

4-2023

## Demystifying Preservice Teacher Reflective Thinking: A Systematic Literature Review

Joan Flora

Follow this and additional works at: <https://digitalcommons.georgefox.edu/edd>



Part of the [Teacher Education and Professional Development Commons](#)

---

DEMYSTIFYING PRESERVICE TEACHER REFLECTIVE THINKING:

A SYSTEMATIC LITERATURE REVIEW

by

Joan Flora

FACULTY RESEARCH COMMITTEE:

Chair: Dane Joseph, PhD

Dean of Education: Marc Shelton, EdD

A Dissertation Presented to the Faculty of the

Doctor of Educational Leadership Department

in partial fulfillment for the degree of

Doctor of Education

GEORGE FOX UNIVERSITY

March 2023



GEORGE FOX  
UNIVERSITY

COLLEGE OF EDUCATION | EdD

DEMISTIFYING PRESERVICE TEACHER REFLECTIVE THINKING: A SYSTEMATIC LITERATURE REVIEW, a  
Doctoral research project prepared by JOAN FLORA in partial fulfillment of the requirements for the  
Doctor of Education degree in Educational Leadership.

This dissertation has been approved and accepted by:

4/3/23 

April 3, 2023

Dane Joseph, Ph.D.

Associate Professor of Education  
Director of Dissertation Projects

4/3/23 

April 3, 2023

Marc Shelton, Ed.D.

Professor of Education  
Director, Educational Leadership

## ABSTRACT

This systematic literature review responds to the need for research on clarity of what reflective thinking practice is and in determining the value of that practice for preservice teachers. While much has been written about preservice teacher reflective thinking, few studies have explored empirical research on the processes that inform and shape preservice teachers' reflective practice. This study examines the existing literature to discern common themes in the diverse definitions of reflective thinking. This study also examines diverse frameworks that help teacher educators guide, analyze, assess, and measure the quality of preservice teacher reflective thinking. This study helps inform education preparation programs on program-level shifts to consider improving the quality of reflection for all preservice teachers and to realize critical reflection into taking action to provide outstanding educational opportunities and outcomes for each student. Findings from within the literature suggest preservice teachers' thinking can be developed through instruction, pedagogical processes, and artifacts. This finding holds for preservice teachers in a wide range of grade levels and content areas.

## ACKNOWLEDGEMENTS

First and foremost, for Ann Ellen Staley, June 1, 1946 - February 25, 2022. You were and always will be one of my most profound teachers of reflective practice. With joy, love, and keen observation, you modeled reflective practice for all the people in your life. I am forever grateful that you were my Methods professor, university supervisor, colleague, dearest friend, and kindred spirit. You live in my heart and through my actions.

To my teaching colleagues throughout my career, your support through our collaborative discussions over the decades sustained my work in this demanding profession. Thank you, Joie, Deit, Cindy G., Florence, Nels, Betsy, Jeff, Cindy B., Jennifer, Angie, Travis, Erin, Marie, Jim, Bob, Carley, Jill, and Carrie-Ann. For my current teaching colleagues, your support and care eased the way for our shared work as teacher educators.

A special thank you to Julie Kalnin, who coached and questioned my thinking on this dissertation--and on all our shared projects--from start to finish. Just when I began to wonder if I would have colleagues like the dream teams from my past, I met you: generous, wickedly funny, and constantly improving my work. Thank you, thank you. May we have many more years of collaboration and lively discussions.

And always, thank you to my family: Tom, Katie, and Graham. You are the loves of my life and my daily teachers. May we have continued decades of profound joy and foolishness together.

## TABLE OF CONTENTS

Abstract .....	ii
Acknowledgements.....	iii
Table of Contents.....	iv
List of Tables .....	v
List of Figures .....	vi
Chapter 1	
Purpose of the Study.....	1
Background of the Problem.....	1
Conceptual Framework.....	2
Theoretical Framework for this Study .....	7
John Dewey.....	8
Paulo Freire.....	9
Donald Schön.....	9
Maxine Greene.....	10
Marilyn Cochran-Smith and Susan Lytle .....	10
History of Reflective Thinking in the United States.....	14
Ethical Considerations.....	16
Significance of this Study.....	18
Definition of Terms .....	19
Chapter 2.....	22
Methodology.....	22
Instruments and Procedures.....	27

Findings.....	30
Definitions of Reflective Thinking.....	31
Theme One: Diverse Frameworks for Reflective Thinking.....	36
Frameworks Used to Analyze Structure of Reflective Thinking.....	37
Frameworks Used to Assess Levels of Reflective Thinking.....	42
Theme Two: Scaffolding Preservice Teachers' Reflective Thinking.....	46
Pedagogical Tools: Integrated Processes.....	46
Pedagogical Tools: Single Process.....	51
Pedagogical Tool: Collaborative Discussions.....	52
Pedagogical Tool: Writing.....	55
Pedagogical Tool: Video.....	57
Pedagogical Tool: Visual Thinking .....	58
Theme Three: Culturally Sustaining Practices.....	59
Summary of Findings.....	64
Chapter Three.....	66
Discussion of Findings.....	66
Findings from Theme One: Diverse Frameworks for Reflective Thinking.....	68
Findings from Theme Two: Scaffolding Reflective Thinking.....	68
Findings from Theme Three: Culturally Sustaining Practice.....	70
Limitations.....	72
Implications and Recommendations for Practice.....	72
Recommendations for Further Research.....	77
Conclusion.....	77

References.....	79
Appendix A.....	111
Appendix B .....	113
Appendix C .....	114
Appendix D.....	117



## LIST OF TABLES

Table 1: Search Strings for Online Database Searchers.....	29
Table 2: Key Researchers' Definitions of Reflective Thinking.....	32
Table 3: Key Researchers' Frameworks and Models for Reflective Thinking.....	34
Table 4: Diverse Frameworks to Analyze Reflective Thinking.....	37
Table 5: Diverse Frameworks to Assess Reflective Thinking.....	43
Table 6: Integrated Processes Teacher Educators Used to Develop Preservice Teacher Reflective Practice.....	47
Table 7: Pedagogical Tools Teacher Educators Used to Engage Preservice Teachers in Reflective Thinking.....	52

## LIST OF FIGURES

Figure 1: Conceptual Framework to Investigate the Value of Reflective Thinking for Preservice Teachers.....	3
Figure 2: Theoretical Framework to Investigate the Value of Reflective Thinking for Preservice Teachers.....	12
Figure 3: Flowchart Depicting the Selection of Data.....	23
Figure 4: Flowchart of Themes Emerging in the Data.....	30

## Chapter 1

### Purpose of the Study

The purpose of this study was to conduct a systematic literature review to investigate to what extent preservice teachers' reflective thinking matters to the quality of preservice teachers' learning and performance. The study was designed to examine empirical research literature that guides education preparation providers and teacher educators in providing clear, coherent methods of operationalizing effective thinking practices for preservice teachers. This study builds on the large body of literature on reflective thinking for preservice teachers.

### Background of the Problem

Education preparation providers (EPPs) are responsible for preparing preservice teachers with the skills and dispositions of reflective teachers and modeling the reflective thinking process for their students. It is assumed that reflective thinking is foundational for high-quality teachers who positively impact student learning. However, what defines high-quality, effective teaching in increasingly complex and diverse American classrooms is continually evolving and expanding. Current, dynamic classrooms redefine teachers as "social mediators, learning facilitators, and reflective practitioners" (Larrivee, 2000). In this light, reflective thinking is viewed as a foundational tool in developing and improving professional learning for educators. Reflective thinking has been touted as the "grand idée in teacher education" (Jay & Johnson, 2002, p. 73). However, decades after John Dewey's (1933) seminal work, *How We Think*, reflective thinking has become an umbrella term that encompasses a wide range of approaches and aims, lacking a clear definition, rationale, process, and outcome for preservice teachers (PSTs).

Much research has been done on reflective thinking, and it is considered relevant within

the field. However, the multiple definitions, frameworks, and models have impeded consensus on what reflective thinking is. I sought to answer the research questions through the existing literature. I also sought to surface new understandings of reflective thinking for EPPs and for educational policy and practice in evaluating PST performance for licensure through teacher performance assessments.

### **Conceptual Framework**

The conceptual framework for this systematic literature review centered on the argument within the literature that reflective thinking has reached a level of orthodoxy in education without clear guidelines on what it is, how to implement it, how to develop PSTs into reflective thinkers, and how to measure reflective thought. To that view, reflective thinking practice is unclear, unknown, and unpracticed after a century of research and discussion. In this light, reflective thinking practice for PSTs has questionable value.

A competing claim from Brookfield (2017), Larrivee (2008), and Rodgers (2012) is that EPPs must focus on reflective thinking as a valuable, foundational skill for teaching. Proponents of reflective thinking claim it is a teachable and learnable skill with clear outcomes and measures. From this point of view, there is an urgent demand for EPPs to teach and engage PSTs in reflective thinking.

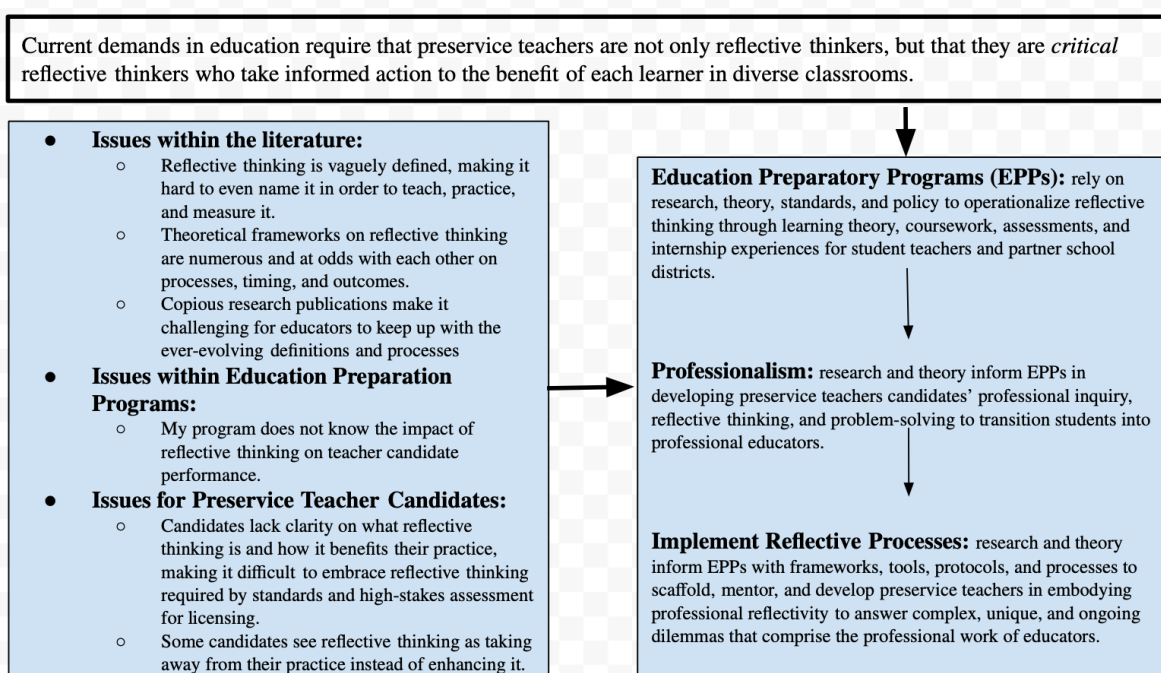
Proponents of PST reflective thinking claim that PSTs will be able to improve inclusion and learning for diverse students (Buckley, 2000; Gorski & Dalton, 2020; Jez, 2022; Kavanagh, 2017). However, there is a consensus on a lack of understanding of what reflective thinking is. Scholars who see value in reflective thinking fear that the lack of understanding of what reflective thinking is may lead to low-quality PST thinking practices and interventions. Further, a

lack of understanding may lead to low-quality PST reflective thinking and performance.

Ironically, education has a tumultuous history with reflective thinking: it is foundational, but we do not fully understand it. See figure 1 below for the conceptual framework for my research on PST reflective thinking.

**Figure 1**

*Conceptual Framework to Investigate the Value of Reflective Thinking for Preservice Teachers*



While there is tension within the literature about how to define, implement, and assess reflective thinking, it is important to note that national teaching standards demand reflective thinking. The standards also determine the level of performance PSTs must demonstrate for certification. Part of the argument is that reflective thinking practice shifted from a vague definition to desirable dispositions and outcomes, to mandated assessments for PSTs (Glasswell

& Ryan, 2017). The Interstate Teacher Assessment and Support Consortium (InTASC) standards are a set of guidelines for teacher education programs and professional development.

The standards provide a framework for the knowledge, skills, and dispositions that teachers should possess to be effective in the profession. The InTASC standards include several standards related to reflective thinking, including Standard 2: Learning Differences; Standard 3: Learning Environments; and Standard 10: Professional Learning and Ethical Practice (InTASC, 2017). These standards emphasize the importance of ongoing reflection and self-assessment for teachers, as well as the importance of creating learning environments that support and encourage student reflective thinking. While standards for reflective thinking are an important consideration in the conceptual framework for this study, the investigation of how reflective thinking practice became a policy mandate for teacher licensure is beyond the scope of this study.

Another important consideration is how national standards for professional educators align with the national assessments measuring preservice teacher performance to the standards (Clayton, 2018; Glasswell & Ryan, 2017; Nagle, 2008). The Education Teacher Performance Assessment (edTPA) is a national performance-based assessment system for teacher candidates. It is designed to assess a teacher candidate's ability to plan, teach, and assess student learning, and it is currently required in several states in America. The edTPA Content Area Handbooks include a section on reflection, which emphasizes the importance of reflective thinking in the teaching and learning process (Pearson, 2022). The edTPA handbook claims that teachers should use reflective thinking to consider and evaluate their practice, identify areas for growth and improvement, and adjust their teaching strategies and practices based on what they have learned.

The Praxis Performance-based Assessment for Teachers (PPAT) is another performance-

based assessment system for teacher candidates. The PPAT Candidate and Educator Handbook includes a section on reflective practice, which defines reflective thinking as "the process of actively and intentionally considering one's own teaching and learning experiences to inform and improve professional practice" (ETS Home, 2022). It suggests that reflective thinking is an essential component of effective teaching and learning and that it should be ongoing and iterative.

In sum, the InTASC standards, the edTPA Content Area Handbooks, the PPAT Candidate and Educator Handbook, and the PPAT Reflective Practice Handbook all portray the concept of reflective thinking as an essential part of the teaching and learning process (ETS Home, 2022; Pearson, 2022; InTASC, 2017). They emphasize ongoing reflection and self-assessment for teachers, as well as using reflection to inform and improve professional practice. Traditional conceptions of reflective thinking tend to focus on individual self-reflection and self-assessment, viewing reflective thinking as a tool for improving one's practice. In this sense, the InTASC standards and national assessments both emphasize the importance of ongoing reflection and self-assessment for teachers. The standards indicate that reflection can be used to identify areas for growth and to adjust one's teaching strategies and practices based on what has been learned (InTASC, 2017). While standards for reflective thinking are an important domain in the conceptual framework for this study, the investigation of how well the reflective thinking standards align with national assessments extends beyond the scope of this study.

Aside from national standards and assessments, there are significant issues within the literature on reflective thinking practices for PSTs. In addition to the multiple and conflicting

definitions of what reflective thinking is, the numerous frameworks on reflective thinking are at odds with each other on processes, timing, and outcomes. EPPs strive to meet the standards to implement effective reflective practice, but the literature lacks consensus on the process and products of PST reflective practice.

Confounding the issue is the sheer number of published peer-reviewed studies to research the perennial question of what reflective thinking is. To discover the flow of literature publications over the last 20 years on the topic of preservice teacher reflective practice, I used the ERIC database to graph publications by year. The result is a steady average of approximately 50 publications per year on reflective thinking focused on PSTs.

