles and abilities, ensuring that instruction is accessible and effective for all learners.

Finally, fostering a culture of collaboration will be emphasized throughout the session. Educators will be encouraged to engage in peer collaboration, fostering an environment where insights are shared, and collective learning experiences are valued. Through this collaborative approach, participants will be better equipped to address the challenges and opportunities inherent in the data collected within this project study. The final exercise will intel participants completing the *Beyond Boundaries: A Plan for Writing Integration in Teacher Education* professional development survey.

Table 7

Professional Development Agenda

	Agenda	
Day	Topics	Activities
1	Self-assessment Data review	Analysis of course requirements and descriptions, current collaboration expectations, as well as timelines and resources needed.
		Share of college instructor and middle school science teacher data.
2	Strategic planning Strategies Diversity	Discussion of the importance of pedagogy
		Explore strategies for seamlessly integrating writing across different subject areas.
		Discussion of diverse academic contexts.
3	Skills Writing techniques Next steps Evaluation	Discussion of what opportunities will help to develop skills in integrating and assessing writing.
		Explore formative and summative writing techniques.
		Next Steps and evaluation

Roles and Responsibilities

The professional development plan is designed to provide the insights gleaned from the analysis of data collected from college instructors and middle school science teachers. The overarching goal is to stimulate dialogue on the significance of offering pre- and post-service teachers' opportunities to explore writing instructional strategies, facilitating their integration and assessment in the classroom.

In my role as facilitator, I will lead the 3-day professional development, provide support during all collaborative discussions, and contribute to devising a plan for leaders to contemplate and enact programmatic changes aimed at assisting pre- and post-service teachers in integrating and assessing writing in their classrooms.

The 3-day professional development session requires the involvement of school leaders tasked with sanctioning curriculum and course modifications. Additionally, it extends to college instructors who teach in the school education. Given its K–12 focus, the professional development session could be presented to K–12 leaders. K–12 participants should ideally include instructional specialists and professional development planners responsible for coordinating and executing professional development within the school district.

Project Evaluation Plan

Garone et al. (2022) conducted a qualitative research study and hypothesized that successful professional development initiatives require an evaluation and accountability design method. Therefore, during the development of the professional development plan, Guskey's five levels of professional development evaluation served as a framework. According to Guskey (2002), this approach entails evaluating participants' reactions, gauging their learning, measuring organizational support and change, assessing participants' application of new knowledge and skills, and evaluating learning outcomes.

Garone et al. (2022) used the Guskey evaluation methodology in their research. Their study concluded with recommendations and approaches that other researchers could use when developing evaluation tools to use for professional development sessions.

Therefore, Guskey's evaluation methodology was used to devise the evaluation tool for each day of the session. Each question was written based on the five elements that Guskey presented.

The evaluations will be delivered to participants in electronic form by using Google Forms. Participants will include school leaders, college instructors, and K–12 school leaders. The information collected at the end of each day will be used to improve the design of the professional development session, measure the efficacy of the sessions, and ideas for future professional development opportunities. Information will also be shared with the school leaders. Information shared will not include information that could be used to identify participants.

Project Implications

The proposed professional development plan was created to address how teacher education programs prepare college instructors and middle school science teachers with the pedagogical skills necessary to integrate writing in classroom. The data analysis results in Section 2 were used as a framework to develop the professional development plan that could help higher education institutions develop a plan to include pedagogical writing coursework to better prepare teachers for integrating and assessing writing in a classroom.

Using the data gathered from college instructors and middle school science teachers on the effectiveness of teacher education programs in preparing teachers to integrate and assess writing in classrooms was pivotal in shaping the content of the professional development plan. Through thorough analysis of this data, school leaders are

presented with an opportunity to promote social change within both higher education institutions and K–12 settings. By contemplating programmatic adjustments informed by these insights, schools may enhance writing instruction, potentially leading to improved academic achievement, decreased retention and dropout rates, and enhanced professional development.

The preparedness and confidence of college instructors and middle school science teachers will be positively influenced by the implementation of the professional development plan. An additional benefit of the professional development plan will include the improvement of middle school science students' writing skills. The professional development plan could benefit other higher education institutions and K–12 school programs to promote positive social change within their institutions and systems.

Conclusion

In Section 3, the objectives and rationale behind designing a comprehensive 3-day professional development program was discussed. Included was an extensive review of relevant literature, focusing on professional development plans and their connection with the five key themes derived from participant interviews' data analysis. The implementation strategy for the professional development plan and detail the steps to be taken upon approval of the project was considered.

The professional development plan was created based on perceptions from college instructors and middle school science teachers regarding their preparedness to teach how to integrate and assess writing within a classroom setting. Drawing from a well-established research model, Guskey's five levels of professional development evaluation

was included to explain how the plan incorporates clear goals, a detailed project description, comprehensive evaluation criteria, and thoughtful considerations of project implications.

In Section 4, a discussion will be presented on the project's strengths in promoting confidence among college instructors and middle school science teachers regarding the integration and effective assessment of writing in a classroom. Additionally, the potential impact on the writing proficiency levels of middle school students will be examined. Furthermore, included in Section 4 is a reflection regarding the progression of the project study and how my understanding has increased throughout the project study.

Section 4: Reflections and Conclusions

The primary objective of this qualitative project study was to explore the perspectives of college instructors and middle school science teachers regarding how teacher education programs are equipping middle school science teachers with the pedagogical skills needed to integrate and assess writing in a science classroom. Through comprehensive data collection and analysis, a significant disparity emerged between the perceptions of college instructors and current middle school science teachers regarding how a teacher education program prepared middle school science teachers to integrate and assess writing in their classrooms.

Consequently, the findings of this project study informed and provided context for the development of a targeted 3-day professional development program. I designed the professional development plan as an effort to share information regarding the disparity between the perceptions of college instructors and middle school science teachers and start a conversation that will springboard into systematic improvements that close the gap in stakeholders' perceptions. Eventually, by sharing insights on effective strategies for bridging this divide, the professional development plan will enhance the quality of teacher education programs and better prepare future educators for the integration of writing in science classrooms.

I named the professional development plan: *Beyond Boundaries: A Plan for Writing Integration in Teacher Education.* The plan includes a PowerPoint presentation and a step-by-step plan that school leaders can use to start their planning to address the

local problem of middle school science teachers not being prepared to assess and integrate writing in their classrooms.

<div align="center">**Project Strengths and Limitations**</div>

Project Strengths

I designed this project (i.e., the professional development plan) to encourage a dialogue among school leaders. The intentional emphasis on data sharing attempts to encourage meaningful conversations concerning the perceptions held by college instructors and middle school science teachers. Furthermore, the nature of the professional development plan offers stakeholders the flexibility that is needed when exploring program changes based on research. The flexibility will allow different types of colleges and universities to consider implementing the professional development plan. The plan can be delivered face-to-face or virtually. The plan can also be revised to add school specific experiences, concerns, and program highlights.

Project Limitations

It is imperative to acknowledge certain inherent limitations. The time investment required to effectively bridge the gap between the perceptions of college instructors and middle school teachers could be perceived as undesirable. Specifically, the planned 3-day presentation could present its own set of challenges, demanding a substantial commitment from stakeholders and potentially impacting their willingness to fully engage in all 3 days of professional development sessions. However, it is worth noting that the extended duration of the 3 days of session can be perceived as a strength. This extended timeframe provides stakeholders with sufficient space and opportunity for deep,

substantive conversations concerning the perceptions held by both college instructors and middle school science teachers.

Recommendations for Alternative Approaches

This project study addressed the local problem of the barriers and challenges facing middle school teachers in integrating writing skills in the science classroom. In this study, I focused on how middle school science teachers obtained the skills needed to integrate and assess writing in their classrooms. Based on the results, I created a professional development plan that includes a PowerPoint presentation, which is a familiar format that is used in the education industry. However, an alternative approach that could have been used for this project study is the delivery of a white paper.

A prominent issue that I focused on when deciding which type of project to complete was my hope that the project would be a living document. I did not want the professional development plan just to live in someone's email or on a shelf. When considering implementing this professional development plan, another approach would be to have current and past teachers also participate in the planning process. Based on the data collected, having both types of participants at the table could produce a more productive and reliable process. This approach could present several challenges that include but are not limited to the cost and the amount of planning that it would take to bring in stakeholders outside of the college and university.