Adding to the issue, the program I direct relies mostly on coursework completion, grade percentage averages, and professors' letters of recommendation to determine candidate readiness for clinical practice as PSTs. While coursework and learner disposition within the coursework are important indicators, they may not provide enough information on candidates' readiness for what John Dewey called reflective thinking dispositions: curiosity, open-heartedness, open-mindedness, and responsibility-taking for one's learning (1938). Successful course completers have many skills and dispositions for learning, but those skills may not be aligned and transferrable to the clinical year of student teaching. This is an issue because PSTs' readiness to think reflectively is undefined, unmeasured, and not considered before candidates are placed in the classroom.

Further, PSTs are faced with novel experiences throughout their working day. The cognitive demand is intense. Psychologists describe states of learning confusion as "dissonance,"



(Festinger, 1957) “disequilibrium,” (Piaget, 1970) “puzzles of practice” (Gahlsdorf Terrell & Sherman, 2022), and “wobbles” (Barnatt et al., 2017; Fecho et al, 2005). PSTs are steeped in learning demands, making it difficult to learn, practice, and refine reflective thinking required by standards and high-stakes assessments for licensing. Dewey asserted that humans “do not learn from experience, but we learn from reflecting on experience.” If so, PSTs may learn to teach, not from teaching directly but from thinking reflectively about their experiences of teaching. The literature may offer data to guide EPPs into clarity. Without data to help articulate the rationale and benefits of reflective thinking, PSTs may experience reflective thinking as taking away from their practice instead of enhancing it. Currently, many of the candidates I direct view reflective thinking processes as assigned tasks that add to the intense cognitive demand of the clinical year. Many of the candidates miss that reflective thinking is a method to arrive at informed action to improve learning outcomes for all students.

Finally, without clarity, processes, and outcomes described in the literature, it is challenging for EPPs to effectively operationalize reflective thinking practices. It is even more challenging to implement evidence-based reflective thinking practices to develop PSTs for the complex work of teaching. Conducting a systematic literature review is crucial to the arguments underlying the value of reflective thinking practice for PSTs’ development. Given the significance of these puzzles, a systematic literature review of reflective thinking is the right decision for my research. The study is timely and appropriate as state and national standards demand that PSTs think reflectively to learn and improve practice.

### **Theoretical Framework for this Study**

John Dewey, Paulo Freire, Donald Schön, Maxine Greene, Marilyn Cochran-Smith, and Susan Lytle are widely referenced theorists on reflective thinking in the research literature. All

six theorists agreed that reflective thinking is the only way professionals can solve the complex, ongoing problems and puzzles that make up professional work. To this view, PSTs must learn the skills and dispositions of reflective teachers to sustain their careers and to model the process for their students. While Schön (1983) claimed reflective thinking is “how professionals think,” each of the six theorists included in the theoretical framework for this study articulated the meaning and the purpose of reflective thinking within the profession of teaching.

### ***John Dewey***

Dewey, a philosopher, believed that reflective thinking was an essential part of the learning process. He emphasized the importance of experience and practical problem-solving in education. However, summarizing Dewey’s view of learning as “learning by doing” inaccurately captures what Dewey meant (Rodgers, 2012). Ultimately, Dewey (1938) saw the purpose of education as growth, which comes from reflection on experience. Dewey described a process of reflection that begins with an experience that one willingly engages in to avoid fast, certain conclusions (1933). Part of the work in reflection is naming the problem or puzzle and formulating a question for inquiry (Dewey, 1933). But questions are not always apparent in complex problems; so, Dewey suggested tentative hypotheses that must be further examined by others (1933). Once a possible meaning is identified, the thinker acts, which Dewey (1933) considered a “response” rather than a “reaction.” For Dewey, the implications for reflective thinking in education are for educator preparation programs to develop teachers’ capacity to think about where the students are in their learning and to discern what each learner needs for the next step in learning (Dewey, 1938). To accomplish this, Dewey noted that teachers need four key dispositions: curiosity, open-mindedness, whole-heartedness, and responsibility.

### ***Paulo Freire***

Freire, also a philosopher, placed a strong emphasis on the role of experience in learning, arguing that education must be a liberating force that helps individuals critically examine the world around them and bring about social change. Freire (1970) used the word “reflection” to describe what educators now call “critical reflection” (Geng et al., 2019; Gorki & Dalton, 2020; Jay & Johnson, 2002; Larrivee, 2008b; Mendina, 2020). Freire’s work focused on alleviating human suffering through education. Freire’s premise was that alleviating human suffering would empower each student. For Freire, the process of reflection began with deep listening and is followed by compassionate dialogues to bring awareness of a particular situation to bridge relationships and repair injustice. To this view, reflective thinking is not a skill to master, but a means of being human. The implications for reflective thinking in education are for educator preparation programs to develop teachers’ openness and capacity to think beyond what Freire (1970) called “comfortable views of everyday life” (p. 173).

### ***Donald Schön***

Schön, another philosopher, focused on the role of reflective thinking in professional practice, arguing that professionals should engage in reflective thinking to continuously improve their skills and to better serve their clients. Schön’s work on reflective thinking for professional practice was embraced by education, which is ironic because Schön (1983) referred to education as a “minor profession.” Still, his work focused on defining and implementing reflective thinking in a profession. According to Schön, reflective thinking is the process of actively and critically thinking about one’s learning and experiences to better understand and learn from them (1983). It involves considering one’s thoughts and actions, as well as the context in which they took place to gain insights and to make improvements. Reflective thinking is an essential component of

professional development and lifelong learning. Less concerned with social action than Dewey or Freire, Schön claimed that education and reflective thinking practices are inseparable. Schön introduced the notion of reflection-on-action (a social act) and reflection-in-action (a solitary act). The implications for reflective thinking in education are for EPPs to develop teachers' expertise in reflection-on-action and reflection-in-action, which become both the content and the pedagogy of EPPs (Rodgers & Laboskey, 2016). According to Schön, PSTs must learn to reflect like professional teachers. However, what is missing from Schön work is how to accomplish that feat. Also missing is a focus on students. Schön's gap is what most educators see as the larger purpose of education as described by Dewey and Freire.

### ***Maxine Greene***

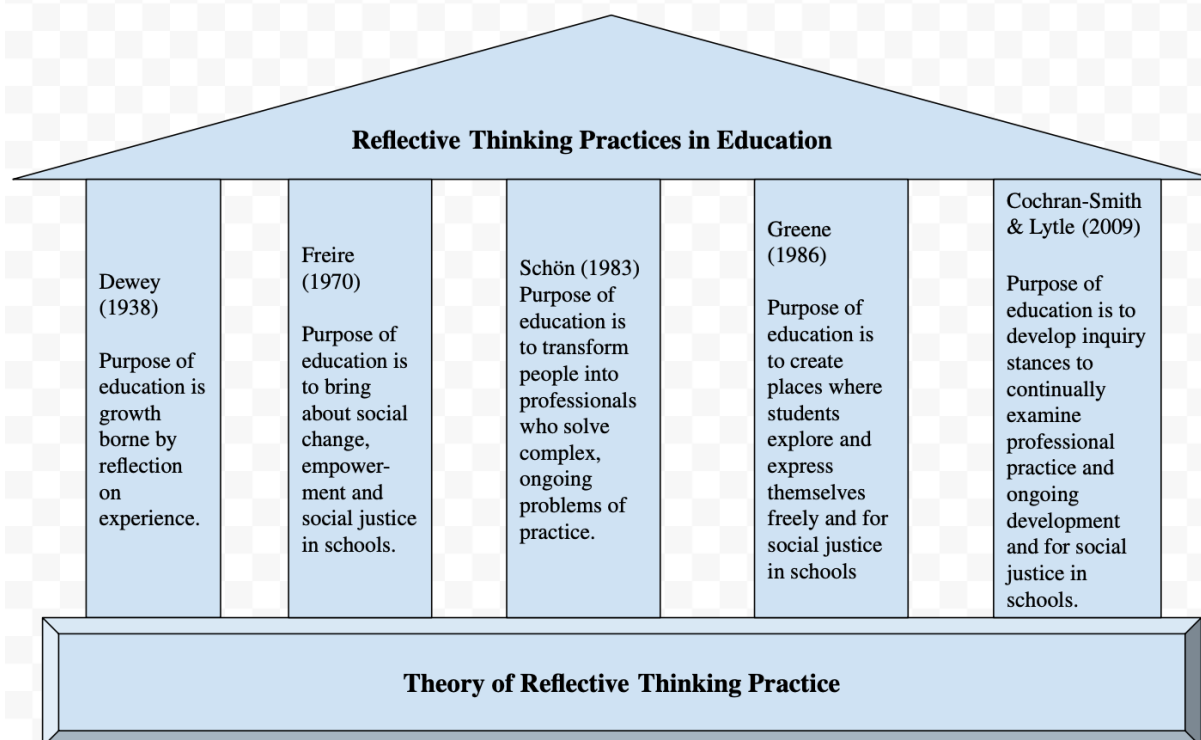
Greene, an educational philosopher like Dewey, emphasized the importance of imagination and creativity in education. She argued that schools must be places where students can explore and express themselves freely. Greene (1986) was concerned with the social structures that prevented each learner's empowerment and opportunities. In reflecting on Schön's work, she wrote: "We ought to talk more readily about what the practice is *for*, about the purposes we define for ourselves at this particular moment in our history" (1986, p. 70). The implications for reflective thinking in education are for educator preparation programs to develop teachers' beliefs in the potential for each student to achieve high levels and to create a deep awareness of the moral agency of the teaching profession (1986). For Greene, reflective thinking is a driving force for the very purpose of education.

### ***Marilyn Cochran-Smith and Susan Lytle***

Cochran-Smith and Lytle, scholar-practitioners, focused on the role of teacher learning and professional development, arguing that teachers must engage in ongoing reflective practice

to improve their teaching skills. Cochran-Smith and Lytle's (2009) inquiry stance was a reflective thinking practice that emphasized the importance of teachers actively examining their professional development. This approach advocated for teachers to constantly question their teaching practices and seek out new knowledge and understanding to continuously improve their effectiveness as educators. This stance encouraged teachers to be open to new ideas and perspectives and to be willing to challenge their assumptions and beliefs to grow and develop as professionals. Additionally, it emphasized the importance of teachers engaging in collaborative inquiry with their colleagues as a means of supporting one another's professional growth and learning. To accomplish this, Cochran-Smith and Lytle created “inquiry as a stance” to illustrate that practitioner knowledge is dynamic. Cochran-Smith (2004) defined education preparation programs as an ongoing continuum for learning and political challenges, and not a training program of “best practices” for all teachers within the time constraint of the program.

Theorists in the framework for this study are widely referenced in the research literature on reflective thinking, and they articulated the meaning and the purpose of reflective thinking within the profession of teaching. Their thinking and published work were foundational for the now widespread practice of reflective thinking in education. Figure 2 illustrates the theoretical framework for this study:

**Figure 2***Theoretical Framework to Investigate Reflective Thinking for Preservice Teachers*

Note: Cochran-Smith & Lytle (2009), Dewey (1938), Freire (1970), Greene (1986) & Schön (1983)

Many PSTs in the EPP I direct see written reflection as repetitive hoop-jumping that takes away from their clinical learning. Rather than being foundational to their learning, PSTs see reflective thinking as a time-consuming burden without discernible benefits. Adding to the issue, the clinical practice supervisors note PSTs are required to “reflect” without the benefit of being taught *how* to reflect. The supervisors argue that while they believe reflective thinking is foundational to navigating the complexities of teaching, they are not equipped to evaluate written reflective thinking. Additionally, the PSTs I work with experience the words “reflect” and “reflective thinking” as vastly different, undefined tasks required of them in their coursework, in their clinical practice, and in the teacher performance assessments required to demonstrate proficiency in teaching.

Another problem with the loose, unagreed-upon definition of reflective practice for PSTs is that it is hard to assess and measure a skill that is vaguely defined (Hickson, 2011; Pultorak, 2010; Rodgers, 2002; Thompson & Pascal, 2012). Finally, with a vague definition, it is difficult for EPPs to implement it, practice it, mentor it, and assess it.

Reflective thinking is a broad term that encompasses a range of activities, dispositions, and practices related to thinking critically and deeply about one's own experiences and practices. While there is no consensus on a specific definition of reflective thinking, there is consensus that reflective thinking is an important skill for educators and students to develop (Brookfield, 2017; Kavanagh, 2017; Rodgers, 2012). In the debate within the literature, it is important to review the history of how reflective thinking began, along with the rationale for its emergence and importance in education. Schön's *The Reflective Practitioner* (1983) claimed that ongoing reflective thinking may provide the solutions to complex, ongoing problems professionals face in their work. However, there are many varieties of reflective thinking, and teacher educators and EPP leaders cannot assume that PSTs can automatically engage in the purposeful reflective thinking that Schön describes.

Brookfield (1987) and Larrivee and Cooper (2006) indicate that reflective thinking is a learned skill with clear outcomes. However, the research literature provides no consensus on the impact of reflection on teacher performance (Brookfield 2017; Mann & Walsh, 2013; Pultorak, et al., 2010). In addition, other scholars claim reflection “is more than a technique; it is an orientation with a long history” (Rodgers & LaBoskey, 2016). Other expansive phrases that strive to name reflective thinking in education are “a habit of mind” (Cochran-Smith & Lytle, 2009), “a way of working, moving, in the world” (Kincheloe, 2012), and “a way of knowing” (Walter, 2020). Greene (1995) claimed reflective thinking is: “not a strategy to be employed, but

a way of being essential to the realization of democratic ideals" (p. 172). The literature offers no consensus of reflective thinking as a skill, as a discrete activity, as a strategy, or as a discipline. Aside from being ill-defined and value-laden, reflective thinking appears to be both content and pedagogy, both a process and a product. As a scholar-practitioner, understanding reflective thinking as content and pedagogy is a helpful frame for my work. It is also helpful to consider the history of how reflective thinking developed into a foundational practice for educators in America.

### **History of Reflective Thinking in the United States**

The turn of the twentieth century gave rise to constructivist thinking that challenged rote memorization in American public education, shifting the student from a passive recipient of teacher-centered classrooms to empowered learners who construct their meaning and claim responsibility for learning (Adams, 2006). While constructivism is a philosophy of teaching, not a teaching method, there is agreement that it requires making meaning to construct one's knowledge rather than students passively absorbing a teacher's knowledge (Adams, 2006; Lebow, 1993). Dewey, who argued that education must reflect the changing American society, drew his notions of reflective thinking from constructivism (Adams, 2006). Dewey distinguished the difference between routine, reflexive action, and reflective action over a century ago, making his work foundational in influencing reflective thinking practice in American education (1933). Dewey defined reflexive action as what we do within our belief systems to understand our complex roles with others (1933). Dewey defined reflective thinking as a method of thought that acknowledges quandaries, doubts, dilemmas, and contradictions (Brookfield, 2017; Dewey, 1933; Larrivee, 2008). Larrivee writes, "[...] Dewey asserted that the capacity to reflect is initiated only after recognition of a problem or dilemma *and* the acceptance of uncertainty"



(2006, p. 6). The tension created in acknowledging that a problem exists launches the reflective thinker into active inquiry, defining the current reality and creating new ideas and actions (Larrivee, 2006).

Schön added to Dewey's work by redefining educators as reflective practitioners who continually learn from experience and re-framing experiences through reflective thinking, especially problematic, unexpected experiences (1983, 1987). Schön argued that teachers were not "just technicians" but also professionals engaging students in learning and inquiry (1983, 1987). This argument gained momentum in early 1980s America, giving rise to teachers' reflective practice as a professional endeavor. Schön defined a problem as any "puzzling or troubling, or interesting phenomenon with which the individual is trying to deal" (1983, p. 50). There are no "neat solutions" for reflective thinkers, who must enter a patterned inquiry cycle to seek a solution (Schön, 1983). Even so, the decisions following the inquiry cycles remain open to examination and redesign, depending on new experiences and changing contexts.

Schön emphasized that reflective thinking is a significant factor for teachers striving to solve consequential problems of practice in their work (1983). Further, Schön added the concept of reflecting in the present (in-action) and the past (on-action) (1983). To reflect in action is to self-observe thinking and action as it is happening in the moment. While it is challenging to reflect in the moment, experienced teachers can and do evaluate what is currently happening in a classroom and re-engage students in their learning. Schön noted that this form of reflective thinking is tacit (1983). A more common form of reflective thinking is reflection-on-action, which "looks back" on an experience or action to impact future action in a similar context (1983).