Another alternative approach could have been focusing on the barriers and challenges facing teachers in integrating writing skills in a general education classroom. One of the points that emerged while collecting data was that college instructors rarely

know what subject their students will teach when they get out of college; therefore, the alternative approach would not limit the subject matter of the teacher, except for English language art majors. After having conversations with college instructors, English majors had a distinct perspective on writing in the classroom, so it should be considered how English language art majors could skew the data.

The literature review in Section 3 resulted in significant findings that influenced the decision making process in deciding to develop a professional development plan for the research project. The research revealed a notable gap between the information available regarding the development of professional development plans and their applicability in addressing issues specific to teacher education programs. Specifically, this gap highlighted discrepancies between what teacher education programs were providing and what teachers perceived they received, as well as their desired support in understanding how to integrate and assess writing in the classroom.

As stated by Korkko et al. (2022), a sound professional development plan is a catalyst for promoting teacher professional growth. This realization highlighted the need to develop a professional development plan to bridge the gap between theory and practice. Therefore, the research findings served as a catalyst for my decision to develop a 3-day professional development plan aimed at addressing writing pedagogical practices and teachers' practical needs regarding integrating and assessing writing in the classroom.

Scholarship, Project Development and Evaluation, and Leadership and Change

As a doctoral student, I have engaged in the research and development of this project study, and it has been a profound, transformative experience. Throughout this journey, I have encountered numerous challenges and opportunities for growth, intellectually, personally, and professionally. I started this program many years ago and left the program before deciding to come back. Unbeknownst to me, I had to ask for permission to start the program again because so much time had passed and received approval in January of 2020. Again, unbeknownst to me, shortly thereafter the world would change forever; however, I did not let the COVID-19 pandemic derail me.

As a doctoral student, the process of conducting research has deepened my patience and understanding of educational dynamics and the complexities of conducting research. Engaging with existing literature has provided me with valuable insights regarding the distinct types of research approaches and how important it is to all information. For example, it is important to pay attention to keywords when searching for scholarly articles. Recognizing the significance of keywords found in the library database has broadened my focus and deepened my understanding of relevant literature. By paying attention to the keywords used by other researchers, I have been able to expand my search parameters and uncover hidden gems that have enriched my research.

The preparation courses that focused on methodology were helpful; however, it is one thing to read and discuss methodological approaches in a class, but reading about the many ways researchers approach the methodology process was more impactful.

Furthermore, struggling with the methodology and data analysis processes has sharpened my analytical skills and strengthened my ability to critically evaluate research findings.

Developing a professional development plan based on data analysis allowed me to translate theoretical knowledge into actionable steps. Navigating the complexities of recruiting participants and then analyzing the collected data has strengthened my belief in good people and how amazing the thematic analysis process is for researchers.

In summary, the research and development of this project has been a transformative learning experience, shaping me into a more informed, resourceful, and adaptable person. I am thankful for the opportunity to contribute to the field of higher education and to continue growing and evolving in my professional journey.

Reflection on Importance of the Work

While reflecting on the importance of this project study, it became evident that it addressed a critical aspect of professional development planning and implementation within higher education. My review of existing research underscored a notable gap in the literature concerning development processes, as highlighted by Ling (2020). By taking on the challenge of crafting a professional development plan specifically tailored for college and university school leaders and instructors, this project study holds the potential to enhance the preparedness of future middle school science teachers.

Through this endeavor, invaluable insights were gleaned into the intricacies of devising effective professional development strategies. Conducting the literature review resulted in various insights regarding professional development being used to the advancement of educational practices but also that it holds promise for improving student

learning outcomes. Moreover, the analysis of the data collected in this study uncovered a significant discrepancy between the perceived preparedness of teacher candidates and the actual needs of college instructors. While 4 out of 5 college instructors reported that their teacher education programs provided opportunities for students to learn about integrating and assessing writing in a classroom, a concerning finding emerged from the survey of 13 teachers when 12 of them expressed that their teacher education programs failed to adequately equip them with the skills necessary to integrate and assess writing in a middle school science classroom. This finding underscores the urgent need for reforms within teacher education programs to address the current gap between the perspectives of the college instructors and middle school science teachers. I learned that the gap between these perspectives offers an opportunity for improvement and emphasizes the importance of aligning teacher preparation with the evolving demands of teachers. By bridging this gap, teacher education programs can better fulfill the needs of aspiring educators and ensure they are adequately equipped to effectively meet the challenges of the classroom. Thus, this project study not only shed light on existing deficiencies but also serves as a call to action for enhancing teacher education practices to better serve both educators and students alike.

Implications, Applications, and Directions for Future Research

The outcomes of this project study bear significant implications that could influence the preparation of future middle school science teachers. The study findings offer insights and evidence that may be used to advocate for organizational changes as well as aid school leaders and college instructors in comprehending the efficacy of

employing professional development plans to enhance instruction. Moreover, if the professional development plan presented in this project study is fully implemented, the college and university study sites could establish a robust framework for supporting their students with the knowledge needed so they may integrate and assess writing in their classroom.

Furthermore, the professional development plan holds applicability beyond college and universities and can be adapted for use in K–12 school settings. School leaders can leverage the plan to augment their own professional development plans designed to refine the skills of existing teachers, specifically with integrating and assessing writing in the classroom.

For future research endeavors, it may be advantageous to separate participants into distinct groups. Separating the college instructors and middle school teachers into two different studies will allow for a more nuanced analysis of the data and a larger participating pool of one group. This approach could enable researchers to identify and delve deeper into the patterns, trends, and variations that may not be evident when analyzing a dedicated sample size.

As discussed in Section 1, Kind and Chan (2019) found that teacher pedagogy training needed more research with respect to understanding the correlation between pedagogy skills and student achievement. Therefore, future researchers should consider researching specific teacher education programs and the student achievement of those teachers who graduated from their own programs.

These results serve as a foundational reference and catalyst for future research projects seeking to assess the impact on student academic achievement. Therefore, future researchers should study the effectiveness of individual teacher education programs by examining the writing abilities of students taught by teachers who have graduated from these programs, to determine if there is a correlation between the teacher education program and the academic achievements of their students in writing.

It is noteworthy that this study was constrained by a limited number of participants who consented to participate. Hence, I recommend that future research solicit IRB approval from a larger pool of schools. Additionally, when crafting the design for the study, incorporating schools of varied types is essential. The delimitation on the selection of schools also posed challenges in data collection in the current study. Another delimitation for this project study was the type of teacher that was qualified to participate. Having science teachers or middle school teachers in future research could help in obtaining richer data and further understanding the problem space.

I would like to offer a piece of advice to future researchers who decide to employ Braun and Clarke's thematic analysis in their work: trust the process. Additionally, I recommend viewing recordings on YouTube where Braun and Clarke themselves present or discuss their analysis strategies. These resources can provide invaluable insights and enhance a researcher's understanding of the thematic analysis process.

Conclusion

In this project study, I successfully highlighted a significant disparity between the perceptions of college instructors and middle school science teachers regarding the

integration and assessment of writing in the classroom. The primary goal of this project study was to explore the knowledge and practices of middle school science teachers in this regard. While conducting interviews and analyzing data, it became strikingly evident that there exists a pressing need to reconsider the approach to preparing and supporting teachers in understanding how to effectively integrate and assess writing within a classroom.

The insights gained from this study underscore the importance of addressing this issue not only within the context of middle school science classrooms but also across disciplines and educational levels. It is imperative that educators across all fields receive adequate training and support to incorporate writing skills development into their teaching practices. By rethinking current strategies and enhancing support mechanisms, future teachers can be better equipped to successfully include writing in their classroom, thereby fostering study success across academic areas.

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Appendix A: Professional Development Plan

Professional Development Session: Three Day Agenda

Resources:
- Agenda
- PowerPoint Presentation
- Visualizer
- Chart Paper
- Markers
- Post-its
- Pens
- Candy
- Water

Beyond Boundaries: A Plan for Writing Integration in Teacher Education
Facilitator Amanda M. Stewart

AGENDA: Day 1 - Assessing the Program

1. Self-Assessment
2. Building your review team
3. Identifying where you are
4. Setting a timeline
5. Resources and Evaluation

Part 1: Assessing the Program

Self-Assessment: Participants will chat about who and what departments are part of each step. 120 minutes with 10-minute break

Analyzing Current Course Portfolio: Identify courses and course work that includes writing instruction that teaches how to integrate and assess writing in the classroom.
- Pay attention to details on how the courses address integration and assessment of writing in the classroom.
- 60 minutes

Networking and Collaboration: Discuss professional development planning expectations with course development committee.
- How does the school provide students' the skills needed to integrate and assess writing in the classroom?
- Review core competencies, essential skills, and course syllabus
- Define and articulate expectations of the committee

- Identify strategies for networking and collaborating with other educators
- 60 minutes

Identification of Core Competencies: Identify instructional goals or learner outcome for students
- Define the core competencies
- Identify skills that educators need to develop or enhance
- 30 Minutes

Cultural Competence and Inclusion: Discuss the cultural and socioeconomic background of student population.
- Fostering equity and inclusion in education
- Understanding and embracing cultural and socioeconomic diversity
- Critically important for promoting a fair and equitable environment
- 60 Minutes

Lunch: 60 minutes

Alignment with Teaching Standards: Aligning the professional development plan with relevant teaching standards or competencies
- Essential for ensuring the quality of the course work
- Alignment of the professional development plan with standards
- Facilitate targeted growth

Timeline and Milestones: Develop a realistic timeline for accomplishing goals
- Break down the plan into manageable milestones and deadlines to track progress over time.

Resource Requirements: Identify the resources required for professional development planning and activities
- Include financial resources, time commitments, and materials.
- Reflection and How evaluation will occur

Day 1 Evaluation: 15 minutes
- Thank you for participating.
- Scan the QR Code below to complete the day 1 evaluation

Beyond Boundaries: A Plan for Writing Integration in Teacher Education
AGENDA: Day 2: Strategic Planning

Strategic Planning
- The importance of understanding where you are today.
- Consensus Building & Group Effort
- Resources Needed and Evaluation
- 120 minutes

Where are you today?
- Can we answer? What is writing pedagogy?
- Inclusive Efforts
- How will we assess, provide feedback, and improve?
- 60 minutes

Who does this impact?
- How many areas/disciplines are within the school of education?
- Does each area value students who write well?
- Teacher Education Programs
- What subject do students write about?
- 60 minutes

Lunch - 60 minutes

Including Assessment
- Formative
- Summative
- Rubrics
- Feedback
- 60 minutes

Outliers? Are they?
- Technology
- Cultural
- Peer Collaboration
- 45 minutes

Day 2 Evaluation: 15 Minutes
- Thank you for participating
- Scan the QR Code below to complete the day 2 evaluation

Beyond Boundaries: A Plan for Writing Integration in Teacher Education

AGENDA: Day 3: Implementation and Evaluation

Review Previous 2 days: Accomplishments and Thoughts
- 30 minutes

Implementation and Evaluation
- Development

- Revision
- Evaluation of Efforts
- 90 minutes

Developing a New Course: What steps do you take to develop a new course or to revise an existing course? 90 minutes
- Whole Group Discussion – 15 minutes
- Break Out in Small Groups – 60 minutes
- Share Out – 90 minutes
- Whole team discuss the importance of:
  - ✓ Process - 60 minutes
  - ✓ Stakeholders - 60 minutes
  - ✓ Sharing Research with decision makers - 60 minutes

Day 3: Final Evaluation – 15 - 20 minutes

Presentation: Beyond Boundaries: A Plan for Writing Integration in Teacher Education

1
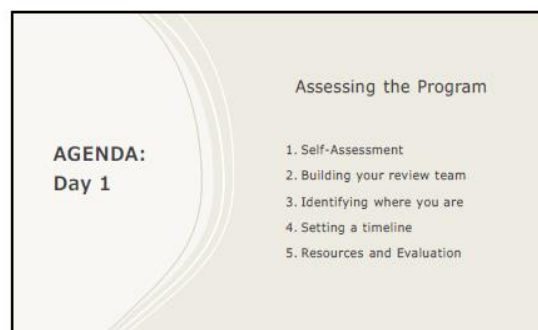
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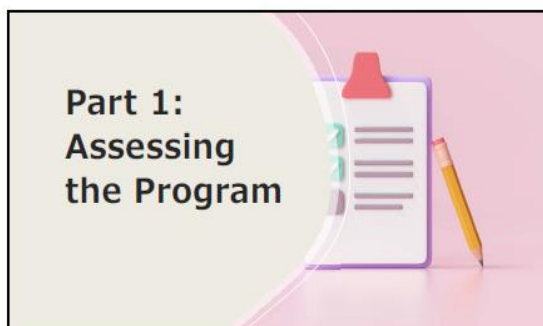
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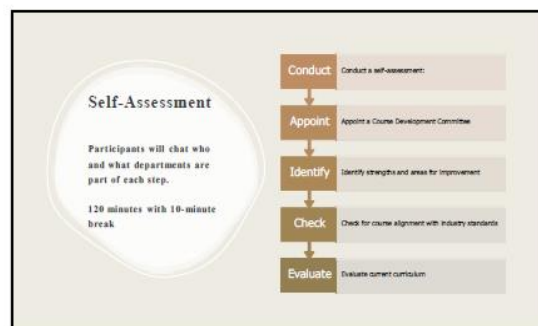
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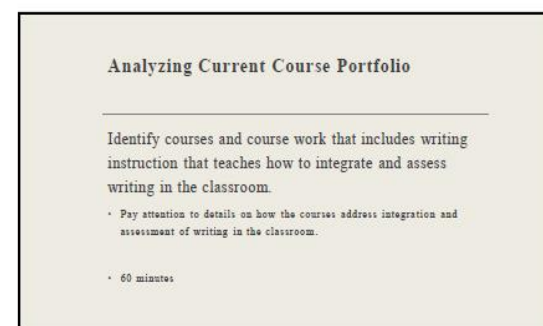
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6

Identification of Core Competencies

Identify instructional goals or learner outcome for students
- Define the core competencies
- Identify skills that educators need to develop or enhance

7

Cultural Competence and Inclusion

Discuss the cultural and socioeconomic background of student population.

- Fostering equity and inclusion in education
- Understanding and embracing cultural and socioeconomic diversity
- Critically important for promoting a fair and equitable environment

8

Alignment with Teaching Standards

Align the professional development plan with relevant teaching standards or competencies:

- Relevant teaching standards or competencies is essential for ensuring the quality of the course work
- will facilitate targeted growth in areas deemed essential for effective integrating and assessing writing in the classroom. 90 minutes

9

Timeline and Milestones

Develop a realistic timeline for accomplishing goals:

Break down the plan into manageable milestones and deadlines to track progress over time.

10

Resource Requirements

Identify the resources required for professional development planning and activities:

Include financial resources, time commitments, and materials.

11

Reflection and Evaluation

Establish a process for reflection and evaluation:

Reflection and evaluation data will be used to adjust the PDP based on insights.

12

Day 1: Evaluation

Thank you for participating. Scan the QR Code below to complete the day 1 evaluation for:

Beyond Boundaries: A Plan for Writing Integration in Teacher Education

QR CODE will be placed here

13

Strategic Planning

AGENDA: Day 2

1. The importance of understanding where you are today.
2. Consensus Building & Group Effort
3. Resources Needed and Evaluation

14

Where are you today?

- Can we answer? What is writing pedagogy?
- Inclusive Efforts
- How will we assess, provide feedback, and improve?

15

Who does this impact?

- How many areas/disciplines are within the school of education?
- Does each area value students who write well?
- Teacher Education Programs
  - What subject do students write about?

16

Including Assessment

- Formative
- Summative
- Rubrics
- Feedback

17

Outliers? Are they?

- Technology
- Cultural
- Peer Collaboration

18

Day 2: Evaluation

Thank you for participating. Scan the QR Code below to complete the day 2 evaluation for:

Beyond Boundaries: A Plan for Writing Integration in Teacher Education

QR CODE will be placed here

19

AGENDA: Day 3

Implementation and Evaluation

1. Development
2. Revision
3. Evaluation of Efforts

20

Developing a New Course

- Review first two days. Accomplishments/Thoughts
- What steps do you take to develop a new course or to revise an existing course? 90 minutes
    - Whole Group Discussion – 15 minutes
    - Break Out in Small Groups – 60 minutes
    - Share Out – 90 minutes
- Whole team discuss the importance of:
    - Process – 60 minutes
    - Stakeholders – 60 minutes
    - Sharing Research with decision makers – 60 minutes

21

Day 3: Final Evaluation

Thank you for participating. Scan the QR Code below to complete the evaluation for:

Beyond Boundaries: A Plan for Writing Integration in Teacher Education

QR CODE will be placed here

22

PROFESSIONAL DEVELOPMENT PLAN

Beyond Boundaries: A Plan for Writing Integration in Teacher Education

The purpose of this professional development plan is to serve as a valuable tool for colleges and universities in assessing the effectiveness of their current programs in equipping pre-service teachers with the essential skills for integrating and assessing writing in the classroom. Developed based on research obtained from middle school science teachers, this plan is designed to transcend subject-specific boundaries and benefit general education majors across diverse disciplines so pre-service teachers will be properly trained to integrate and assess writing in their classrooms.