Dewey (1933) and Schön (1983, 1987) argued that people learn more deeply when they reflect on the experience and that transformational learning does not necessarily happen without reflective thinking processes. Both Dewey (1933) and Schön (1983, 1987) concluded that while experience is the beginning of learning, learning is not as simple as “learning by doing.” Reflective thinking values people learning from their own experiences, over the traditional model of knowledge transfer from teacher to student. Early frameworks of reflective thinking practice developed from Dewey’s (2018) and Schön’s (1983, 1987) work.

The early frameworks concentrated on observing and experiencing an event to introduce reflective thinking to lead to new thinking and action for improvement in the current state. Each model that developed from the frameworks featured learners as autonomous and self-directed. It is important to differentiate between a conceptual framework and a working model. A framework gives the overall structure of a concept, such as reflective thinking, while a model operationalizes the concept. It is also important to note that there is not an agreed-upon reflective thinking model for PSTs in the literature. Further, the research literature over the last twenty years lacks consensus on which models effectively develop PSTs’ reflective thinking (Pultorak, et al., 2010).

### **Ethical Considerations**

While human subjects were not included in this study, I worked to eliminate my biases. To accomplish the elimination of bias, it was important to identify how the closely related themes were distinct from each other. For example, protocols, processes, and tools are all related to reflective thinking, but they serve different purposes. This study defines protocols as structured procedures that outline the steps in a particular activity or process. Protocols provide

the structure and guidelines for reflective thinking practice, while processes are the specific steps involved in that practice, and tools are the resources used to facilitate and support the practice.

Eliminating bias was a serious challenge for a single researcher in a systematic review process, which typically includes at least two to three people. In this study, I focused on being as transparent as possible with the chair, the experts, and my colleagues because it is incredibly challenging to discern one's own biases. Furthermore, Petticrew and Roberts (2006) cite the systematic literature review as the least biased research type. Still, publication bias exists, and this research was limited to reviewing literature that was published and available for review (Piper, 2013). Because of the possibility of publication bias, Petticrew and Roberts (2006) recommended a systematic literature review including published *and* "gray literature" (p. 80). However, there were two concerns about using Google Scholar as a literature database: it is a less credible database than the education-specific databases, and it was difficult to winnow the return of 8,000 articles. Even with a Boolean operator search of PST reflective thinking within a single year resulted in over 2,000 returns. Also, Google Scholar includes non-peer-reviewed content, which could decrease the quality of a systematic review. To guard against that, I used Google Scholar searches for articles that were not available through the usual university research library subscriptions. Google Scholar was also helpful in discerning how many times a subject matter expert in preservice teacher reflective practice was cited in peer-reviewed literature across the databases.

I sought to answer the research questions through the existing literature, which may surface new understandings of reflective thinking for EPPs and for educational policy and practice in evaluating PST performance. In addition, I listened to and acknowledged PSTs' concerns about the lack of focus and conflicting approaches to reflective thinking in the program

I direct. Critical listening surfaced my assumptions about reflective thinking practice as an “obvious” meaning for PSTs, university supervisors, teacher educators, and EPP leaders. While that is an important stance for a director of clinical practices, my work as a scholar-practitioner was to delve into the research and report what is in the literature regarding what reflective thinking is and what value, if any, it holds for practitioners. To accomplish that, I bracketed my personal preferences and assumptions while working in my research role. As recommended by Denzin (2010), I created a systematic approach by creating clear categories, definitions of terms, structures, delimiting criteria, and decision rules to guide my research.

### **Significance of this Study**

The loose definition of reflective thinking is a significant issue for EPPs, PSTs, and the broader scholarly community. Historically, there is not a clear distinction between reflective thought from other kinds of thinking (Rodgers, 2002). However, state and national standards and frameworks for reflective practice are clear that PSTs must think to learn and improve practice. How PSTs acquire and implement thinking to learn and improve their practice remains undefined. In sum, it is hard to assess and measure a skill that is vaguely defined (Pultorak, 2010; Rodgers, 2002; Thompson & Pascal, 2012).

This research aims to provide EPPs with an informed understanding of the trends from the past 12 years in PST reflective practice. Specifically, this study advances informed understandings of defining, developing, and measuring PST reflective thinking to understand the outcomes and gains from a program level. This study concerns EPPs that design and implement methods and strategies to successfully develop and measure PSTs’ reflective thinking. Additionally, this study concerns PSTs’ professional learning and the schools that employ them as novice educators.

Finally, this study advances my understanding of reflective thinking to implement high-quality PST reflective thinking within the program I direct. Knowing what reflective thinking is and understanding how it can be measured empowers my work in developing university supervisors and mentoring teachers who guide and cultivate future teachers. The merit of a systematic literature review on this topic is to discern if the literature debate offers common threads of agreement for reflective practice. Agreement on what outcomes and gains reflective thinking practice offers may provide a much-needed approach to analyzing the content, processes, and outcomes of PST reflective thinking.

### **Definition of Terms**

*Alert novices*: a reflective form of thinking in PSTs that acknowledges uncertainty and the need for feedback and triangulation (LaBoskey, 1994).

*Common sense thinkers*: an unreflective form of thinking for PSTs that relies on personal experience in learning to teach (LaBoskey, 1994).

*Constructivism*: the act of making one's knowledge through active participation in the learning experience once added to the existing schema. (Travers et al., 1993; Voss & Kunter, 2020).

*Critical incident*: an undesirable experience in a school setting; it could be minor (Brookfield, 2012).

*Critical reflection*: involves the ability to examine personal and professional belief systems to focus on power and social justice (Jay & Johnson, 2002; Geng, et al., 2019; Gorski & Dalton, 2020; Larrivee, 2008b; Medina, 2020). In addition, van Manen adds, "critical reflection involves a constant critique of domination, of institutions, and repressive forms of authority" (1997, p. 227).

*Culturally sustaining practices*: sustains and supports bi-/multilingualism and multiculturalism in schools; maintains heritage, values, and cultural and linguistic pluralism (Paris & Alim, 2017).

*Curiosity*: one of four dispositions of reflective practitioners: a willingness to accept uncertainty and begin inquiry (Dewey, 1938).

*Guided Conversations*: a meeting where a facilitator produces a starting set of questions around a single topic (Amobi, 2003; Costa & Garmston, 2002).

*Inquiry stance*: a habit of mind of questioning and valuing deep learning; a way of knowing and being (Cochran-Smith and Lytle, 2001; Smith, Yendol-Hoppen & Milam, 2010).

*Mentor*: an individual with expertise who provides advice to enhance the mentee's professional performance and development. (Costa & Garmston, 2002).

*Practice*: a teacher's repertoire of knowledge, dispositions, skills, and behaviors (Larrivee, 2008).

*Preservice teachers*: students of Education in a period of guided, supervised, and evaluated teaching as they pursue program completion and certification as professional educators.

*Open-mindedness*: one of the four dispositions of reflective practitioners; a willingness to consider new thinking and possibly innovative ideas (Dewey, 1938).

*Reflective inquiry*: assumptions behind all practice are subject to questioning (Dewey, 1938).

*Reflective teaching*: examining one's underlying beliefs about teaching and learning and one's alignment with classroom practice throughout the teaching and learning process (Larrivee, 2005; Larrivee & Cooper, 2006).

*Reflective process*: the ability to reflect on one's actions to engage in a process of continuous learning (Schön, 1983).

*Reflective practice*: on-the-job performance resulting from using a reflective process for daily decision-making and problem-solving (Larrivee, 2008).

*Reflective thinking*: an active, persistent, and careful process of deliberately considering one's thoughts, feelings, and actions. It involves taking a step back from a situation and evaluating one's thoughts and behaviors to gain a deeper understanding of oneself and the situation (Dewey, 1938).

*Reflexivity*: a trait, disposition, or tendency of an individual to engage in reflective thinking (Dewey, 1938).

*Responsibility*: one of four dispositions for reflective thinking identified by Dewey; this involves taking ownership of one's learning and being proactive in seeking out new information and experiences. It also involves being accountable for one's learning and being willing to take risks and make mistakes to learn and grow (Dewey, 1938).

*Self-reflection*: examining how one's beliefs and values, experiences and assumptions, family imprinting, and cultural conditioning impact students and their learning (Larrivee 2005, 2008).

*Supervision*: a professional relationship between an individual entering a field of work and an experienced professional in that field (Costa & Garmston, 2002).

*Tacit knowledge*: the knowledge a person has built up from different experiences. As the PSTs shift into professional educators, their tacit knowledge increase and influence their actions (Meierdirk, 2016).

*Transformational learning*: focuses on the idea that learners can adjust their thinking based on new information (Larrivee, 2008).

*Wholeheartedness*: one of four dispositions for reflective thinking; showing sincerity, and commitment (Dewey, 1938).

## Chapter 2

To answer the research questions for this study, I conducted a systematic literature review. The research questions for this study are:

- How does the peer-reviewed literature in teacher education define reflective thinking?
- What learning outcomes and gains, if any, are described in the peer-reviewed literature on preservice teacher reflective thinking?

### Methodology

This study utilized a systematic review research design. The review protocol included mapping core ideas; identifying authors who emerge as authorities on the subject with multiple texts; and creating a literature survey tally matrix to discern findings. This protocol was established by Machi and McEvoy (2016). A systematic review focuses on “identifying, synthesizing and assessing all available evidence, quantitative and/or qualitative, to generate a robust, empirically derived answer to a focused research question” (Mallett et al., 2012, p. 445). A systematic review of the literature aims to limit bias by “attempting to identify, appraise, and synthesize all relevant studies to answer [...] a set of questions,” (Petticrew & Roberts, 2006, p. 6). Furthermore, Petticrew and Roberts (2006) cite the systematic literature review as the least biased research type and as a “method of mapping out areas of uncertainty and identifying where little or no relevant research has been done, but where new studies are needed” (p. 2).

The review is delimited to literature from the previous 12 years. I aimed to study the most current empirical studies to inform my research so I can facilitate informed decisions for possible implementations for the clinical practice that I direct. It was helpful that the Association of Teacher Educators created a commission to investigate teacher reflectivity’s impact in 2004 (Rigney et al., 2019). Since that time, Pultorak (2009) noted that many studies have been

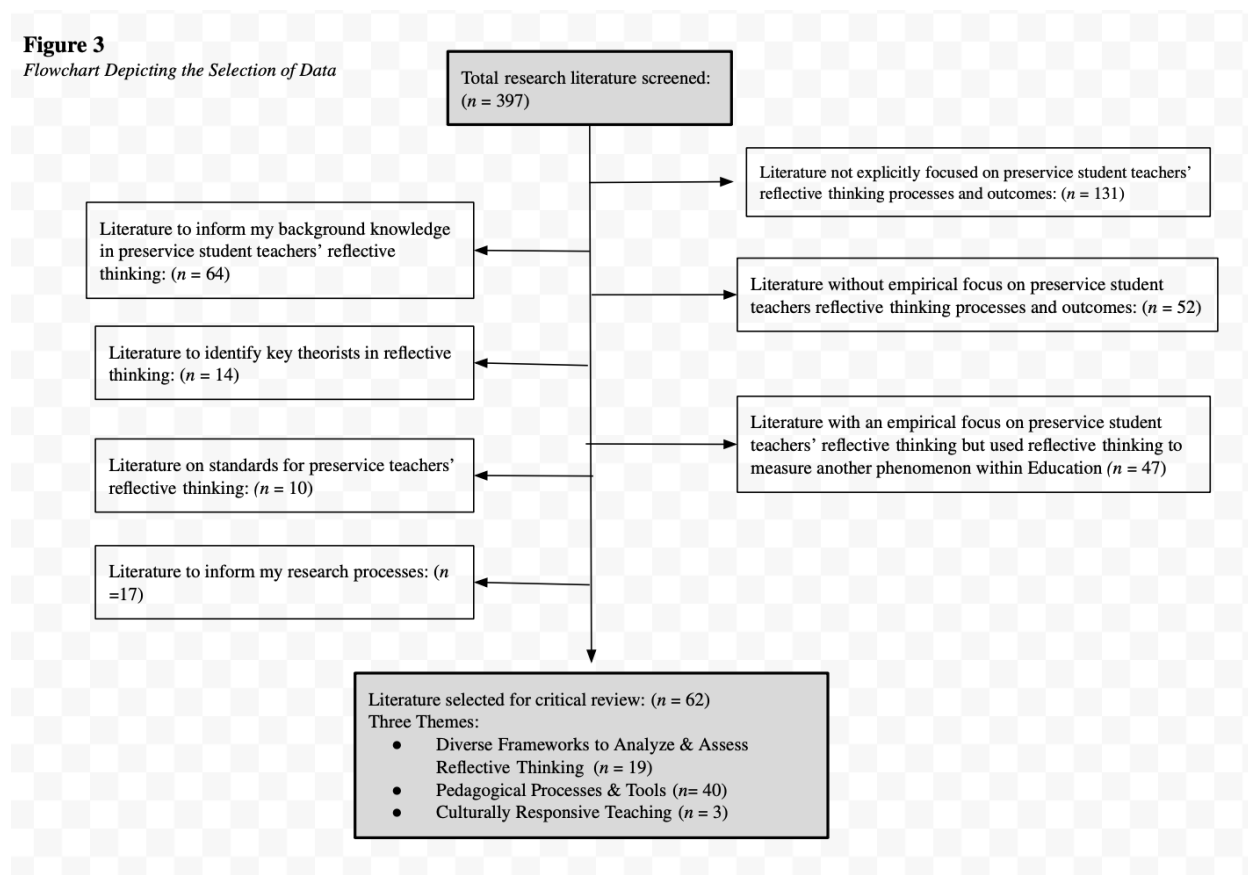


conducted and published on the impact of teacher reflectivity. The inclusion criteria consisted of peer-reviewed, empirical, full-text, qualitative, and quantitative studies published in English from January 2010 to October 2022. I chose literature focused on preservice teachers (PSTs) rather than the wide field of reflective practice in education and other professions because my work as a director of clinical practice concerns developing PSTs into professional educators. Adding this exclusion eliminated thousands of studies as the initial wide search yielded over 7,000 studies, which was unwieldy and impractical for this study's purposes. Narrowing the search through exclusion criteria screened the studies to 397.

Coding helped me identify authors who emerged as authorities in a selection process described by Machi and McEvoy (2016). Figure 3 shows the data review selection process.

**Figure 3**

*Flowchart Depicting the Selection of Data*



From a coding standpoint, I conducted four coding sessions over five months to check to see if the first coding stood “the test of time.” It did not. As my familiarity with the data developed, I was able to discern which articles more accurately were coded within the themes the first coding surfaced. The second coding forced me to closely read the methodologies of articles that could have been coded for multiple themes to help me determine what question the study aimed to answer. From a more informed grasp of the literature, I could see two major domains emerging: definitions of reflective thinking and frameworks for reflective thinking. Two themes emerged within the two domains: content (what to think) and process (how to think) for reflective thinking. The themes from the second coding were confirmed with the third and fourth coding sessions. I acknowledge that most systematic reviews include multiple reviewers who code the work, and then conduct an inter-rater reliability analysis to see how well they match their selection criteria. Instead, I conducted a third coding session with colleagues who were closely following my research. Once I saw “frameworks for reflective thinking” as a major theme for the literature, I could more easily identify which data concentrated on a particular theme for reflection.

From that process, three themes emerged from the coding process: diverse frameworks for analyzing and assessing reflective thinking; pedagogical processes and tools to develop and scaffold reflective thinking; and culturally sustaining practices for reflective thinking. Once the themes were identified, the data were more easily identified in the remaining categories. My colleagues and I examined my decisions to code certain data as frameworks for analyzing reflective or assessing reflective thinking. In the data that were initially coded as “analyzing,” three studies were re-coded as “assessing” after close re-reading and discussion. I also acknowledge that I could apply coding software for a fifth coding, but part of my work in a

systematic literature review is discerning when to move on to the next aspect of the research. I decided to complete the coding with four sessions over five months to study the findings and possible implementations of my study.