The focus is on ensuring that pre-service teachers are well-prepared to navigate the intricacies of integrating and assessing writing within their classroom while fostering a comprehensive approach to educational preparedness. Through careful examination of the data found in this project study, this plan aims to enhance the overall quality of teacher education programs and contribute to the success of educators in various subject areas. Amanda M. Stewart developed the plan. A Walden University doctoral candidate.

GOALS	STRATEGY	FACILITATED BY	TARGET DATE	DATE ACHIEVED
Part 1: Assessing the Program				
1) **Self-Assessment:** Review current course requirements	Conduct a self-assessment to identify strengths and areas for improvement, shaping targeted professional development goals. Ensure that courses align with industry standards and evaluate if the current curriculum adequately equips students for success. This comprehensive approach forms a strategic foundation for continuous improvement in education.	Dean of School: Teacher Education and Instructors	Orientation and Ongoing	

GOALS	STRATEGY	FACILITATED BY	TARGET DATE	DATE ACHIEVED
2) **Analyzing Current Course Portfolio:** Identify courses and course work that includes writing instruction that teaches how pre-service teachers can integrate and assess writing in the classroom.	Analyzing course descriptions within teacher education programs. Look for courses that explicitly mention writing instruction, composition, or literacy development. Pay attention to details on how the courses address integration and assessment of writing in the classroom.	Dean of School: Teacher Education	Orientation, First Quarter, and Ongoing	
3) **Networking and Collaboration:** Discuss professional development planning expectations with course development committee.	Collaborative learning experiences can enhance the effectiveness of professional development.

Have discussions to determine the thoughts about how the school builds up students' skills in the integration and assessing of writing in the classroom. Review core competencies, essential skills, and course syllabus. Be able to define and articulate expectations. Include strategies for networking and collaborating with other educators, mentors, or professionals in the field. | Dean of School: Teacher Education and College of Education leaders | | |

GOALS	STRATEGY	FACILITATED BY	TARGET DATE	DATE ACHIEVED
4) **Identification of Core Competencies:** Identify instructional goals or learner outcome for students.	Define the core competencies and skills that the educator aims to develop or enhance.	Dean of School: Teacher Education	Orientation and Ongoing	
5) **Cultural Competence and Inclusion:** Discuss the cultural and socioeconomic background of student population.	Fostering equity and inclusion in education, particularly by understanding and embracing cultural and socioeconomic diversity, is critically important for promoting a fair and equitable school environment while educating a diverse student body.	Dean of School: Teacher Education and College of Education leaders		
6) **Alignment with Teaching Standards:** Align the professional development plan with relevant teaching standards or competencies. This ensures that the goals and activities are in line with recognized professional benchmarks.	Aligning the professional development plan with relevant teaching standards or competencies is essential for ensuring the quality of the course work and the alignment of the professional development plan with standards that will facilitate targeted growth in areas deemed essential for effective integrating and assessing writing in the classroom.	Dean of School: Teacher Education and College of Education leaders and instructors		

GOALS	STRATEGY	FACILITATED BY	TARGET DATE	DATE ACHIEVED
7) **Timeline and Milestones:** Develop a realistic timeline for accomplishing professional development goals.	Break down the plan into manageable milestones and deadlines to track progress over time.	Planning Committee		
8) **Resource Requirements:** Identify the resources required for professional development, including financial resources, time commitments, and materials.	Considering how technology and other resources can be integrated into professional development activities will enhance planning, teaching, and learning.	Planning Committee and Dean of School: Teacher Education		
9) **Reflection and Evaluation:** Establish a process for regular reflection and evaluation of progress.	Reflection and evaluation data will be used to adjust the professional development plan based on insights gained.	All Committee members		
Part 2: Strategic Planning for Improvement				
1. Understanding Writing Pedagogy	Develop a comprehensive understanding of writing pedagogy, including theories, methods, and best practices in teaching writing.	College of Education leaders and instructors		
2. Writing Across Disciplines	Explore strategies for addressing how writing is integrated across different subject areas, recognizing the importance of writing	College of Education instructors		

GOALS	STRATEGY	FACILITATED BY	TARGET DATE	DATE ACHIEVED
	in various academic contexts.			
3. Assessment Techniques	Provide students the opportunity to develop skills in designing effective assessments for writing, including formative and summative assessments that align with learning objectives.	College of Education instructors		
4. Providing Constructive Feedback	Provide students the opportunity to develop skills needed to provide constructive and actionable feedback on students' writing, fostering a supportive and growth-oriented learning environment.	College of Education instructors		
5. Individualized Instruction	Students learn how to tailor writing instruction to meet the diverse needs of individual students, considering different learning styles and abilities.	College of Education instructors		
6. Incorporating Technology	Students explore the integration of technology tools and digital platforms to enhance writing instruction and create engaging learning experiences.	College instructors Technology Department		
7. Cultural Competence in Writing Instruction	Gain cultural competence to address diverse linguistic and cultural backgrounds, ensuring inclusive writing instruction that resonates with all students.	All Staff		

GOALS	STRATEGY	FACILITATED BY	TARGET DATE	DATE ACHIEVED
8. Promoting Peer Collaboration	Explore techniques for fostering peer collaboration and feedback in writing activities, encouraging students to learn from and support each other.	Dean of Teacher Education and College of Education leaders and instructors		
Part 3: Implementation & Evaluation				
1.Development of a new course	Begin to create, revise, or enhance the portfolio of courses/course work.	Dean of School: Teacher Education and College of Education leaders and instructors		
2. Revise current course	Do the degree course requirements change?	College of Education leaders and instructors		
3. Evaluation	Collecting ongoing course information and planning information will assist in improving courses in the future.	All Participants		

Resources		
TITLE	SUMMARY	REFERENCE
Fostering More Equitable Teacher Professional Development at All Stages Using the Systematic Approach to Teacher Effective Development (SATED) Tool.	The author introduces the SATED (Systematic Approach to Teacher Effective Development) checklist tool. This tool is designed to facilitate a teacher-centered approach to professional development, contrasting with the prevalent one-size-fits-all model. By offering developmentally appropriate differentiated learning activities, both mandatory and optional, the author aims to cultivate a more conducive learning atmosphere for teachers, fostering effectiveness. SATED also advocates for collaboration and the formation of professional development communities, enabling teachers to collectively address challenges.	Szabo, S. (2022). Fostering more equitable teacher professional development at all Stages using the systematic approach to teacher effective development (SATED) tool. *Delta Kappa Gamma Bulletin, 89* (1), 24–35.
Utility of a self-regulated learning microanalysis for assessing learning during professional development.	The study investigated the experiences of three distinct participants involved in a professional development program focused on scientific argumentation (science writing), utilizing the Self-Regulated Learning framework. By analyzing their learning processes and outcomes concurrently, the research aims to assist teachers in offering more targeted support to enhance both the content knowledge and teaching skills of teachers. This initiative is particularly crucial considering the renewed emphasis on integrating science practices into formal science instruction, as highlighted by the implementation of the Next Generation Science Standards (NGSS) in the United States.	Peters-Burton, E. E., Goffena, J., & Stehle, S. M. (2022). Utility of a self-regulated learning microanalysis for assessing learning during professional development. *Journal of Experimental Education, 90*(3), 523–549. https://doi.org/10.1080/00220973.2020.1799314

Appendix B: Inclusion Criteria - Teacher

Teacher Recruitment Flow Chart

Section A: Inclusion Criteria

1. Do you teach middle school students (any grade 6-8)? Yes/No

2. Are you certified to teach in the state where you are teaching? Yes/No

3. Did you complete a teacher education program between the years of 2015 and 2023 at Northern Community College, Southern State University, or a school in the Mid-Atlantic part of the United States? Yes/No

4. Have you earned at least a bachelor's degree? Yes/No

If they answer NO to any of the questions, go to section B. If they answer YES to each of these questions, go to section C.

Section B: Exclusion Statement

I am sorry, but based on your answers, you do not currently fit the inclusion criteria to be a participant in my doctoral research study. However, I want to thank you for responding and for your willingness to participate.

Section C: Informed Consent – See Appendix C

Section D: Demographic Questionnaire:

1. What is your name? (This will remain confidential.)

2. What is the name and location of the school where you teach middle school students? (This will remain confidential.)

3. What subject(s) do you teach?

4. In what year did you complete your teacher education program?

5. Did you attend Northern Community College?

6. Did you attend Southern State University?

7. If you attended another school to complete your teacher education program, what is the school's name?

8. I will need to contact you to set up an interview. Please provide a cell phone number or your private email address. To help protect your identity, your personal information will be stored separately from your interview responses.

9. What is the best day of the week and time to schedule an interview (face-to-face or virtual)?

Appendix C: Inclusion Criteria – College Instructor

College Instructor Recruitment Flow Chart

Section A: Inclusion Criteria

Have you taught in a teacher education program between the years of 2015 and 2023?

Yes/No

If they answer NO to the question, go to section B. If they answer YES to each of these

questions, go to section C.

Section B: Exclusion Statement

I am sorry, but based on your answer, you do not currently fit the inclusion criteria to be a

participant in my doctoral research study. However, I want to thank you for responding

and for your willingness to participate.

Section C: Informed Consent – See Appendix C

Section D: Demographic Questionnaire:

1. What is your name? (This will remain confidential.)

2. What is the name and location of the college you have taught in the teacher

   education program? (This will remain confidential.) To protect your identity your

   personal information will be stored separately from your interview responses.

   a. If the answer is not one of the two schools included in the study. The

      researcher will follow up with:

   b. Have you ever taught at Northern Community College?

   c. Have you ever taught at Southern State University?

3. What classes(s) do you or have you taught?

4. I will need to contact you to set up an interview. Please provide a cell phone number and a private email address. To protect your identity your personal information will be stored separately from your interview responses.

5. What is the best day of the week and time to schedule a 45-minute interview (face-to-face or virtual)?

Appendix D: Interview Protocol - Teacher

Interview Script

Thank you for your willingness to participate in today's interview. Today, I will read from a script that will help to ensure consistency throughout my interviews. As I have shared with you before, my study seeks to understand middle school science teachers' perspective regarding their pre-service course experience and their willingness to teach and assess writing in their classroom. I will ask you questions about your time when you were in your teacher education program, specifically about your experiences with your coursework.

This research study aims to explore college instructors and middle school science teachers' perspectives regarding how teacher education programs provide the pedagogical skills necessary to integrate writing within the science classroom, and to make recommendations on how teacher education programs can change their programs to help support teachers' instructional planning and execution. The interview will last approximately 45 minutes. There are 10 questions.

Thank you for completing the consent form. [review aspects of the consent form with participant]. If you are uncomfortable with any of the questions, please let me know. You are not obligated to answer a question that you do not wish to answer. If you need help understanding something I ask, please feel free to stop me and let me know.

During the interview, I will record the audio portion of the session and take notes. The audio recording and notes will help me to record and analyze the data that I am collecting. Throughout this process, your information will be held in strict confidence. Your comments will not be shared directly with your employer or colleagues. At the completion of my research, my report will not have any identifying information about the participants, such as name, school name, etc. Do you have any questions or concerns before we get started?

Can I begin recording? **Yes** - Thank you. Please let me know if, at any point, you want me to stop recording or keep something you said off the record. **No** - Thank you for letting me know. I will only take written notes.

This is teacher #____. The date is ____. The time is _____. We are meeting face-to-face/virtually.
1. How do you feel your teacher preparation program equipped you with the tools and knowledge needed to integrate and assess writing in your instruction? (pedagogy)

2. How did your teacher education program provide the knowledge and skills necessary to understand how to integrate and assess writing about scientific concepts and ideas? (pedagogy)
3. How has your own teacher preparation experience influenced how you integrate writing into science lessons that have writing tasks that are at least two paragraphs in length? (teaching)
4. Please describe your experience with integrating writing as a regular part of your lesson plans. (pedagogy)
5. How would you describe your use of integrating writing skills to help your students write about scientific topics and ideas? (pedagogy)
6. What are some teaching strategies that you are currently using that you believe are effective in supporting your students' writing process? (teaching)
7. Please describe a specific instance when you felt challenged by providing instruction for a science writing task and what you did to overcome the challenge? (teaching)
8. How do you assess these writing assignments? Do you assess critically looking for writing errors or content errors? Or do you assess writing assignments for writing and content errors? (pedagogy)
9. If you could give advice to university/college leaders regarding what teacher education programs can do better to help prepare you to integrate and assess writing in your classroom, what would it be? (pedagogy)
10. Before we conclude the interview, is there anything else you would like to share about the instruction you received while completing your teacher education program that influences how you do or do not integrate writing in your lessons? (pedagogy)

Closing

I enjoyed our time together. Thank you for participating. I would like to remind you that your participation today is 100% voluntary. Within the next two weeks, I will send you an email asking you to review the interview transcripts for accuracy. This will give you the opportunity to let me know if I did not capture your thoughts correctly. Please email me any corrections within five business days after receiving the transcripts. Again, thank you for your time and cooperation.

Appendix E: Interview Protocol - College Instructor

Thank you for your willingness to participate in today's interview. Today, I will read from a script that will help to ensure consistency throughout my interviews. As I have shared with you before, my study seeks to understand college instructors' perspective regarding how they help prepare pre-service teachers to integrate and assess writing in the classroom. I will ask you questions about your time when you have served as a college instructor teaching pedagogy classes or skills in a teacher education program.

This research study aims to explore how middle school science teachers have received writing pedagogy training, how they integrate and assess writing in their lessons, and to make recommendations on how teacher education programs can change their programs to help support teachers' instructional planning and execution. The interview will last approximately 45 minutes. There are 11 questions.

Thank you for completing the consent form. [review aspects of the consent form with participant]. If you are uncomfortable with any of the questions, please let me know. You are not obligated to answer a question that you do not wish to answer. If you need help understanding something I ask, please feel free to stop me and let me know.

During the interview, I will record the audio portion of our session and take notes. The recording and note-taking will help me to collect and analyze data. Throughout this process, your information will be held in strict confidence. Your comments will not be shared directly with your employer or colleagues. At the completion of my research, my report will not have any identifying information about the participants, such as name, school name, etc. Do you have any questions or concerns before we get started?

Can I begin recording? **Yes** - Thank you. Please let me know if, at any point, you want me to stop recording or keep something you said off the record. **No** - Thank you for letting me know. I will only take written notes.

This is college instructor #____. The date is ____. The time is _____. We are meeting face-to-face/virtually.
1. In reflecting on your college teaching experience, what type of pedagogy classes or lessons helped prepare college students to be able to integrate and assess writing in their lessons? (content)
2. What are the ways that your college students learn about theoretical principles and approaches to integrating writing in the classroom? (pedagogy)
3. What are some examples of instructional training you have provided that focused on teaching college students how to integrate and assess writing in a classroom? (pedagogy)

4. What types of opportunities do you offer your students to model instructional strategies that can be used to help their students successfully complete writing assignments? (pedagogy)
5. How are your college students given the opportunity to learn strategies that focus on writing instruction across curriculum, not just for future English teachers? (pedagogy)
6. What classes are offered at your school that provide students with an opportunity to focus on writing pedagogy? (content)
7. What are examples of instructional experiences your students have when they student teach regarding integrating and assessing writing in the classroom? (content)
8. How do your course materials help pre-service teachers examine assessment data, particularly writing data, and use that information to integrate writing into their lessons? (pedagogy)
9. What are your thoughts about your teacher education program providing college students with the knowledge of how to successfully integrate writing assignments in their lessons? (teaching)
10. If you could give advice to university/college leaders regarding what teacher education programs can do better to help prepare teachers to integrate and assess writing in the classroom, what would it be? (content)
11. Is there anything else you would like to share about your experience of providing students with writing pedagogy skills?

Closing

I enjoyed our time together. Thank you for participating. I would like to remind you that your participation today is 100% voluntary. Within the next two weeks, I will send you an email asking you to review the interview transcripts for accuracy. This will give you the opportunity to let me know if I did not capture your thoughts correctly. Please email me any corrections within five business days after receiving the transcripts. Again, thank you for your time and cooperation.