The following questions guided the inclusion or elimination of the data to determine study quality as described by Zawacki-Richter et al (2020) and Machi and McEvoy (2016):

- Is a focused clinical question clearly stated?
- Are the search methods used to identify relevant studies clearly described?
- Was a comprehensive literature search performed?
- Was selection bias avoided?
- Was there duplicate study selection and data extraction?
- Were the characteristics of the studies included?
- Was the scientific quality of the studies assessed and documented?
- Were the methods used to combine the findings of studies appropriate?
- Was the scientific quality of the studies used appropriately in formulating conclusions?
- Was publication bias assessed?
- Was the conflict of interest stated?

A systematic literature review may reveal a clearer understanding of the process and the outcomes of reflective thinking, which is promoted, developed, and evaluated through language. Freire (2014) wrote that reflection is wholly connected to language and that our capacity as humans is realized through our ability to name the aspects of our world. Mann and Welsh (2006) write, “Through focusing on the language to achieve a task or complete a practice, we can gain a fine-grained understanding of how the task gets done” (p. 294). Much has been studied and written about PST reflective thinking.

The research procedures consisted of systematic database searches, organization of the data, analysis of the data, and reporting findings. Most of the searches were linear searches through multiple databases to ensure as much relevant data as possible. However, not all processes for finding key articles were smooth. Some articles were not immediately available through the usual searches. To solve that, I worked with research librarians to obtain all the articles in this review.

In this study, it was crucial to employ a “critical appraisal” of studies to determine if the articles were “adequate for answering the question” (Petticrew & Roberts, 2006, p. 126). While the questions from Machi and McEnvoy (2016, p.76) proved helpful in the inclusion and elimination processes of peer-reviewed literature, I created a context to formalize a systematic process of reviewing each study (Petticrew & Roberts, 2006). My process was to employ three basic tools before further screening the literature for quality:

- Skim abstracts with research questions visible to discern if the material helped answer the research questions for the literature review (Machi & McEnvoy, 2016).
- Scan tables of contents, chapters, and sub-headings to discern if the literature addressed the key terms or core ideas of the research questions (Machi & McEnvoy, 2016).
- Use RefWorks to organize the data by themes and to “hold” the literature for quick reading.
- Employ quick reads of the introductions and conclusions to identify the main ideas and key concepts (Machi & McEnvoy, 2016).
- Skim read faster than inner vocalization reading speed to gather main and supporting ideas (Machi & McEnvoy, 2016).

- Map main and supporting ideas in Google Sheets, including authors, texts, and page numbers (Machi & McEnvoy, 2016).
- Skim glossaries, appendixes, and references for additional information to assist the research (Machi & McEnvoy, 2016).

In addition, the database search centered on three main education databases: ERIC, Education Source, and ProQuest: Education. Gale OneFile was used as a supplementary database to ensure I was not missing key literature from 2010 to 2022 and to examine the unique returns with the full-text repository that may not have been provided by the three main education research databases. Finally, JSTOR, a journal archive, was used as a supplementary database because it offered backfiles of journals beginning with the first journal, and it offered full-page images. Working with university research librarians affirmed this approach was a thorough, in-depth review of peer-reviewed, published literature.

### **Instruments and Procedures**

This study was an extensive review of the current literature on PST reflective thinking. For this systematic review process, the instruments and procedures consisted of systematic database searches, organization of the data, analysis of the data, and reporting findings in an unbiased method. The instruments consist of the databases the researcher used, as well as Google Sheets used for analysis. The procedures will be the methods of combining search terms to select the literature that was reviewed.

I employed Boolean operators to experiment and noted the results of the searches (Machi & McEvoy, 2016). Mapping the research by core concepts and mapping authors' contributions was key in this work (Machi & McEvoy, 2016, pp. 53-56). Access to my university's RefWorks was vital in collecting, organizing, and seeing patterns in the data. In addition, taking additional

steps in mapping, e.g., varying PST reflective thinking that complements or contrasts major theories. The maps were essential for helping me conceptualize the divergent and convergent stances on reflection and reflective practice, easing the way for analyzing the results of the search. In particular, the table from Machi and McEvoy was especially helpful because it divided the literature into three major tasks of collecting the data, organizing the information, and analyzing the patterns of the data.

To begin my research, I used ERIC, Education Source, ProQuest: Education, Gale OneFile, and JSTOR databases with a variety of keywords as search strings for peer-reviewed literature about reflective thinking in EPPs. The literature included for review in this study was found in the following databases: ERIC, Education Source, ProQuest: Education, Gale OneFile, and JSTOR. I used search strings to enter an online database search field to retrieve specific results. My search strings combined words and phrases as illustrated in table two, as well as the additional filters applied to the search. The keyword search was informed by Zawacki-Richter et al. (2020) who advised using specific topic terms, synonyms, and key terms in connection to article titles, abstracts, and authors' keywords. As suggested by Machi and McEnvoy (2016), Boolean operators "and," "or," and "not" provided more comprehensive returns of relevant data. In addition, employing truncation of root words in the research process broadened the returns. Table 1 summarizes the search strings I used for online database searches.

**Table 1***Search Strings for Online Database Searches***Boolean operators “and” and “or” in each search string**


---

("reflection\*" OR "reflective\*" OR "reflect\*" OR "reflective practice\*" OR "critically reflect\*" OR "critical reflection\*" OR "critical reflective practice\*") AND ("student teacher\*" OR "preservice teacher\*" OR "pre-service teacher\*" or "teacher candidate\*")

("self reflection\*" OR "self-reflection\*" OR "reflecting\*" OR "learning\*" OR "thinking\*" OR "critical thinking\*" OR "critical think\*") AND ("student teacher\*" OR "preservice teacher\*" OR "pre-service teacher\*" or "teacher candidate\*")

("levels of reflection\*" OR "reflection levels\*" OR "depth of reflection\*" OR "depth of reflective thinking\*" OR "measure reflective thought\*" AND ("student teacher\*" OR "preservice teacher\*" OR "pre-service teacher\*" or "teacher candidate\*")

("framework for reflection\*" OR "frameworks for reflection\*" OR "frameworks for reflective thought\*" OR "frameworks for reflective thinking\*" AND ("student teacher\*" OR "preservice teacher\*" OR "pre-service teacher\*" or "teacher candidate\*")

("theories for reflection\*" OR "reflective theories\*" OR "reflective thinking theories\*" OR "reflective thinking practice theories\*" OR "reflective practices theories\*" AND ("student teacher\*" OR "preservice teacher\*" OR "pre-service teacher\*" or "teacher candidate\*")

("protocols for reflection\*" OR "protocols for reflective thinking\*" OR "protocols for reflective thinking practice\*" OR "processes for reflection\*" OR "processes for reflective thinking" AND ("student teacher\*" OR "preservice teacher\*" OR "pre-service teacher\*" or "teacher candidate\*")

("types of reflective thinking\*" OR "types of reflection\*" OR "types of reflective thought\*" OR "typology of reflective practice\*" OR "typology of reflective thought\*" AND ("student teacher\*" OR "preservice teacher\*" OR "pre-service teacher\*" or "teacher candidate\*")

("develop reflection\*" OR "develop thinking\*" OR "develop critical thought\*" OR "develop critical thinking\*" OR "develop critical reflection\*" OR "teach reflective thinking\*" OR "teach critical reflection\*" AND ("student teacher\*" OR "preservice teacher\*" OR "pre-service teacher\*" or "teacher candidate\*")

("conditions for reflection\*" OR "conditions to develop thinking\*" OR "conditions for critical thought\*" OR "conditions for critical thinking\*" OR "conditions for critical reflection\*" OR "reflective thinking conditions\*" OR "teaching conditions for critical reflection\*" AND ("student teacher\*" OR "preservice teacher\*" OR "pre-service teacher\*" or "teacher candidate\*")

("benefits of reflection\*" OR "benefits to reflective thinking\*" OR "benefits for critical thought\*" OR "benefits to critical thinking\*" OR "impact of critical reflection\*" OR "impact of reflective thinking\*" OR "impact of critical reflection\*" AND ("student teacher\*" OR "preservice teacher\*" OR "pre-service teacher\*" or "teacher candidate\*")

("models for reflection\*" OR "models for reflection\*" OR "models for reflective thought\*" OR "models for reflective thinking\*" AND ("student teacher\*" OR "preservice teacher\*" OR "pre-service teacher\*" or "teacher candidate\*")

---

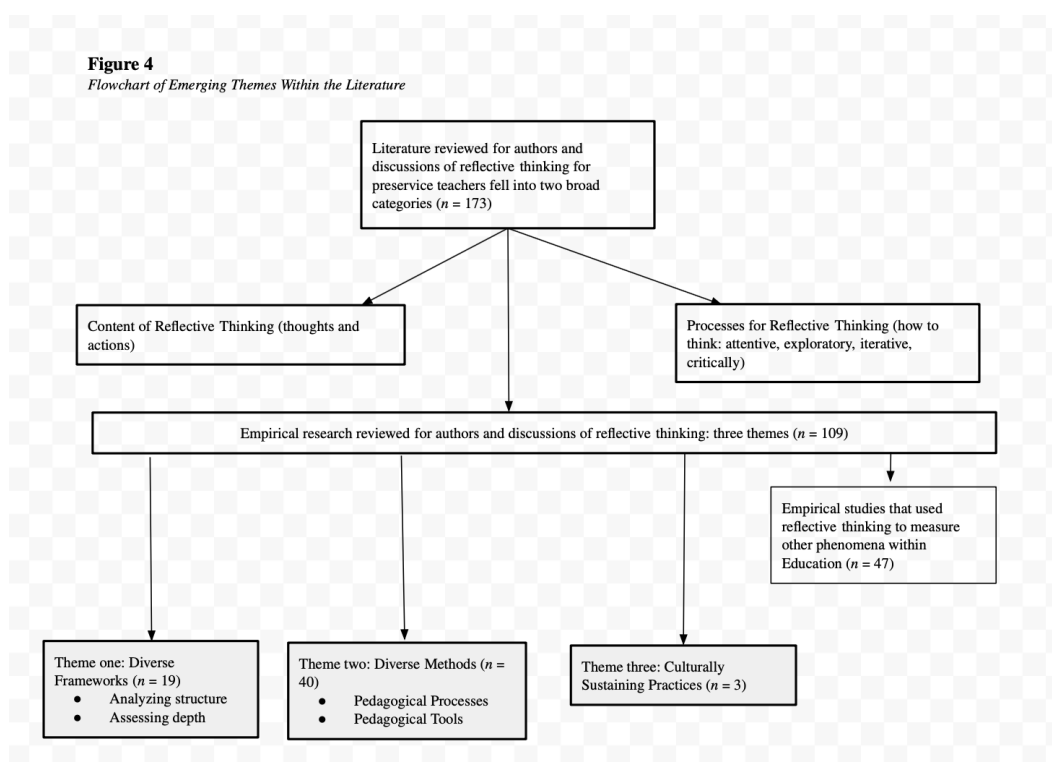
I limited the query to peer-reviewed literature published from January 2010 to October 2022. Of the 397 results reviewed, 131 articles focused on reflective thinking but not on PST reflective thinking. Those articles were discarded. I used 27 articles to deepen my understanding of the research process for this study or of current standards for PSTs’ reflective thinking. While these articles were vital to my research, they were not included in the critical review of literature in this systematic review. In addition, 14 articles were used to deepen my understanding of

theorists of reflectivity. While foundational to my background knowledge, these articles were not included in the critical review of the literature.

The 225 remaining articles included discussions and/or findings on reflective thinking helped me with my first goal of identifying key authors who provided clear definitions of reflective thinking. In addition, the 225 studies were foundational in helping me extract two broad categories of content (what to think) and process (how to think). Another goal was to find empirical studies to analyze the outcomes of reflective thinking. To accomplish that, I reviewed 109 empirical studies and eliminated 47 studies that used reflective thinking to measure another aspect of teacher education. The remaining 62 studies examined the gains or lack of gains of PSTs' reflective thinking. Figure 4 summarizes the emerging themes from the literature.

**Figure 4**

*Flowchart of Emerging Themes Within the Literature*





### **Definitions of Reflective Thinking**

One of the arguments within the research literature was a lack of consensus on the definition of reflective thinking. There are many definitions of reflective practice. Broadly, reflection is a method of thinking about a complex issue with the intent to find meaning and take informed action to improve a situation or outcome. Specifically, the fifteen most cited authors/author groups emerged with explicit definitions. Table 2 summarizes key researchers' definitions of reflective thinking found within the literature.

**Table 2***Key Researchers' Definitions of Reflective Thinking*

Researcher (s)	Year	Definition of Reflective Thinking
Dewey	1933	"Active, persistent and careful consideration of any belief or supposed form of knowledge in the light of the grounds that support it and the further conclusion to which it tends."
Freire	1970	Reflective thinking is a process in which individuals critically examine their own experiences and ideas to better understand the world around them and to work towards social change.
Schön	1983, 1987	"Questioning the assumed structures of 'knowing-in-action' and 'thinking critically' about that thinking that got us to fix this opportunity."
Boyd & Fale	1983	"The process of internally examining and exploring an issue of concern, triggered by an experience, and which creates and clarifies meaning in terms of self, and which results in a changed conceptual perspective."
Boud	1985	"Generic term for those intellectual and affective activities in which individuals engage to explore their experiences in order to lead to a new understanding and appreciation."
Greene	1986	"Reflective thinking is an essential part of this process of inquiry and exploration, as it allows individuals to critically examine their own experiences and ideas in order to gain a deeper understanding of the world around them."
Mezirow	1991	"The process of critically assessing the content, process, or premise(s) of our efforts to interpret and give meaning to an experience. [...] Premise reflection involves us becoming aware of why we perceive, think, feel, or act as we do and of the reasons for and consequences of our possible habits."
Hatton & Smith	1995	"Deliberate thinking about action with a view to its improvement."
Moon	1999	"A form of mental processing with a purpose and/or anticipated outcome that is applied to relatively complex or unstructured ideas for which there is not an obvious solution."
Kember et al.	2000	Reflection and critical reflection are viewed as two levels on a four-scale continuum of reflective thinking.
Korthagan & Valoso	2005	"Reflection is a systematic way of improving one's practice." "Core reflection involves questioning and reframing a person's deepest levels of functioning such as identity and mission. Core reflection aims at durable changes."
Kember et al.	2009	Reflection "operates through a careful re-examination and evaluation of experience, beliefs and knowledge" and "leads to new perspectives." Critical reflection, the highest level of reflection, consists of "involving perspective transformation" and "necessitates a change to deep-seated, and often unconscious, beliefs and leads to new belief structures."
Cochran-Smith & Lytle	2009	"Reflective thinking is a process of examining and evaluating one's own experiences and actions in order to improve practice and better understand the complex and dynamic nature of teaching and learning."
Mann et al.	2009	"Purposeful critical analysis of knowledge and experience, in order to achieve deeper meaning and understanding."
Sanders	2009	"A metacognitive process that occurs before, during and after situations with the purpose of developing greater understanding of both the self and the situation so that future encounters with the situation are informed from previous encounters."

Despite the many definitions of reflective thinking, there are common threads to guide this research. While the language changes from researcher to researcher, there are consistent

ideas and assumptions, beginning with lower to higher levels of thinking and complexity. Additionally, there was agreement that reflective thinking moves from a description of a noteworthy incident to critical thinking about the incident to take informed action for improvement. Finally, there was agreement on moving from a self-focus to multiple perspectives focus. From the key authors and author groups in table 3, reflective thinking practice can be generalized to center on puzzles or problems of practice which cannot be easily solved. A second generalization is that reflective thinking is cyclical, with puzzles or problems framed and reframed over time, as originally described by Dewey (2018) and Schön (1983). Finally, seeking multiple perspectives in a puzzle or problem of practice was consistent through the research on improving the quality of PST reflection. The merit of discerning common themes with the research on reflective practice is that it provides an approach to analyze the content, processes, and outcomes of PST reflection.

Because the definitions of reflective thinking were closely related to reflective thinking frameworks and models, I created a separate table for reflective thinking frameworks and models to distinguish them from the definitions. Fifteen most cited authors/author groups emerged with explicit frameworks and models. Table 3 summarizes key frameworks and models within the literature in this review.

**Table 3***Key Researchers' Frameworks and Models for Reflective Thinking*

Researcher(s)	Year	Reflective Thinking Frameworks or Models
Borton	1970	Three questions to capture thinking on a particular incident: 1. What? 2. So what? 3. Now what?
Argyris & Schön	1974, 1978	Double-loop learning "occurs when error is detected and corrected in ways that involve the modification of an organization's underlying norms, policies and objectives."
Kolb	1984	Reflection is conceptualized as one stage and pole of the four-stage cycle of Kolb's experiential learning.
Korthagen	1985	ALACT model: '1. Action. 2. Looking back at the action. 3. Awareness of essential aspects. 4. Creating alternative methods of action. 5. Trial.
Gibbs	1988	This is a six-stage model with key questions in each stage that can be applied to everyday experiences in teaching. In a departure from Kolb's model, Gibbs used description and associated emotions as foundational steps in the reflective process while also pressing for evaluation, re-evaluation, other possibilities, and an action plan for future situations.
Brookfield	1990	A process comprising three interrelated phases: "1. identifying the assumptions that underlie our thoughts and actions; 2. scrutinizing the accuracy and validity of these in terms of how they connect with or are discrepant with, our experience of reality; 3. reconstituting these assumptions to make them more inclusive and integrative."
Atkins & Murphy	1993	1. Awareness of uncomfortable feelings and thoughts; 2. Critical analysis of feelings and knowledge; 3. New perspective
Brookfield	1995	Uses four lenses for teachers in a process of critical reflection: an autobiographical lens (experience and emotions associated with the experience); the students' point of view (descriptive, emotions, and feedback loops); teaching colleagues' experiences and feedback loops), and literature (using theories to gain insight).
Johns	1995	1. Description of an experience. 2. Structured reflection questions on how the practitioner came to make a specific decision or a series of decisions. 3. Influencing factors stage to help a practitioner isolate what affected the decision-making process and actions. This notion of influencing factors was a new development in surfacing the complexity and dynamic nature of in-action noticing and decision-making.
Kember et al.	2000	Reflection and critical reflection are viewed as two levels on a four-scale continuum of reflective thinking.
Rolfe et al.	2001	Based on Terry Borton's model (1970) of three "What? So what? Now what?" questions, this framework expanded the questions into three levels: 1. description 2. theory/knowledge 3. action while adding the element of past, present, and future.
Korthagan & Valoso	2005	Onion has six levels of reflection: 1. Environment 2. Behavior 3. Competencies 4. Beliefs 5. Professional identity 6. Mission Authors combined the ALACT model with Onion to facilitate "core reflection."
Roberts	2006	1. Initial focus or prior knowledge 2. Initial experience 3. Reflection questions and generalization 3. Experimentation. 4. The model continues with the next iteration of the cycle to showcase experiential learning as an ongoing process in which one's learning experiences are connected to previous and future knowledge and experiences
Smith	2011	1. Personal level (thoughts and actions) 2. Interpersonal (interactions with others) 3. Conceptual (concepts, theories, and methods) 4. Critical (political and social context)

Although diverse, the definitions, frameworks, and models of reflective thinking formed two broad categories: content (what to think) and processes (how to think). Table 3 presents the

15 most cited authors or author groups and their definitions or models of reflection. It was not surprising that the language varied within the definitions. The definitions vary based on focus or non-focus on specific concepts. For example, some definitions and frameworks included beliefs and/or emotions, while others ignored those concepts. Some models included more detail on a concept such as past, present, or future. Some models relied on inquiry and experiential learning while others on the environment and situated learning. One author group renamed reflective thinking as “deliberate analysis” to avoid the issue of multiple definitions (Brown & Coles, 2012). These authors were not included in the table because they did not define reflective thinking, except for a complete reframing of the concept.

Considering the key definitions and frameworks/models from both tables, I categorized reflective thinking into two domains: content and process. Content is what to focus on; process is how to focus on the content. That was an important distinction because it led me to further limit this literature review to empirical studies for my second research question: what learning outcomes and gains, if any, are described in the peer-reviewed literature on PST reflective thinking?

By focusing on the results of reflective thinking within the literature, 62 studies remained. Each article was carefully studied and noted for purpose, research questions, methods, and findings. The articles in this literature review include a wide variety of grade levels and content areas. Reflective thinking within coursework in EPPs was represented in 28 articles. Math, science, and STEM PSTs’ reflective thinking were represented in 19 articles. Elementary education PSTs’ reflective thinking was captured in 12 articles. Seven studies examined reflective thinking in PST in special education and English language learning. Six articles represented disciplines in the humanities. One article represented physical education, and three

articles focused on culturally sustaining practices. A wide range of content disciplines and grade levels were represented in the literature.

To help me analyze the content of the articles, I turned to Rigney et al.'s (2019) literature review process. Inspired by their table design, I created a table to study the research questions, methods, and findings of each researcher. I found three themes within the literature. Theme One encompassed diverse frameworks to analyze and assess reflective thinking. To ease understanding of the outcomes for each article, I created a summary table for the 12 studies that used frameworks to analyze the structure of PSTs' reflective thinking is in Appendix A. Likewise, a summary table for the seven studies that used diverse frameworks to assess the level of PST reflective thinking is in Appendix B.

Theme Two featured diverse processes to scaffold reflective thinking and specific tools for reflective thinking. A summary table for the 25 studies with diverse processes, along with the frameworks and results on PSTs' reflective thinking is in Appendix C. Additionally, a summary table for the 15 studies on pedagogical tools, along with the frameworks and results on PSTs' reflective thinking is in Appendix D.

Theme Three included culturally sustaining practices. Because there were only three articles in this section, I did not create a summary table. The next section defines each theme and summarizes the studies included in this review.

### **Theme One: Diverse Frameworks for Reflective Thinking**

While researchers used the frameworks for reflective thinking in various ways and contexts, two common methods used the frameworks as tools to categorize the structure of reflective thinking (analysis) or to determine the depth of reflective thinking (assessment). To connect methodological analysis and research findings, 12 authors/author groups focused on

frameworks as tools to make sense of PSTs' reflective thinking structures. Table 4 summarizes 12 studies that used frameworks to analyze reflective thinking.

**Table 4**

*Diverse Frameworks to Analyze Reflective Thinking*

Frameworks to analyze type of reflection	Author(s)
Domains of Critical Reflection (adapted from Smith, 2011)	Astika, 2014
Lee's Framework (Lee, 2005)	Barry & Caravan, 2020
Journal Analysis (Zimmet, Roznau & Verner, 1999)	Cohen-Sayag & Fischl, 2012
Reflective Practice Questionnaire (Priddis & Rogers, 2018)	Day et al., 2022
The Framework for Teaching Evaluation (adapted from Danielson, 2018)	Endacott, 2016
Framework for Reflective Learning (Boud et. al, 1985)	Foong et al., 2018
Framework on Facilitation Style (Young and MacPhail, 2016)	
Hierarchy of Reflection (Kreber & Cranton, 2000)	Jones & Ryan, 2014
ALACT Model (Korthagen, 2001)	Kaya & Oz, 2021
Research-adapted framework (adapted from the Reflective Thinking Scale)	
Researcher-adapted framework (adapted from Dewey, 1910; Rodgers, 2002; van Es & Sherin, 2010)	Lebak, 2017
Framework for Reflective Practice (Rolfe et al., 2001)	Slade et al., 2019
Levels of Reflection (Harland & Wondra, 2011)	
Researcher-adapted framework (Husu, Toom, and Patrikainen 2008)	Toom et al., 2015
Reflective Dispositions Framework (Dewey, 1964)	Zoellner et al., 2017

### Frameworks Used to Analyze Structure of Reflective Thinking

There was not much overlap in the frameworks researchers used to analyze the structure of PST reflective thinking. Researchers used varying definitions of reflective thinking, and each framework was adapted to the purpose of each study. In a way, this was not surprising. According to Rigney et al. (2019), researchers anticipated that the abstract nature and complexity of reflective thinking would inspire a myriad of typologies to contextualize and systematize reflective practice. Of the diverse frameworks in table 5, five were adapted by authors/author groups to study the impact of program-level processes to develop PST reflective thinking.

In one such study, Toom et al. (2015) used their framework to categorize six forms of reflective thinking: (a) introspection; (b) association; (c) integration; (d) validation; (e) appropriation; and (f) transformation (Husu, Toom, & Patrikainen, 2008, as cited in Toom et al.,

2015). The framework was used to analyze results from a portfolio of video-recorded lessons, collaborative discussions, written reflections, and interviews within a portfolio of three unit plans to categorize the structure of PSTs' reflective thought. Through the written reflections at the end of each unit, Toom et al. found evidence of transformative reflection in eight PSTs' portfolios. In Toom et al.'s study, transformative reflection is considered the highest level of reflective thinking. Other researchers in this review label this level of reflection as critical reflection (Astika, 2014; Geng et al., 2019; Gorki & Dalton, 2020; Hatton & Smith, 1995; Jay & Johnson, 2002; Mendina, 2020). I describe critical reflection in detail in the section for theme three: culturally sustaining practices. From this point on, I will refer to the highest level of reflective thinking as critical reflection in keeping with most of the authors in this review. In Chapter Three, I will discuss the rarity of critical reflection in the findings of the articles reviewed in the studies.

A second program-level study by Slade et al. (2019) explored processes to inform teacher educators in developing PSTs' reflective thinking as described in two frameworks: the Framework for Reflective Practice (Rolfe et al., 2001) and Levels of Reflection Framework (Harland & Wondra, 2011). Rolfe et al.'s inquiry of 'What? So What? and Now What?' was used to prompt PST written reflections. Harland and Wondra's framework featured four categories of thinking: habitual action, understanding, reflection, and critical reflection. The researchers found that Rolfe et al.'s inquiry protocols had a significant influence on PSTs' thinking with all 243 PSTs showing growth in every category of the Levels of Reflection Framework (Harland & Wondra, 2011). Slade et al. found the acquisition of educational knowledge, skills, and dispositions to be the most important benefit of reflective thinking in their year-long study.



Kaya and Oz (2021) also investigated the impact of program study on PSTs' reflective thinking, but they used the ALACT Model (Korthagen, 2001), which emphasizes improvement cycles of action, looking back, awareness, creating alternatives, and trials. This study also included the Reflective Thinking Scale, a five-point Likert scale used to categorize reflective thinking in habitual actions, understanding, reflecting, and critical reflection. While Kaya and Oz found that all 277 PSTs improved their reflective thinking, the PSTs did not show evidence of critical reflective thinking. Kaya and Oz concluded that the lack of an explicit aim to define and develop reflective thinking throughout the teacher program may have impacted the results.

In one program-level study, Day et al. (2022) wondered if the program of study impacted PSTs' reflective thinking. To find out, the researchers used the Reflective Practice Questionnaire Framework (Priddis & Rogers, 2018). This study involved 467 PSTs, the largest study in this review. Day et al. found a statistically significant difference in reflective capacity between elementary and secondary PSTs in a one-year program, indicating differences in reflective capacity dependent on the program of study.

The final program-level study in this section investigated reflective dispositions PSTs developed in the final year of their teaching program. Zoellner et al. (2017) used the Reflective Dispositions Framework (Dewey, 1964), which details the qualities of open-mindedness, whole-heartedness, and responsibility. The study included a written teaching autobiography, written reflections, lesson observations, and student achievement data. The results showed that PSTs made significant gains in their reflective thinking. Zoellner et al. predicted the data collection would show evidence of all three reflective dispositions (Dewey, 1964). However, the dispositions were unevenly represented with open-mindedness being the least represented in the data.

Considering another aspect of teaching clinical practice, two studies investigated the impact of expert feedback and or facilitation styles on PST reflective thinking. Cohen-Sayag and Fischl (2012) analyzed special education PSTs' structured journals via a Journal Analysis Framework. The framework described three categories of reflective thinking: descriptive, comparative, and critical. The content focused on experience from teaching practicums. In this study, half of the PSTs received feedback on the journal entries from their practicum supervisors. Half of the PSTs received no feedback. Results indicated that both groups improved in descriptive levels of thinking. However, the group that received feedback showed evidence of comparative and critical thinking. The researchers concluded that the differences between the two groups may be in the context of participants' dispositions and through the different treatments in responses to the journals.

In a related study on supervisor feedback, Foong et al. (2018) analyzed the impact of facilitation on PSTs' reflective thinking by using two frameworks: the Framework for Reflective Learning and the Framework on Facilitation Style. This study included lesson observations, interviews, facilitated discussions, and written reflections. In pairing supervisors' facilitation styles (master, coach, navigator, and collaborator), Foong et al. found collaborative facilitation styles resulted in critical reflection. Instructive facilitation styles (master and coach) resulted in descriptive reflection (Foong et al.).

Five studies considered evidence of course-level PST reflective thinking (Astika, 2014; Barry & Caravan, 2020; Endacott, 2016; Jones & Ryan, 2014; Lebak, 2017). As with all the articles in this section, the studies used frameworks to connect methodological analysis and research findings to make sense of the findings. For example, Lebak (2017) adapted three frameworks (Dewey, 1910; Rodgers, 2002; van Es & Sherin, 2010) to describe four categories of

reflective thinking: description, understanding, evaluation, and a call to action. In this framework, a call to action is considered the highest form of reflection and is akin to critical reflection (Astika, 2014; Geng et al., 2019; Gorki & Dalton, 2020; Hatton & Smith, 1995; Johnson & Jay, 2002; Mendina, 2020). Using video-assisted recall and peer observation as the content for written reflection, Lebak found that PSTs improved their reflective thinking from description to understanding and evaluation. However, none of the written reflections showed evidence of a call to action.

In another course-level examination of reflective thinking, Astika (2014) adapted the Domains of Critical Reflection (Smith, 2011) to study written reflections in a methods course for English Language Arts PSTs. Astika used four categories of thinking: personal thoughts and actions; interactions with others; concepts, theory, and methods; and critical thinking for ethical and social contexts. Astika found that while the PSTs improved their thinking from personal to conceptual, none of the journals showed evidence of critical thinking. It is important to note that Smith's Domains of Critical Reflection framework begins with personal thoughts and emotions. That is a distinction from most of the frameworks for reflective thinking. I'll discuss the implications of including or excluding emotions in Chapter Three.

Jones and Ryan (2014) used The Hierarchy of Reflection to analyze the impact of unstructured blog posts on PST reflective thinking. This framework offers three categories of reflection: content (description); process (pedagogical knowledge); and premise (importance of the content/process problem). The researchers investigated whether more digital interaction between PSTs throughout a teaching practicum would enhance premise reflection. The unstructured blogs received no responses from the teacher educators, and the PSTs' responses were unstructured and unscored. Jones and Ryan (2014) noted no change in categories of

reflection from the beginning post to the final post. In a related course-level study, Barry and Caravan (2020) noted little change in PSTs' unstructured online discussion boards. The researchers used Lee's Framework (Lee, 2005) to describe what they found in their data. PSTs began in the recall category (Lee) and remained there, focusing mostly on self while assigning blame to others in student teaching.

In a slightly different approach, Endacott (2016) used a teacher evaluation framework to code examples of reflective thinking in social studies PSTs. In this case, the evaluation framework was used as a methodological framework to study how video-assisted recall impacted written reflections. Endacott found that video-assisted recall supported in-action instructional decisions and classroom management, two key indicators in the Framework for Teaching Evaluation (Danielson, 2018).

A summary table for the 12 studies that used frameworks to analyze the structure of PSTs' reflective thinking is in Appendix A, along with the outcomes of each study.

### **Frameworks Used to Assess Levels of Reflective Thinking**

While the analyzing frameworks helped researchers make sense of the structure of PST reflective thinking, the assessment frameworks were used as tools to determine the depth of PST reflective thinking. In particular, the studies in this section included summative evaluations in program-level assessments, course assignments, or a final PSTs' self-reflection. Table 5 summarizes studies that used frameworks to assess levels of reflective thinking.