Appendix F: Demographic Information

Middle School Science Teachers	College Instructors
Name and Email Address	Name and Email Address
If they completed a teacher education program between 2015 and 2023	If they taught for a teacher education program between 2015 and 2023
If they were certified	Highest level of education
Role and grades taught	
Highest level of education	

Appendix G: Initial Codes - Teachers

Abstractness	Feeling overwhelmed	Pressure
Academic	Focus	Pride
Academic achievement	Focus on comprehension	Prioritization
Academic assessments	Focus on content	Privacy
Academic difficulties	Follow-up	Privacy concerns
Academic expectations	Forgetting	Privilege
Academic expertise	Frequency	Problem-solving
Academic focus	Frustration	Procrastination
Academic improvement	Future plans	Productivity
Academic performance	Future request	Professional development
Academic pressure	Generalization	Professional experience
Academic reading	Generational differences	Professional growth
Academic requirements	Geographic location	Professional guidance
Academic subjects	Goal-oriented	Professional identity
Academic tasks	Good communication skills	Professional training
Academic writing	Grade level	Program evaluation
Academics	Grading	Progress
Achievement	Gradual release	Project-based learning
Acknowledgment	Grammar	Pushing for effort
Active learning	Graphing	Pushing students to go beyond
Active reading	Gratitude	Qualitative research
Adaptability	Growth	Quality
Adaptation	Growth mindset	Quality control
Advice	Hands-on learning	Questioning
Affirmative action	Hard work	Reading comprehension
Aging	Helping others	Reading skills
Amazement	Help-seeking	Reading strategies
Ambiguity	High achievement	Reasoning
Analysis	High school	Recognition of experience
Analytical thinking	High standards	Students' capabilities
Annotating	Higher education	Prior knowledge
Anonymity	Ideas	Recommendations
Anticipation	Identification	Recording
Apology	Imagination	Redundancy
Application	Impact	Reflection
Application of concepts	Impatience	Regret

Applications

Appreciation

Articulation

Asking for clarification

Aspiration

Assess writing

Assessment

Assessment criteria

Assessment Evaluation criteria

Assessment of writing

Assessment Rubric

Assessment Virtual labs

Assigning task

Assignments

Assistance

Assumption

Attention

Attention to detail

Audio recording

Autonomy

Awareness

Awareness of student population

Belief in pre-writing

Bilingualism

Boundaries

Brainstorming

Breaking down

Burning out

Preparation

Transition

Caution

Certification

Challenge in communicating

Challenged

Challenging

Challenging experience

Change

Cheating

Imperfection

Implementation

Importance

Importance of evidence

Importance of grades

Importance of writing

Improvement

Improvement suggestions

Improving writing skills

Inaccuracy

Inadequacy

Inclusion

Inclusiveness

Inclusivity

Incoherence

Incorporating concepts

Incremental changes

Independence

Independent learning

Inexperience

Inference

Influence

Influence of peers

Informal learning

Information processing

Information seeking

Information sharing

Initiative

Innovation

Inquiry

Insecurity

Inspiration

Instruction

Instructional challenges

Instructional planning

Instructional training

Insufficient content

Integration

Integration of knowledge

Relationships

Relief

Reminder

Repetition

Report writing skills

Request for clarification

Research

Research protocol

Resilience

Resources

Respect

Response

Responsibility

Review

Review opportunity

Revision process

Reward preference

Risk

Routine

Rubric

Rubrics

Satisfaction

Scaffolding

Schedules

Schema activation

School environment

School transition

School transitions

Science

Science and education

Science awareness

Science classroom

Science education

Science fair

Science teachers

Science teaching

Science writing

Scientific communication

Scientific concepts

Child development	Integration of skills	Scientific knowledge
Choice	Integration of writing	Scientific literacy
Clarification	Integration of writing skills	Scientific method
Clarity	Intentionality	Scientific process
Class discussion	Student Interest	Scientific skills
Class size	Interest in feedback	Scientific topics
Classroom	Intervention	Scientific writing
Classroom activities	Interview	Seeking advice
Classroom management	Interview note review	Seeking clarification
Coaching	Interviews	Seeking guidance
Cognitive load	Intuition	Seeking information
Collaboration	Isolation	Seeking validation
Collaborative planning	Job satisfaction	Self-assessment
Colleague relationships	Job stress	Self-awareness
College	Judging criteria	Self-confidence
College instructors	Judgment	Self-directed learning
College instructors	K-12 education	Self-doubt
Comfort	Knowledge	Self-efficacy
Comfort with writing assignments	Knowledge acquisition	Self-improvement
Commitment	Knowledge assessment	Self-perception
Communication	Knowledge seeking	Self-reference
Communication difficulties	Knowledge sharing	Self-reflection
Communication skills	Knowledgeable	Self-reliance
Comparative analysis	Lab reports	Sentence structure
Comparison	Lack of attention to detail	Setting high standards
Complex task	Lack of Clarity	Sharing information
Complexity	Lack of collaboration	Simplicity
Comprehension	Lack of communication	Simplifying
Conceptual understanding	Lack of confidence	Skepticism
Concern	Lack of depth	Skill acquisition
Confidence	Lack of engagement	Skill development
Confidentiality	Lack of expectations	Skill enhancement
Confirmation	Lack of familiarity	Skills
Confusion	Lack of focus	Skills development
Consent	Lack of guilt	Social media
Consistency	Lack of instruction	Societal impact
Content analysis	Lack of integration	Socioeconomic inequality
Content errors	Lack of interest	Standardized tests
Content focus	Lack of knowledge	State standards

Content knowledge	Lack of preparation	State variations
Content relevance	Lack of pressure	STEM
Content-focused	Lack of resources	Strategies
Continuing education	Lack of specificity	Structured learning
Continuous learning	Lack of support	Struggle
Controversial	Lack of thoroughness	Student assessment
Course experiences	Lack of training	Student autonomy
COVID-19	Lack of understanding	Student behavior
Creative process	Lack of variety	Student choice
Creativity	Lack of writing skills	Student development
Credibility	Language teaching	Student engagement
Critical analysis	Language acquisition	Student evaluation
Critical thinking	Language barriers	Student learning
Criticism	Language comprehension	Student success
Critique	Language learning	Student support
Cross-cultural understanding	Language skills	Student-centered learning
Cross-curricular integration	Learning gaps	Student-level relevance
Cultural difference	Learning opportunity	Study
Cultural diversity	Leadership effectiveness	Studying techniques
Cultural responsiveness	Learning	Subject diversity
Curiosity	Learning assessment	Subjectivity
Curriculum	Learning assistance	Success
Curriculum analysis	Learning by doing	Success factors
Curriculum development	Learning difficulties	Suggestion
Curriculum limitations	Learning disabilities	Summary
Data analysis	Linguistics	Supervision
Data collection	Listening	Support
Deception	Learning strategies	Supporting students
Decision-making	Lengthy questions	Survey
Dedication	Lesson planning	Task delegation
Depth of Knowledge	Lesson structure	Teaching strategies
Desire for clarity	Limitations	Teamwork
Desire for continued learning	Limited focus	Technical language
Desire for directness	Limited writing skills	Teacher education programs
Desire for more knowledge	Linguistic development	Teacher empowerment
Desire for more training	Feeling of unfairness	Teacher expectations
Detailed instructions	Peer feedback	Teacher perspectives
Detail-oriented	Logic	Teaching experience
Determination	Logical reasoning	Teacher preparation programs

Differences	Long-term observation	Teacher training
Differentiation	Mastery	Teachers
Difficulty	Material reward	Teaching
Difficulty in expressing thoughts	Material selection	Teaching and learning
Difficulty learning	Materials	Teaching approach
Difficulty understanding	Measurement	Teaching
Digital platforms	Medical school	Test-taking strategies
Digital submission	Meeting needs	Teaching method
Direct impact	Meetings	Teaching methodologies
Disagreement	Memory	Teaching methods
Disappointment	Memory enhancement	Teaching preparation
Disapproval	Memory improvement	Teaching skills
Disconnection	Memory loss	Technological advancement
Discussion	Memory recall	Technology
Disengagement	Middle school	Technology in education
Disinterest	Middle school science	Testing
Dislike keyboard-based learning	Middle school science teachers	Transition
Dissatisfaction	Middle school teachers	Thinking
Distraction	Misconception	Time
Diversity	Misconceptions	Time constraint
Documentation	Motivation	Time management
Doubt	Multitasking	Time pressure
Ease of understanding	Mutual assistance	Time-consuming
Education	Need for explanation	Timing
Education disparities	Negative experience	Tools and knowledge
Education quality	Negative feedback	Topics
Education system	Negative generalization	Training
Educational background	Negative judgment	Training effectiveness
Educational evaluation	New experience	Verbal communication
Educational experience	Nostalgia	Translation
Educational gaps	Not focused on writing skills	Trust
Educational leadership	Expression	Uncertainty
Educational measurement	Expression of doubt	Underestimation
Educational methods	Fairness	Understanding
Educational strategies	Note-taking	Understanding individual differences
Educators	Objective	Understanding students
Effective	Objective testing	Use of PowerPoint
Effective planning	Objectivity	Vague language