**Table 5***Diverse Frameworks to Assess Reflective Thinking*

Frameworks for assessing levels of reflection	Author(s)
Framework of Four Levels of Reflection for Teacher Education (Harland & Wondra, 2011)	Catalana, 2020
Researcher-adapted Torrance Tests of Creative Thinking-Figural, form a (Torrance, 1998)	
Researcher-adapted rubric (adapted from Hatton & Smith, 1995)	Calandra et al., 2018
Researcher-adapted Rubric for Critical Reflection (Ward & McCotter, 2004)	Hagevik et al., 2012
Levels of Reflection (adapted from Hatton & Smith, 1995)	Mena-Marcos et al., 2013
Reflective Learning Model (Brown & Irby, 2001)	Ogan-Bekiroglu, 2014
Researcher-developed domain-specific rubric (Ogan-Bekiroglu, 2014)	
Reflective Thinking Levels (adapted from Hatton & Smith, 1995)	Oner & Adadan (2011)
Learning to Notice Framework (van Es, 2002)	Santagata & Angelici, 2010
Research-developed Lesson Analysis Framework (Santagata et al., 2007)	

Hagevik et al. (2012) adapted the Rubric for Critical Reflection (Ward & McCotter, 2004) to score written reflections from a capstone presentation of PSTs' action research at the end of the teacher education program. The framework featured four levels of reflection and three domains on focus, inquiry, and change of practice, if any. Hagevik et al. found that while the PSTs showed significant growth from routine to dialogic levels, there was no evidence of transformative reflection. This framework considered transformative reflection as the highest level that leads to PSTs changing their teaching behaviors and approaches in response to students' needs and diversity.

In another study, Mena-Marcos et al. (2013) adapted the Levels of Reflection Framework (Hatton & Smith, 1995) to assess the impact of coursework and clinical experience on PSTs' self-reflection. This framework described four levels of reflection from habitual to critical, similar to frameworks by Lee (2005) and Ward and McCotter (2004). The researchers found that while PSTs increased the depth of their reflective thinking and led to increased pedagogical knowledge, there was no evidence of critical reflection.

Following Mena-Marcos et al. (2013), Calandra et al. (2018) used Hatton and Smith's

framework (1995). However, the purpose of the study was to score and compare PSTs' reflective thinking levels when they had access to a video clip of a lesson, an audio clip of a lesson, or their memory as a context for written reflection. The findings indicated that PSTs demonstrated significantly higher levels of reflective thinking when prompted by video as compared to audio. Reflecting from memory alone resulted in the lowest levels of reflective thinking.

Ogan-Bekiroglu (2014) took a different approach when assessing levels of reflective thinking. Instead of using a specific framework to discern reflective thinking, Ogan-Bekiroglu used the Reflective Learning Model (Brown & Irby, 2001) to guide the PST teaching portfolio structure and development through a five-step process. PSTs' reflective thinking levels in teaching portfolios were scored using Ogan-Bekiroglu's domain-specific rubric. Results show that most of the PSTs gained expertise in reflecting on their teaching skills. However, Ogan-Bekiroglu concluded that supervision and support in developing the portfolio may have improved PSTs' reflective thinking even more.

Like Ogan-Bekiroglu (2014), Oner and Adadan (2011) used portfolios to study levels of PST reflective thinking. Instead of a domain-specific rubric, Oner and Adadan used the Reflective Thinking Levels framework (Hatton & Smith, 1995) but adapted it differently than Mena-Marcos et al. (2013). In this adaptation, Oner and Adadan added typologies of reflective thinking, to assess reflective thinking within categories the researchers found useful. By doing so, the researchers found significant levels of growth in PSTs recognizing discrepancies in their experiences and goals, experiences and observations, and goals and observations. This categorization led to rich content for reflective thinking. The PSTs showed evidence of growth over time in four of the six categories that serve as content for reflective thinking, with a small decrease in the claim-evidence and reflection-in-action categories.

Catalana (2020) used two frameworks to study levels of reflection and to compare the levels of reflection with levels of creativity. To accomplish this, Catalana used The Framework of Four Levels of Reflection for Teacher Education (Harland & Wondra, 2011). This framework is like the prior frameworks and ranks critical reflection at the highest level. The researcher-adapted Torrance Tests of Creative Thinking-Figural, Form A (Torrance, 1998) described four categories of creativity and listed levels within the categories to determine the depth of creativity. The results showed a correlation between high levels of reflective thinking and high levels of creativity. In addition, there was a correlation between low levels of reflective thinking and low levels of creativity. Catalana found no evidence of critical thinking in the written reflective essays.

In the final study focusing on a framework to assess reflective thinking, Santagata and Angelici (2010) used the Learning to Notice Framework (van Es, 2002) to score PSTs' written analysis on observed teaching. The Learning to Notice Framework (van Es) describes four levels of elaboration. The researchers also used a Lesson Analysis Framework (Santagata et al.) to develop PSTs' reflective thinking on teaching through video recordings of teachers and students in action. PSTs who used the Lesson Analysis Framework improved their unprompted analysis and reached the highest level the Learning to Notice Framework (van Es).

The diverse frameworks from Theme One fell into two categories: analyzing and assessing reflective thinking. The frameworks demonstrated a variety of perspectives and conceptualizations of reflective thinking. Of the many frameworks used to analyze the structure of reflective thinking and score the depth of reflective thinking, there was not much overlap in either category. Researchers used diverse definitions of reflective thinking, and each framework was adapted to the purpose of each study. However, there remains agreement on the highest level

of reflection as the ability to examine personal and professional beliefs to focus on the broader aspects of power and justice (Astika, 2014; Geng et al., 2019; Gorki & Dalton, 2020; Hatton & Smith, 1995; Johnson & Jay, 2002; Mendina, 2020). Rigney et al. (2019) saw analysis and assessment as the “what” of reflective thinking. Theme Two will explore the “how” of reflecting thinking processes, and Theme Three, culturally sustaining thinking, will explore the “why” of reflective thinking practices. See Appendices A and B for summary tables for the 19 studies in theme one: diverse frameworks to analyze and assess PST reflective thinking.

### **Theme Two: Scaffolding Reflective Thinking**

Theme One featured frameworks that helped researchers make sense of the structures and depth of PST reflective thinking. Theme Two frameworks helped teacher educators (TE) scaffold reflective thinking through instruction and processes.

### **Pedagogical Tools: Integrated Processes**

Within this section, TEs aimed to develop and deepen PSTs’ conceptual understanding of reflective thinking. In this section, 11 studies featured frameworks adapted from other researchers’ frameworks. Four studies used a common framework but each with significant adaptations. The remaining 14 authors and author groups applied previously published frameworks to their studies. In keeping with the frameworks from Theme One, overlap between the frameworks was rare. Of the 25 articles in this section, two studies showed mixed results with limited improvement of PSTs’ reflective thinking. One study found no change in PSTs’ reflective thinking. The remaining 22 articles reported improved qualities of PSTs’ reflective thinking. Table 6 summarizes the frameworks and integrated processes that TEs used to develop the depth and breadth of PST reflective thinking.



**Table 6***Integrated Processes Teacher Educators Used to Develop Preservice Teacher Reflective Practice*

Framework type	Author(s)	Integrated processes to develop reflective thinking
Researcher-adapted frameworks	Karlstrom & Hamza, 2019	Video recordings; mentor feedback; written reflections
	Kourieos, 2016	Video recordings; peer debriefing; written reflections
	Loman et al., 2020	Peer observation; peer coaching; peer feedback
	Parker & Heywood, 2013	Subject matter learning audit; group discussions
	Shek et al., 2021	Video recordings & annotation, debriefs; written reflect
	Shin, 2021	Video exemplar (viewing for schema); peer observations; written reflections; TE interviews
	Siry & Martin, 2014	Co-planning; video recordings; debriefs; written reflections
	Sydnor, 2016	Video recordings; written reflection; mentor feedback; goals
	Williams, 2020	Video stimulated reflection (VSR); debriefs
Applied frameworks	Yee et al., 2022	Peer observations; peer feedback; interviews; written reflections
	Yuan et al., 2022	Video recordings & written reflections
	Addleman et al., 2014	Collaborative discussions; Study Abroad program; written reflections.
	Cheng, 2020	Photos; TE interviews; written reflections
	Dayal & Alpana, 2020	Video recording; peer & TE feedback; self-assessment
	Demissie, 2015	Drawn reflections on conceptual
	Günizi, K. & Derya, K. (2020)	teaching; group & self-reflection; surveys; interviews
	Harding et al., 2021	Concept maps; drama; written reflection
	Hawkins & Park Rogers, 2017	Audio transcriptions; verbal & written reflections
knowledge	Heinrich & Donham, 2015	Community of Practice with video recording
	Kajder & Parkes, 2012	Capstone paper; questionnaires; focus groups
	Karlsson & Nilsson, 2019	Unstructured blogs; vlogs; and blogs on blogs
	Lamb et al., 2013	Planning; video-annotated lesson observations; questionnaires; TE feedback; written reflections
	Lutovac et al., 2015	Collaborative discussions; surveys; written reflections
	McGarr et al., 2019	Video-recordings; debriefs; written reflect; TE interviews
	Nagro, 2020	Vignette baseline essay; collaborative discussions; “hunting assumptions” final reflection
		Video recording; reflective essays

In studies with researcher-adapted frameworks, researchers used a variety of tools and approaches to instruct PSTs in reflective thinking processes. Video recording and viewing was the preferred tool with collaborative debriefing and written reflections (Karlstrom & Hamza, 2019; Kourieos, 2016; Shek et al., 2021; Shin, 2021; Siry & Martin, 2014; Sydnor, 2016; Williams, 2020; Yuan et al., 2022). Peer observations of teaching and written reflections were used in three studies (Loman et al., 2020; Shin, 2021; Yee et al., 2022). One study focused on

peer coaching, due to video restrictions within school settings (Loman et al., 2020). To develop PSTs' reflective thinking through a pedagogical lens, Parker and Heywood (2013) adapted Shulman's Subject Matter Learning Audit (1986, 1987). Eight of the 11 studies showed evidence of improved quality reflective thinking. However, two studies resulted in only slight improvements in PSTs' reflective thinking. Shin (2021) found mostly technical levels of reflective thinking in isolation but also found deepened reflective thinking with peer feedback and peer emotional support. Likewise, Yee et al. (2022) noted growth beyond descriptive levels when PSTs were able to share their emotions with peers and receive feedback. Shek (2021) found no change in PST reflective thinking despite the many processes used to develop it.

In studies that applied previously published frameworks to develop and discern levels of PSTs' reflectivity, there was a bit more overlap in the frameworks. In five such studies, Harding et al. (2021) and Lutovac et al. (2015) both used the Learning to Notice Framework (Sherin & van Es, 2008; van Es & Sherin, 2002) to build PSTs' reflective practices through a myriad of processes and found PSTs improved and deepened reflective thinking. Likewise, Cheng (2020) and Kajder & Parkes (2012) used similar frameworks that described four levels of reflection: Larrivee's Levels of Reflection (2008) and Hatton and Smith's Reflective Thinking Levels (1995). The difference in the two frameworks, aside from predictable wording differences, was that Larrivee's framework (2008) included pedagogical theories while Hatton and Smith's framework (1995) included reasoning. In a slightly different approach, McGarr et al. (2019) used the Differentiation of Two Dimensions of Reflections (Lane et al., 2014) to analyze PSTs' reflective thinking in a final written reflection. This two-level framework helped the TEs discern narrow or broad perspectives in PSTs' written reflections. A narrow perspective featured a focus on self, while a broad perspective featured a focus on others. All five author groups found the

frameworks helpful in scaffolding instruction and in measuring the quality of PSTs' reflective thinking.

The remaining seven studies shared no overlap in frameworks and used a variety of pedagogical approaches. In one such study, Nagro (2020) used the Danielson Framework (2018), an evaluation framework, to focus PSTs on four levels of performance for five teaching elements over the course of a year. Nagro created a checklist to simplify the Danielson Framework (2018) and introduced PSTs to lesson observations via previously recorded lessons. As PSTs acclimated to teaching, they video-recorded their lessons, using the framework to self-identify levels of performance. Nagro found the Danielson Framework (2018) useful as a teaching tool, and the findings indicate PSTs improved the quality of their reflective thinking.

Karlsson and Nilsson (2019) used the Content Representation for Planning and Reflection Framework (Hume & Barry, 2011) to focus PSTs on lesson planning and reflection on taught lessons. PSTs were required to identify two noteworthy incidents within recorded lessons and digitally annotate where in the video the critical incidents occurred. Noteworthy incidents were considered any event in a classroom setting that contributed to or distracted from the learning (Karlsson & Nilsson). In this process, PSTs scrutinized their videos and connected noteworthy incidents identified in the video with written analysis of their teaching. Karlsson and Nilsson found the framework helpful in deepening PSTs' pedagogical insight.

Similar to Karlsson and Nilsson (2019), Hawkins and Park Rogers (2016) used video-assisted recall to study PSTs' dispositions for noting and tracking changes in their students' thinking within a unit of study. To accomplish this, Hawkins and Park Rogers used the Situated Learning Framework (Lave, 1991) to guide the community of practice discussions. In addition, the TEs used the Pedagogical Content Knowledge Framework (Shulman, 1986) to describe and

measure PSTs' depth of science content knowledge. These authors found both frameworks helpful in developing PSTs' reflective thinking in content knowledge and in developing dispositions for developing their students' reflective thinking.

Dayal and Alpana (2020) also used video-recorded lesson observations but focused on peer and TE feedback before PSTs self-evaluated their metacognitive processes in a written reflection. Dayal and Alpana found the Metacognitive Framework (Krathwohl, 2010) helpful in developing PSTs' pedagogical reflective thinking processes and scoring written reflections. In a similar process, Lamb et al. (2013) used video-recorded lesson observations with peer feedback but tracked the discussions through online postings. Lamb et al. used their adapted survey for reflective thinking by combining questions from van Manen (1977) and Zeichner and Liston (1987). Lamb et al. found evidence of improved written reflective thinking for PSTs and noted that the survey helped determine PST self-reported types and levels of reflective thinking.

Two TE groups sought to develop PSTs' reflective thinking through an inquiry process. Heinrich and Donham (2015) used a framework that guided PSTs in inquiry with the Unlearning Certainty Framework (Kuhlthau, 2004). PSTs wrote capstone papers, completed questionnaires, and participated in focus group interviews. Demissie (2015) also aimed to develop PSTs' inquiry but used the Philosophical Community of Enquiry Framework (Lipman, 2003) to guide PSTs' thinking processes. Although Heinrich and Donham and Demissie focused on developing PSTs' inquiry, Demissie began the inquiry process with PSTs' drawn conceptual knowledge of teaching. Demissie called the cartoons "drawn reflections," and the PSTs revisited the images at the end of the study, drawing new understandings of conceptual knowledge of teaching before writing final reflections. Although the frameworks and processes were different, both TEs reported improved PST reflective thinking.

Günizi and Derya (2020) also explored a visual thinking tool to develop PSTs' reflective thinking with concept maps and drama role plays. Günizi and Derya used the Framework for Concept Maps (Schaal, 2010) to guide PSTs and to deepen PSTs' reflective thinking. Much like the Demissie (2015) study, the PSTs revisited the maps at the end of the study, adding new understandings of conceptual knowledge of teaching before writing final reflections. Günizi and Derya found the framework helpful and noted that PSTs improved their reflective thinking throughout the term.

Finally, Addleman et al. (2014) used a study abroad three-week summer session in Vienna, Austria to immerse PSTs in reflective practice using collaborative discussions. Addleman et al. used the Courage to Lead Group Framework (Palmer, 2004). Perhaps the most profound example of disequilibrium of the articles in this review, Addleman et al. used peer questioning and discussions to derive themes that each person has a deep knowledge and that talking together is how humans make meaning and experience self-discovery. Addleman et al. found the Courage to Lead Group Framework helpful but also noted that facilitation of the discussions mattered in that PSTs did not always follow the norms for the discussions.

The variety of frameworks and use of integrated processes demonstrate TE creativity in instructing and deepening PST reflective thinking. Rigney et al. (2019) described instructional processes as the “how” of reflecting thinking. A summary table for the 25 studies with diverse processes, along with the frameworks and results on PSTs' reflective thinking is in Appendix C.

### **Pedagogical Tools: Single Process**

In a shift from integrated tasks to scaffold instruction, the following TEs focused on a single tool to support PSTs' reflective thinking in coursework related to clinical practice. There are four clusters of pedagogical tools from the data: collaborative discussions, writing, video, and

visual thinking. Table 8 summarizes the studies used to engage PSTs' reflective thinking via a single pedagogical tool.

**Table 7**

*Pedagogical Tools Teacher Educators Used to Engage Preservice Teachers in Reflective Thinking*

Pedagogical tool	Description of tool	Teacher Educator(s)
Collaborative Discussions	Participants talked with each other using protocols and group structures to collaboratively reflect on practice.	Carlson, 2019 Çimen & Çakmak, 2020 Clarà, 2019 Clarke, 2011 Day, 2013 Kesting et al., 2020 Nguyen & Ngo, 2018
Writing	Participants' digital and non-digital captures of their written reflections	Boyd et al., 2013 Farr & Riordan, 2015 Ilin, 2020 Ozudogru, 2021 Parmigiani & Hidi, 2019
Video	Participants used video recordings as a tool for reflection.	Theelen et al., 2019 Xiao & Tobin, 2018
Visual thinking	Participants reflected on their development of teacher identity by creating a photo reflection report instead of a written reflection.	Hahl, 2021

**Pedagogical Tool: Collaborative Discussion**

Collaborative discussion tools were the most often used tool in this section as the TEs sought to understand how types of discussions might promote PSTs' learning to reflect on specific aspects of their practice. Clarà et al. (2019) used six kinds of discussion protocols to develop collaborative reflection: framing, oppositional voice, counter positions, and alternatives, asking for the dilemma, problematizing, and modeling. While Clarà et al. reported growth in PSTs' reflective thinking, they also cautioned that this study was highly contextualized with a specific goal of delving deeper into situational dilemmas in teaching. They warned that their facilitative process may not be informative for reflection processes with other goals.

Çimen & Çakmak, 2020 used collaborative discussions slightly differently. They investigated the impact of feedback on PSTs' reflective thinking through collaborative discussion on teaching puzzles of practice. Çimen and Çakmak divided the PSTs into two groups: one group received peer and TE structured verbal and written feedback while the other group received unstructured verbal feedback. The authors reported that the more interaction the feedback process contained, the more PSTs engaged in deeper levels of reflective thinking, as measured by the Reflective Thinking Tendency Scale (Semerci, 2007). Çimen and Çakmak found the framework helpful and noted that with structured facilitation, PSTs also showed improved levels of active discussion and questioning.

In keeping with the theme of diverse processes, Clarke, M. (2011) used a think-aloud protocol to generate verbal reflective thinking in a large lecture hall. While PSTs enjoyed the verbal process, they were less excited about the written self-reflections that followed the think-aloud sessions. Clarke adapted a Cochran-Smith survey (1991) as a pre/post means to measure PSTs' reflective thinking and slight improvements in PST written reflective thinking. Clarke found think-aloud verbal reflection helpful but limited.

Kesting et al. (2020) used a "mini" community of practice collaborative process with two reflection frameworks: Levels of Reflection (Hatton & Smith, 1995) and language used for argumentation (description, justification, critique, and discussion). Based on the findings, PSTs shifted from a descriptive level of reflection to a critical level after going through four cycles of teaching and reflection. Kesting et al found both frameworks helpful in scaffolding and measuring PSTs' reflective thinking.

Nguyen and Ngo (2018) created peer mentor groups and instructed PSTs on listening, conflict resolution, and facilitation techniques before beginning peer lesson observations. Similar

to Kesting et al. (2020), Nguyen and Ngo used the Levels of Reflection Framework (Hatton & Smith, 1995) to determine the level of PST reflective thinking. Nguyen and Ngo found that peer interaction to reflect on teaching practices was powerful in increasing PST written and verbal reflection levels. Within each group, the PSTs reflected together on the strengths and areas of growth of their lessons. Nguyen and Ngo categorized the findings into two trends: (1) the impact of observing peers on reflection; (2) the impact of peer feedback on reflection. Through focus groups following the teaching practicum, Nguyen and Ngo noted that PSTs adjusted and improved their teaching practices because of peer observations and collaborative discussions. Similar to Kesting et al., Nguyen and Ngo found the framework helpful in measuring PST reflective thinking.

Day (2013) also focused on peer lesson observation and collaborative discussion to support PSTs' reflective thinking but used two frameworks: Peer Observation Teacher Reflection (Cosh, 1999) and Peer Coaching Framework (Vacilotto & Cummings, 2007). The first framework was used to prompt individual written reflection on a puzzle of practice and the second framework was used to promote collaborative reflection on the effectiveness of peer coaching. Day found that PSTs reflected on their teaching, which helped them modify and improve their practices. Day found both frameworks helpful as tools for developing reflective thinking and for structuring peer coaching.

Carlson (2019) studied PSTs' reflective thinking through a Critical Friends Group collaborative process, using a researcher-adaPSTed reflective thinking framework from Zeichner and Liston (2013). While PSTs did demonstrate growth in reflective thinking about their teaching practices, Carlson warned that Critical Friends Group collaboration does not guarantee critical thinking or friendliness. Carlson concluded that this study was highly contextualized, and



the Critical Friends Group collaboration may not work in other contexts. The results of this study were mixed with some improvement in reflective thinking but lacked the dramatic growth described by other TEs in this section (Çimen & Çakmak, 2020; Clarà et al.; Day, 2013; Kesting et al., 2020; Nguyen & Ngo, 2018). Two of the seven TEs and TE groups reported some growth in PSTs' reflective thinking through collaborative discussions (Carlson, 2019; Clarke, 2011). Four TE and TE groups reported clear improvements (Çimen & Çakmak, 2020; Clarà et al., 2019; Day, 2013; Nguyen & Ngo, 2018). Kesting et al., (2020) reported evidence of critical reflection in PSTs' reflective thinking using four cycles of community of practice protocols.

### **Pedagogical Tool: Writing**

Shifting from collaborative discussion to writing, five studies sought to understand PST reflection through digital and/or non-digital written reflection. Of the three articles that focused on digital written reflection, each TE used a different framework and a different approach to scaffold PST reflective thinking (Boyd et al., 2013; Farr & Riordan, 2015; Parmigiani & Hidi, 2019). For example, Boyd et al. (2013) used the Apprenticeship of Observation Framework (Feiman-Nemser, 1983) to prompt PSTs' reflective thinking on past teaching events through blogs and online comments. What was different about this study was that the course happened after the teaching practicum and relied on PSTs' memories of critical incidents from their practice. Boyd et al. found blogging as a useful tool because peer and teacher feedback occurred more consistently in blogs than in non-digital, non-social pathways. While PSTs showed improved reflective thinking, there was no evidence of critical reflection.

Farr and Riordan (2015) also studied the impact of blogging, online chat, discussion forums, and blogs in digital reflective thinking but used the Community of Inquiry Framework (Garrison & Anderson, 2000). While most posts remained at the descriptive level, there were 41

examples of critical reflections posted. The TEs concluded that "just because reflection is not critical does not mean it is unimportant or unnecessary" (Farr & Riordan, p. 6). The authors surmised that descriptive reflections are valuable and possibly an important precursor to other types of reflection that are developed with time.

In a slightly different treatment, Parmigiani and Hidi (2019) used the Reflective Thinking Framework (Taggart & Wilson, 2005) and focused on mobile devices to capture digital reflective writing. While mobile devices afforded multiple interactions in structured prompts amongst PSTs, the candidates reported when there were too many digital interactions, the technology became distracting. Parmigiani and Hidi found increased levels of reflective thinking over the course of the term and noted that PSTs suggested in-person discussions to balance digital reflections in future courses.

In a more traditional format of non-digital journal reflections, two TEs stepped away from technology to capture and mentor PST reflective thinking. Using two frameworks to guide their study, Ilin (2020) relied on four written journals to track PST reflective thinking during a teaching practicum. The journals were structured with pre-determined topics: a reflection after a lesson observation; noticing from a mentor teacher's classroom management strategies; classroom contexts and academic language; and assessment and error correction. Ilin used Taggart and Wilson's (2005) Reflective Thinking framework and adapted Hatton and Smith's (1995) Reflective Thinking Levels framework to guide instruction and to measure the results. Ilin found that PSTs used a descriptive tone in writing their journals rather than a reflective one. Most of the journals were on a technical level followed by a contextual level. A few examples evidenced dialectical reflection. When interviewed at the end of the term, Ilin discovered that PSTs had not fully understood the meaning of reflection. PSTs thought that writing about what

they observed in their teaching was reflective thinking.

Ozudogru (2021) also used Hatton and Smith's (1995) Reflective Thinking Levels framework to guide and measure levels of PST reflective thinking in weekly journals. Ozudogru was interested in learning what effect a course on curriculum development had on PSTs' written reflections. To accomplish that, Ozudogru created two groups: Group 1 had the curriculum development course. Group 2 had not yet taken the curriculum development course. The results showed Group 1 written reflections had evidence of understanding and interpretations of experiences more so than Group 2. However, the curriculum course did not have a significant effect on PSTs' critical reflection levels.

### **Pedagogical Tool: Video**

Moving from writing to video, two studies sought to understand PST reflection through video recordings of teaching. In this section, each author group used a different framework and a different approach to scaffold PST reflective thinking through video. For example, Theelen et al. (2019) used the Learning to Notice Framework (van Es & Sherin, 2002) to study the impact of virtual classroom observations on PSTs' level of interpretation of noticed classroom events. PSTs viewed 360-degree videos of teachers and students to digitally "tag" video fragments to note observations and provide commentary on why a specific fragment was tagged. PSTs were given a pre and post-test to determine the level of growth in noticing and interpreting classroom events. Theelen et al found that 360-degree videos helped PSTs improve what they noticed in teaching and learning. It also helped develop PSTs' insights about teaching styles that influenced teacher-student relationships. The authors found the Learning to Notice Framework (van Es & Sherin, 2002) helpful.

Xiao and Tobin (2018) studied the impact of PSTs viewing recorded lessons of

themselves to reflect on their teaching. PSTs wrote reflections based on viewing videos with and without audio. Turning off the sound helped PSTs attend more to the embodied aspects of their teaching. Xiao and Tobin adapted a framework from Fuller and Manning (1973) to help PSTs focus on self-confrontation, pedagogical knowledge, the pacing of lessons, and the use of body and facial expressions. Xiao and Tobin reported improvement in PSTs' reflective thinking and found the adapted framework helpful.

### **Pedagogical Tool: Visual Thinking**

In this last section of pedagogical tools, one TE studied the impact of visual thinking. Hahl, 2021 used the Reflective Thinking Framework (Korthagan & Valoso, 2005) to guide and measure the level of reflection in PSTs' photo essays. This author questioned the usefulness of written reflections in considering the development of one's teaching. As a TE, Hahl found PST written reflection shallow and perfunctory, done just for the sake of completing assignments. By requiring PSTs to reflect via seven photos of their clinical experiences, along with captions to provide context, Hahl found that using photos scaffolded PST reflection to show the developmental curve of teaching and reflective thinking. The photos also helped PSTs articulate conclusions on abstract thoughts and observations. PSTs reported that the photo essays were meaningful to them and opened new considerations for them in their teaching. Hahl found that PSTs improved their reflective thinking and found the Reflective Thinking Framework (Korthagan & Valoso, 2005) helpful. A summary table for the 15 studies on pedagogical tools, along with the frameworks and results on PSTs' reflective thinking is in Appendix D.

In sum, the frameworks in this section helped TEs scaffold instruction throughout a myriad of integrated tasks or focus on a single pedagogical tool. As with Theme One, the frameworks in this section were used to analyze the breadth of reflective thinking and /or score

the depth of reflective thinking, but the focus was on instruction. There was little overlap between the frameworks, and TEs used diverse definitions of reflective thinking. However, 32 of the 40 studies evidenced improvement in PSTs' reflective thinking. Seven studies reported some mixed results with some improvement in PSTs' reflective thinking. One study reported no change in PSTs' reflective thinking, despite the integrated tasks to develop it.

### **Theme Three: Culturally Sustaining Practices**

While the processes in Theme Three helped TEs scaffold instruction for PST reflective thinking, the studies in this section helped TEs understand and teach social justice challenges in educator preparation programs, classrooms, and schools. Rigney et al. (2019) described culturally sustaining practices as the “why” of reflective thinking practices. In this context, culturally sustaining practices “address issues of educational equity and excellence for all students” (Behizadeh et al., p. 2). LaBoskey (1994) clearly states the “why” of reflective thinking practice: educators are “moral agents” who must “reflect critically on the injustice and inhumanity present in our society and in our educational institutions” (p. 17). To this view, culturally sustaining practices support and develop bi-/multilingualism and multiculturalism in schools, maintaining heritage, values, and cultural and linguistic pluralism (Paris & Alim, 2017). Culturally sustaining practices differ from culturally responsive pedagogy in that it is situated within the context of each culture as opposed to a dominant culture as “responding” to non-dominant cultures (Paris & Alim).

Further, Behizadeh et al. (2019) wrote, “A primary goal of teacher preparation programs should be to develop the reflective and critical problem-solving capacities of preservice teachers, especially social justice-oriented programs that prepare teachers to work in urban schools with historically underserved youth” (p. 1). Of the diverse frameworks in this study, there was

agreement on the highest level of reflection focusing on equity and social justice in classrooms and school. Whether it was termed “critical” (Astika, 2014; Geng et al., 2019; Gorki & Dalton, 2020; Hatton & Smith, 1995; Johnson & Jay, 2002; Mendina, 2020), “transformative,” (Ward and McCotter, 2004) or “a call to action” (Lebak, 2017), the ultimate goal of reflective thinking described awareness of one’s biases, noting students’ needs, and taking action to provide outstanding educational opportunities and outcomes for each student.

In addition, Larrivee and Cooper (2006) and Thompson and Pascal (2011) claimed there are great and intolerable costs in reflective thinking approaches that ignore culturally sustaining practices. Reflective thinking that ignores diverse cultures within a classroom can and does inflict harm on students (Larrivee & Cooper, 2006). Larrivee (2000) wrote, “Unless teachers develop the practice of critical reflection, they stay trapped in unexamined judgments, interpretations, assumptions, and expectations” (2000, p.293). Another danger of ignoring culturally sustaining practices comes down to human thinking: “It is human nature to leap to conclusions about what is happening in any given situation--especially for teachers, who have to react quickly and almost simultaneously to multiple events” (Lampert, quoted by Rodgers, 2002, P. 3). That is an important point, given that PSTs are steeped demands and novel experiences in learning the profession of teaching.

Another important point in considering culturally responsive practices is that PSTs are typically white and female (Bitterman, Goldring, & Gray, 2013) while serving student populations that are now considered a “majority-minority” (Alba, 2018). PSTs cannot simply teach the way they were taught; they must examine their practices to best serve all students (Catalana, 2019; Bitterman, Goldring, & Gray, 2013). Given the dynamic changes in American

public education, PSTs may need to unlearn and delete habits and replace them with practices that signal critical reflective thinking and action for social justice.

Each of the three studies in Theme Three used a variety of pedagogical processes and sought to develop and or measure critical reflective thinking. Each author or author group used different frameworks to support their specific study. Of the three studies in this section, one author did not find critical levels of reflective thinking but made important cultural distinctions between Western and Asian cultures (Choy, 2021). One author group found only 26% of the written reflections measured as critical reflection but discovered a promising pathway in developing critical reflection on social justice challenges (Behizadeh et al., 2019). The last author group did find evidence of critical reflection in PSTs' inquiries and challenged the deficit model of the frameworks used to describe and measure reflective thinking (Ryken & Hamel, 2016).