Effective support
Effective teaching
Effective teaching
Effectiveness of training
Efficiency
Effort
Elaboration
Elementary education
Elementary school
Emotions
Empathy
Emphasis on vocabulary
Empowerment
Encouragement
Engagement
Entrepreneurial struggle
Entrepreneurship
Environment
Equality
Equity in education
Errors
Essay writing
Ethics
Eureka moment
Evaluating others
Evaluation
Evaluation criteria
Everyday science
Evidence
Evidence-based
Examples
Excitement
Expectation
Expectations
Experience
Experiences
Experiential learning
Experimentation

Observation
Observation skills
Online communication
Online learning
Open-minded
Open-mindedness
Openness
Opportunity
Oral communication skills
Organization
Outdoor education
Outside-the-box thinking
Overcoming challenges
Overcoming obstacles
Scientific process
Overstimulation
Overwhelm
Overwhelming
Parenting
Participation
Passion
Patience
Pedagogical skills
Pedagogy
Peer editing
Peer feedback
Peer review
Peer writing
Perception
Perception of incompetence
Perception of inferiority
Perceptions
Perfectionism
Permission
Perseverance
Personal experience
Personal growth
Personal Growth

Validation
Valuing student culture
Workload
Virtual learning
Visual aids
Visual cues
Visualization
Vocabulary
Vocabulary acquisition
Voluntary participation
Volunteering
Pre-service course
Feedback
Willingness to teach
Workforce
Writing proficiency of current events
Workplace skills development
Worry
Writing
Writing activities
Writing assessment
Writing errors
Writing in the classroom
Writing instruction
Writing integration
Writing performance
Writing process
Literacy skills
Writing skills
Writing skills development
Writing skills enhancement
Remote learning
Writing theories
Youth development
Understanding adverbs
Pre-service course experience
Positive
Positive evaluation

Expertise

Explanation

Explanatory skills

Exposure

Fear

Feasibility

Role-playing

Willingness

Perspectives

Perspective-shifting

Persuasion

Physical activity

Future observation

Planning

Family activities

Fatigue

Positive feedback

Poverty

Practice

Prediction

Preparation

Prefer hands-on learning

Appendix H: Secondary Codes - Teachers

Academic	Comprehension	Curriculum Analysis
Lack of Engagement	Open-Minded	Length of Questions
Acknowledgement	Correction Of Work	Writing Activities
Academic Pressure	Connection-Building	Desire For More
Language Learning	Challenges	Training
Aspiration	Peer Review Work	Intentionality
Academic Skills	Criticism Of	Lack Of Training
Language Skills	Curriculum	Determination
Belief	Content Quality	Review Rubric
Achievement	Perspectives	Educational
Language Teaching	Curriculum	Measurement
Development	Development	Differences
Adaptability	Controversial	Rubric Used Pre and
Learning	Persuasion of Teachers	Post
Child Development	Dedication to Work	Knowledge
Application	Course Experiences	Assessment
Learning Pathways	Integration Of Writing	Differentiation
Coaching	Lack Of Resources	Scientific Topics
Assessment	Creativity	Teacher Collaboration
Legal Jurisdiction	Positive Attitude	Difficulty
Classroom	Planning For an	Self-Assessment
Management	Observation	Tools And Knowledge
Boredom	Critical Analysis	Difficulty
Limitations	Professional	Understanding
Collaboration	Development	Writing Skills
Challenges	Pushing Students to Go	Development
Linguistics	Beyond	Educational
Colleague Relationships	Criticism Of Teacher	Background
Clarity	Education Program	Digital Platforms
Literacy	Job Satisfaction	Student Behavior
College Instructors	Recognizing Prior	Encouragement
Cognitive Errors	Knowledge	Disagreement
Misunderstanding	Critique Writing	Time Constraint
Commitment	Questioning	Classroom
College Student	Student Level	Environment
Development	Relevance	Disappointment
Interest	Cultural Awareness	Training Effectiveness
Language Barriers	Understanding	Recognition Of
Communication	Individual Differences	Experience
Neglect	Teacher Education	Disapproval
Consistency	Programs	Student Uncertainty

Effect Support
Disconnection
Visual Aids
Evaluation Criteria
Discussion
Vocabulary Usage
Assign Writing Task
Disengagement
Willingness To Teach
Breaking Down Steps
Disinterest
Writing Assessment
Content-Focused
Dissatisfaction
Writing Development
Evaluating Others
Distraction
Writing Proficiency
Imperfections
Diversity
Writing Skills
Influence Peers
Documentation
Youth Development
Judging Criteria
Doubt of Ability
Active Reading
Seeking Clarification
Ease of Understanding
Basic Structure
Teacher Perspectives
Education System
Conceptual Learning
Team Perspectives
Educational Experience
Education Quality
Excitement to Write
Engagement of
Students
Educational Leadership
Expectation in Rubric
Equity
Elementary Education
Experimentation

Grammar Errors Not
Graded
Importance Of Writing
Expertise
Evaluation Needs
Middle School
Teachers
Family Activities
Feeling Overwhelmed
Perception Of
Inferiority
Desire For More
Focus on More
Reading
Information Processing
Linguistic
Development
Follow-Up
Information Seeking
Scientific Literacy
Frequency of Writing
Information Sharing
Knowledge Seeking
Frustration by Students
Detailed Instruction
Lack of Collaboration
Goal-Oriented
Ideas are Shared
Lack of
Communication
Grading Help is
Needed
Mutal Assistance
Lack of Confidence
Gradual Release of
Responsibility
Sentence Structure
Lack of Engagement
Grammar Check
Instructional Training
Lack of Focus
High Standards
Integration
Lack of Interest

Impact of Writing
Intervention in the Class
Language Barriers
Comprehension
Impatience
Job Dissatisfaction
Language Skills
Implementation
Financial
Dissatisfaction
Educational Strategies
Importance of Writing
Perception of Writing
Incompetence of
Teachers
Professional Guidance
Learning Strategies
Curriculum Limitations
Importance Of Reading
Improving Skills
Logical Reasoning
Emphasis On
Vocabulary
Pre-Service Course
Work
Perspective Shifting
Not Focused on
Writing
Integration Of Writing
Scientific Knowledge
Scientific Writing
Testing Includes
Writing
Scientific Process
Science Education
Professional
Experience
Scientific Skills
Complex Science
Writing Task for
Students
Willingness To Teach

Appendix I: Initial Codes - College Instructors

Academic challenges	Analysis	Classroom discussion
Academic development	Anonymity	Classroom setting
Academic S. Studies	Anxiety	Collaboration
Academic disciplines	APA style	College education
Academic discussion	Appreciation	College experience
Academic environment	Approaches	College Instructors
Academic expectations	Aspirations	College preparation
Academic focus	Assertiveness	College students
Academic goals	Assessment expertise	Communication skills
Academic interests	Assessments	Communication difficulty
Academic level	Attention to detail	Communication gap
Academic performance	Attention to language	Comparing oneself to others
Academic pressure	Attention to writing	Comparison other professions
Academic requirements	Authority	Compensation
Academic schedule	Awareness	Competence
Academic standards	Back to round writing	Competition
Academic subjects	Balance	Complexity
Academic workload	Belief change	Comprehension
Academics	Benefit	Concealment
Academic writing	Best practices	Concerns
Acceptance	Bias	Concision
Accountability	Bullying	Confidence
Achievement	Categorization	Confidentiality
Acknowledgment	Certainty	Conflict
Action research	Challenges	Conformity
Active learning	Change	Confusion
Active listening	Childhood trauma	Connection
Adaptability	Choice	Consent
Advice	Clarification	Content-specific courses
Affection	Clarity	Context
Agreement	Class activities	Contextual influence
Ambiguity	Class discussion	Contextual understanding
Ambition	Classes teach pedagogy	Courses are facilitated
Analogies	Class participation	Course structure
Analogy	Classroom activities	

Create assignment discussion

creating assignments

Creativity

Credibility

Criticism

Critique

Cultural focus

Cultural diversity

Curiosity

Current topics

Curriculum

Curriculum development

Curriculum evaluation

Data analysis

Data collection

Data-driven instruction

Decision-making

Delegation

Desire for improvement

Desire for learning

Development

Developmental state

Difference in delivery

Difference in time

Difficulties in communication

Difficulty expressing oneself

Difficulty in communication

Difficulty in engaging students

Disagreement

Disappointment

Disapproval

Disciplinary literacy

Discontentment

Discussion

Disengagement from education

Disinterest

Dissatisfaction

Diverse opinions

Diverse sources

Diverse student body

Diversity

Doubt

Duration

Education level

Education system

Educational assessment

Educational methods

Educational opportunities

Educational philosophy

Educational practices

Educational program

Educational standards

Educational support

Educational system

Effective communication

Effective learning

Effectively write

Efficiency

Effort

Emotion regulation

Emotional impact

Emotional awareness

Emotional intelligence

Emphasis on the writing

Emphasis on writing skills

Employment

Encouragement

Engagement: Student

Engage students outside

Enjoyment

Enthusiasm

Equity

Ethical dilemmas

Evaluation

Excitement

Exclusion

Expect around writing

Expectations

Experiential learning

Expertise

Explanatory ability

Exploration

Exposure

Family dynamics

Fast pace

Fear

Feedback: Request for feedback

Feedback: Writing assessment

Flexibility

Flip the classroom

Focused teaching

Focus on writing pedagogy

Formatting

Frameworks

Freewriting

Frequency

Frustration

Future plans

Generalization

Goalsetting

Graduate level

Graduation

Grammar skills

Grammatically Writing Correctly

Grammatical writing

Gratitude

Growth mindset

Guidance

Help-seeking

Hesitation

High demand

High expectations

Highschool

Historical context

Hope

Helping people become teachers

Idealism

Importance of clear communication

Importance of clear thought

Importance of correct grammar

Importance of evidence

Importance of feedback

Importance of structure and sound writing

Importance of understanding the audience

Improvement

In adequate preparation

Incoherence

Incompetence

Indecision

Independent learning

Individual differences

Individuality

Ineffectiveness

Inefficiency

Inequality

Influence

Information sharing

Information exchange

Information integration

Information seeking

Inquiry

Inquisitiveness

Insecurity

Insight

Inspiration

Instruction

instructional experiences your students have had

Instructional analysis

Instructional experiences

Instructional strategies

Instructional training

Instruction improvement

Integration

Integration of writing

Integrity

Interdisciplinary

Interdisciplinary learning

Interest in assessment

Interest in teaching

Interesting various subjects

Interesting writing

Inter-generational impact

Internship

Internship opportunities

Internship Student teaching

Interpersonal relationships

Interview process

Interviews

Isolation

Job dissatisfaction

Job opportunities

Justification

Knowledge

Knowledge about instruction

Knowledge In K-12 education

Knowledge sharing

Knowledge transfer

Kthrough12

Laboratory

Lack of accountability

Lack of assessment

Lack of belief

Lack of clarity

Lack of coherence

Lack of confidence

Lack of control

Lack of critical thinking

Lack of empathy

Lack of exploration

Lack of feedback

Lack of focus

Lack of knowledge or expertise

Lack of motivation

Lack of practice application

Lack of practice

Lack of qualifications

Lack of resources or support

Lack of stability

Lack of support

Lack of understanding

Lack of perspective

Language acquisition

Language barriers

Language comprehension

Language development

Language diversity

Language evolution

Language instruction

Language learning

Language proficiency

Language skills

Leadership

Learning

Learning objectives

Lesson planning

Limitation of scope

Literacy: Content area literacy

Literacy: Critical thinking

Literacy: Note-taking

Literacy: Personalization

Literacy: Practical application

Literature

Logical reasoning

Master's degree

Master's students

Matching interests

Meaning

Mentorship

Methods of teaching

Microaggressions

Misconceptions about learning

Misunderstanding

Modeling

Money

Monitoring

More classroom preparation.

Motivation

Narrow focus

Negative experiences

Nostalgia

Notes-taking

Note-taking

Objectives

Observation

Online discussion

Online learning

Open-mindedness

Opinion

Opinion-based reasoning

Opinions

Opportunities learning

Optimism

Organization

Outside of the design content

Outside of classroom

Parenting

Passion

Past negative experiences

Pedagogy

Peer review reference

Perception

Perception of expertise

Perceptions

Perfectionism

Performance

Personal development

Personal growth

Personal preference

Personal responsibility

Perspective

Perspective taking

Physical education

Plagiarism

Planning

Polishing

Politeness

Positive bias

Positive evaluation

Practical application

Praise

Preference for blended learning

Preference for language arts

Preparation

Presentation skills

Pre-service

Pressure

Priority

Privacy

Professional development

Professional experience

Professional growth

Professionalism

Programs are being developed and offered

Progression

Public speaking

Qualifications

Quality

Quality education

Quality standards

Questioning

Questioning the status-quo

Reading

Recommendations

Reduced workload

Reflection

Reflective teaching

Relationship building

Relationships

Relevance

Relevant degree

Repetition

Request

Request for clarification

Request for feedback

Requesting feedback

Required for writing

Research

Research and write before class

Resistance

Resistance to change

Respect

Responsibility

Restriction

Review request

Rigidity

Role model

Role modeling

Routine

Safety

Schedule

Scheduling

Scholarship

School partnerships

Schoolyear

Science

Seeking advice

Seeking clarification

Seeking confirmation

Seeking guidance

Seeking information

Self-awareness

Self-confidence

Self-doubt

Self-expression

Self-improvement

Self-reflection

Sentence structure

Sequencing

Sequential learning

Service

Sharing

Sharing experiences

Sharing teach experience

Shift in priorities

Skepticism

Skepticism towards standardized testing

Skills development

Social development

Social studies

Socio demo factors

Socioeconomic status

Special education

Specialized classes

Specific instruction

Standardization

Standardized tests

Standards

Stereotyping

Strategies

Stress

Structure

Student assistance

Student development

Student engagement

Student feedback

Student life

Student teaching

Students in MET program

Subjectivity

Support

Support that content

Surprise

Task management

Teacher training

T/S interaction

T/S relationship

Teaching

Teaching drama

Teacher Edu. program

Teaching English

Teaching experience

Teaching experiences

Teaching methodology

Teaching methods

Teaching poetry

Teaching skills

Teaching strategies

Instructional strategies

Teacher effectiveness

Teaching strategies

Teaching writing

Technical skills

Text analysis

Theoretical principles

Time

Time constraint

Time distribution

Time duration

Timeframe

Time period

Time pressure

To learn strategies sand

Transience

Transition

Trauma

Training

Transfer of knowledge

Support and learning

Unclear message

Undergraduate

Undergraduates

Understanding

Understanding others

Understanding perspective

Leaders in tune with K-12 teachers

Utilization of a rubric is always

Validation

Value of clear communication

Value of writing

Variability

Variety

Veterans

Voluntary participation

Watered down

Word recognition

Write across curriculum

Writing Process

Writing assessment

Writing fluency

Writing improvement

Writing instruction

Writing pedagogy

Writing pedagogy skills

Writing skills

Writing theories

Written assignment

Written communication

Uncertainty

Teacher development

Appendix J: Secondary Codes - College Instructors

Academic and quality standards

Academic challenges

Academic development

Academic expectations

Academic focus

Academic goals

Academic interests

Academic level

Academic performance

Academic pressure

Academic workload

Active listening

Anxiety with confidence

Assessment expertise

Challenges in education

Class participation

Class participation

Classroom discussion

Communication and interaction

Communication difficulty

Communication skills

Confidence

Content-specific courses

Cultural diversity

Curriculum and content

Curriculum development

Desire for improvement

Development and goals

Disengagement from

Diverse perspectives

Diverse student body

Diversity and inclusion

education

Educational standards

Effort

Emotion regulation

Emotional aspects

Emotional regulation

Ethical dilemmas

Expectations

Expectations and standards

Fear

Feedback and assessment

Feedback request for feedback

Feedback writing assessment

Flipped classroom

High expectations

Individual growth

Instructional effectiveness

Instructional experiences

Instructional strategies

Integration of writing

Integrity

Interest in teaching

Interpersonal relationships

Job dissatisfaction

Lack of resources or support

Language and Literacy

Learning and Motivation

Literacy Critical thinking

Literacy Practical application

Motivation

Peer review

Personal development

Quality standards

Relationship building

Self-improvement

Self-reflection

Student engagement

T/S relationship

Teacher development

Teacher effectiveness

Teaching experience

Teaching methods

Teaching writing

Time management

Writing improvement

Writing pedagogy skills

Academic and quality standards

Academic challenges

Academic development

Academic expectations

Academic focus

Academic goals