Behizadeh et al. (2019) studied the impact of Critical Friends Groups to develop highly diverse PSTs' critical thinking to address social justice issues in the classroom and school context. Using the Reflective Thinking Framework (Thompson & Thompson, 2008), the TEs found the framework helpful in pushing PST discussions from venting frustration (blame) to critical reflection that included depth (examining assumptions, biases, etc.) and breadth (considering the broader context, such as the impact of high stakes testing and discipline policies). Even so, Behizadeh et al. found that 26% of the written reflections evidenced critical levels of reflective thinking in reframing issues from a deficit perspective to pedagogical or relationship challenges. PSTs reported that most of their teaching dilemmas revolved around relationships, curriculum and instruction, and perceptions of students. While 74% of the written

reflections did not reach critical levels, PSTs reported that the process was meaningful for them. Behizadeh et al. noted that PSTs improved their reflective thinking.

Behizadeh et al. (2019) also noted the nuanced facilitation skills needed to guide the group into critical thinking on social justice issues within a classroom. Further, Behizadeh et al. suggested at least one faculty member receive training in Critical Friends Group to learn the process and protocols. In particular, the TEs frequently modeled and asked probing questions to guide PSTs in reframing issues. Finally, Behizadeh et al. concluded that affirming diversity and reframing deficit views must be taught and practiced throughout an educator program. Social justice education belongs to an entire program and cannot effectively be contained to one course in diversity.

In a comparative study, Choy (2021) investigated the differences in reflective teaching in two culturally different countries, Malaysia and Australia. These two countries were chosen because they represented an Asian and a Western cultural perspective among PSTs. Using the Thinking for Teachers Questionnaire (Choy, Yim & Tan, 2017), Choy found that while reflective thinking is emphasized in teacher education programs, the conceptualization of the process of reflective thinking between Asian culture and Western culture was profoundly different. One key difference was that Malaysian PSTs are expected to “learn by observing” and to replicate mentor-teacher teaching without discussion of why and where different approaches might be appropriate (Choy, 2021, p.6). Additionally, an earlier study (Choy et al., 2017, quoted in Choy, 2021) found that Malaysian PSTs were less willing to practice self-reflection independently, as compared with the Australian PSTs. Still, PSTs from both countries reported deeper reflection on their practices after receiving feedback from mentor teachers. Choy (2021) also found the influence of culture was largest in self-belief and concluded that when the national culture is



collectivist in nature, PSTs may need support to develop self-belief to think reflectively without external feedback. However, where the national culture is more individualist, PSTs may need support in self-assessment and critical analysis of their teaching practices to develop more awareness of the impact of their actions on students. Choy found reflective thinking levels for PSTs from both countries at mostly surface and technical levels.

In a study that stands alone in this entire review of research literature, Ryken and Hamel (2016) used their Learning from Practice Reflection Tool (adapted from Dewey, 1938) to challenge the existing framework categories and descriptions of PSTs' thinking in a tiered system from low to high or from surface to deep. Ryken and Hamel investigated the type of reflective thinking in PSTs' written reflection to reframe the typically labeled low or "surface-level" reflections as important inquiries for the ongoing development of PSTs in a complex profession. The Learning from Practice Reflection Tool (Ryken & Hamel, 2016) invites PSTs to generate contextual questions by prompting, "What question does this experience raise for you?" While many PSTs' questions take the form of "how can I" or "how should I," the researchers point out examples of inquiry that investigate complex tensions within teacher practice. To this view, PSTs used "how do I" questions to demonstrate awareness and investigation of social justice challenges. Ryken and Hamel argued that categorizing reflection as low or high contributes to deficit perspectives about the developing PSTs' reflective thinking. Ryken and Hamel acknowledged that Larrivee (2008a) suggested that PSTs reflect at different levels continuously but point out that the frameworks and models failed to capture dynamic thinking. In re-examining written reflections that were categorized as "routine" or "low," Ryken and Hamel found a competence-based, not a deficit-based, framework more accurately captured the critical reflective thinking PSTs demonstrated. As Ryken and Hamel found "how can I?" concerns as

deep investigations into social justice challenges, they also found that such written reflections were scored as “surface” or “low level” reflections because frameworks misled scorers into interpreting the questions as “tell me what to do” thinking.

In their rescoring of 30 PSTs written reflections, Ryken and Hamel (2006) reached a very different conclusion: all 30 final reflections showed evidence of critical reflection. That is an astounding conclusion, given that only seven of the 62 studies (Behizadeh et al., 2019; Cohen-Sayag & Fischl, 2012; Foong et al., 2018; Karlsson & Nilsson, 2019; Kesting et al., 2020; Ryken & Hamel, 2006; Toom et al., 2015) in this review found evidence of critical reflections. Such a conclusion should be taken with caution, as each author group used different frameworks to guide their findings and measure the outcomes of PSTs’ reflective thinking. Still, Ryken and Hamel (2006) offered a heartening conclusion. Given that until the last two decades, there was little data to indicate that PSTs, steeped in novel demands of learning the profession, could even be reflective thinkers (Pavlovich et al., 2009; Rodgers, 2012).

In sum, culturally sustaining practices consider the moral and ethical implications and consequences of classroom and school practices on students and their families. According to Larrivee (2004), this level of reflection is rare for PSTs; it is considered a higher-order level of reflection that questions assumptions, biases, and values of the practitioner, on the students and their learning, in contribution to a just society. Of the three studies in this final section, Ryken and Hamel (2006) stood alone in reframing the existing frameworks from a deficit approach to a competency-based approach.

### **Summary of Findings**

Overall, there is a shared value of reflective thinking in the development of teachers but not a shared language or a shared practice. Additionally, the literature in this review indicated

that PSTs can and do engage in purposeful reflection and that knowing the procedures and protocols of PSTs reflective practice is a vital element of that learning, along with the rationale for engaging in it (Cohen-Sayag & Fischl, 2012; Foong et al., 2018; Karlsson & Nilsson, 2019; Kesting et al., 2020; Ryken & Hamel, 2006; Toom et al., 2015). However, while reflective thinking practices promise "informed practice" for PSTs to positively impact learning outcomes for each student, EPPs continue to have an "uninformed shared meaning" of reflective thinking practice (Fook, White & Gardner, 2006, pp.5-6).

### Chapter 3

This study was a systematic literature review to investigate to what extent preservice teachers' reflective thinking matters to the quality of preservice teachers' learning and performance. The study was designed to examine empirical research literature that guides education preparation providers and teacher educators in providing clear, coherent methods of operationalizing effective reflective-thinking practices for preservice teachers. This study builds on the large body of literature on reflective thinking for preservice teachers (PSTs). Further, this study answered the following research questions:

- How does the peer-reviewed literature in teacher education define reflective thinking?
- What learning outcomes and gains, if any, are described in the peer-reviewed literature on preservice teacher reflective thinking?

#### Discussion of Findings

Until the last decade, there was little data to indicate that PSTs, steeped in the demands of learning the profession, could be reflective thinkers. The current literature indicates that PSTs can and do engage in purposeful reflective thinking. PSTs' understanding of the procedures and protocols of reflective practice is an essential element of their learning, along with the rationale for engaging in it (Egmire, 2020; Fryer, 2013; Furman, 2019). Major findings suggest that reflective thinking is widely recognized as a vital aspect of teacher education (ETS Home, 2022; InTASC, 2017; Pearson, 2022; Pultorak, 2010; Rodgers, 2002; Thompson & Pascal, 2012).

Broadly, reflective thinking is deliberate analysis in which a PST makes sense of puzzles of practice with the intent of taking informed action for future improvement. Specifically, the Praxis Performance-based Assessment for Teachers (PPAT) defines reflective thinking as "the process of actively and intentionally considering one's own teaching and learning experiences to

inform and improve professional practice" (ETS Home, 2022). The literature suggests that reflective thinking is a critical component of effective teaching and learning and that it should be ongoing and iterative.

As illustrated in the varying definitions of reflective thinking frameworks and models, reflection is applied to an array of thinking practices and can have multiple meanings as it is adapted into PST development. The literature described diverse stages, phases, levels, types, and scopes of reflective thinking. Many researchers described reflective thinking progressions (Jay & Johnson, 2002; Gallaven & Webster-Smith, 2010; Larrivee, 2008b; Pultorak, 2010). Additionally, many researchers described the reflective thinking process that begins with non-reflection or technical reflection with a survival concern of “getting it right” to graduate and obtain certification. While reflective thinking practice was usually depicted as developing in stages, that development was “not necessarily linear” (Larrivee, 2008b, p. 11). Reagan et al. (2000) claimed that reflective practice is more like a spiral in which each element of reflective practice is constantly involved in a dynamic process of understanding, change, and refinement.

Diverse frameworks shared common themes of growing levels of sophistication and complexity of thinking and perspective-taking and captured a progression from lower to higher levels of thinking and complexity. Additionally, there was agreement that reflective thinking can develop from a description of a noteworthy incident to critical thinking about the incident to taking informed action for improvement. Finally, there was agreement on moving from a self-focus to multiple perspectives focus. Seeking multiple perspectives in a puzzle or problem of practice was a theme throughout the research on improving the quality of PST reflection. Rigney et al. (2019) concluded, “Reflectivity has been invoked as a valuable way of thinking and

approaching problems in a democratic society in need of more socially just circumstances for students” (p. 306).

### **Findings From Theme One: Diverse Frameworks for Reflective Thinking**

The frameworks researchers used to analyze and assess PST reflective thinking were diverse and without much overlap. However, 62 authors and/or author groups from 2012 to 2022 successfully analyzed, assessed, and measured reflective thinking. This is contrary to what many earlier researchers claimed about the lack of consensus on a definition of reflective practice as a barrier to assessing and measuring reflective thinking (Hickson, 2011; Pultorak, 2010; Rodgers, 2002; Thompson & Pascal, 2012). Each of the 19 authors and/or author groups in Theme One provided a definition of reflective thinking that guided their work.

The lack of a universal definition may have proved challenging to the authors and/or author groups in my study. However, it was not a barrier in defining reflective practice and applying or adapting frameworks to find evidence of improved PST reflective thinking in 17 of the 19 studies in Theme One. Only two of the 19 studies found no change in PST reflective thinking (Barry & Caravan, 2020; Jones & Ryan, 2014). It is important to note that both author groups shared the same approach of unstructured blogs or discussion boards. In addition, the PSTs in Jones and Ryan’s study received no responses or scores on their reflective thinking from the teacher educators.

### **Findings From Theme Two: Scaffolding Reflective Thinking**

Teacher educators used diverse and non-overlapping frameworks to scaffold reflective thinking through instruction and processes. Most studies were conducted within coursework that paralleled student teaching. The content and reflection processes in the courses and the clinical placements varied from study to study. Earlier researchers claimed that PSTs could not think

reflectively about their practice (Larrivee, 2008b; Pultorak, 2010; Rodgers, 2002; Thompson & Pascal, 2012). However, 32 of the 39 studies on pedagogical processes showed evidence of improved PST reflective thinking. Furthermore, 24 of the 39 studies showed significant improvement in reflective thinking for PSTs.

Within the studies with mixed results, Shin (2021) noted that PST reflective thinking improved with peer support. Shin also noted that while the adapted framework in Shin's study did not include emotions, the quality of PST reflections improved when peers were allowed to share their emotions before writing individual reflections. Likewise, Yee et al. (2022) reported mixed results when PSTs reflected in isolation and evidence of improved reflective thinking with peer emotional support. One difference between the two studies was that Yee et al. adapted a framework from Gibbs (1988) that considered emotions as an entry into reflective thinking.

Considering emotions as an entry into reflective thinking was unique. Only four of 62 studies used frameworks that considered human emotions in reflective thinking (Astika, 2014; Farr & Riordan, 2015; Heinrich & Donham, 2015; Yee et al., 2022). Of the studies that considered human emotions, two reported mixed results (Farr & Riordan, 2015; Yee et al., 2022) and two reported clear improvements in PST reflective thinking (Astika, 2014; Heinrich & Donham, 2015).

Only one study in this section resulted in no change in PST reflective thinking (Shek et al., 2021). Shek found no change in PST reflective thinking despite the many processes used to develop it. Ryken and Hamel (2016) explain such findings: most frameworks for reflective thinking share a deficit view instead of a competency-based approach. Ryken and Hamel found that when they re-scored 30 previously "low-level" written reflections with a competency-based framework, they found critical levels of reflective thinking. Ryken and Hamel's assertion will be

discussed in the section for Theme Three.

In Theme Two, most of the pedagogical processes for visual thinking, video recording, and collaborative discussions resulted in improved reflective thinking in teacher candidates. In a way, it is not surprising that 24 of the 39 studies on pedagogical processes included collaborative discussions or debriefing to successfully develop PST reflective thinking, except for Shek et al. (2021). Given the evidence from these studies in Theme Two, reflective thinking appears to develop through interaction with others.

### **Findings from Theme Three: Culturally Sustaining Practices**

Teacher educators used frameworks to understand and teach social justice challenges in classrooms and schools. The frameworks shared no overlap. Earlier researchers claimed that PSTs lacked the time and experience to reflect critically on social justice issues within a classroom (Larrivee, 2008b; Pultorak, 2010; Rodgers, 2002; Thompson & Pascal, 2012). However, two of the three studies from 2016 to 2021 showed evidence of improved PST reflective thinking within coursework that paralleled student teaching (Behizadeh et al., 2019; Ryken & Hamel, 2016). In this context, culturally sustaining practices “address issues of educational equity and excellence for all students” (Behizadeh et al., p. 2).

The third study in Theme Three compared levels of reflective practice between culturally different countries. Choy (2021) investigated the differences in reflective teaching in Malaysia and Australia. These countries were chosen because they represented an Asian and a Western cultural perspective among PSTs. Choy found that while reflective thinking may be emphasized in teacher education programs, the conceptualization of the process of reflective thinking between Asian culture and Western culture were profoundly different.



In a way, this was not surprising. Within the same culture, Calderhead (1989) asserted that even similar terms for reflection and reflective thinking practice are “derived from different theoretical perspectives” (p. 43) and have varying applications for educator preparation programs. Adding to the issue is that current definitions of reflective thinking and the frameworks that guide teacher educators and researchers are strongly influenced by Western cultural heritage (Buckley, 2000). Moreover, cultural differences in reflective thinking extend beyond language differences and frameworks. While many of the teacher educators in Theme Two noted improved reflective thinking through collaborative discussion, Buckley found that how people reflect collaboratively is not universal. In particular, argument is valued in collaborative discussion in dominant Western culture, which can be experienced as “warlike” by other cultures (Tannen, 1998, quoted in Buckley). Buckley noted:

Because collaborative reflection requires communication, culture affects it in a way that individual reflection is not. [...] The ways in which people reflect individually are shared across cultures. In contrast, the ways in which they reflect collaboratively are structured differently among cultures.” (p. 143)

Buckley offered these observations as an American teacher educator specializing in American Indian and Alaska Native science education.

Choy (2021) offered a broad solution to cultural differences: reflective thinking requires support that mirrors cultural differences. Choy concluded that when the national culture is collectivist in nature, PSTs may need support to develop self-belief to think reflectively without external feedback. However, where the national culture is more individualist, PSTs may need support in self-assessment and critical analysis of their teaching practices to develop more awareness of the impact of their actions on students.

Buckley (2000) agreed that awareness of cultural differences is essential in supporting teacher educators to understand cultural cues in PSTs' reflective thinking. In addition, Buckley noted that the United States has a "far-ranging root system" of cultural diversity, which may create a valuable platform to increase insights for PSTs (p. 147). However, Buckley cautioned that awareness alone is not enough to ensure PSTs will improve reflective thinking. Additional strategies such as participant-created discussion norms and teacher educator understanding of cultural cues, such as silence, are entry points in developing reflective thinking.

### **Limitations**

The findings in this study are limited due to one person conducting a systematic literature review that is typically conducted by a team. Further, the limitations of a white, middle-class, American female must be considered. This is especially true for Theme Three: critical reflections with a focus on social justice issues in classrooms and schools. Additionally, this study included empirical research from January 2012 to October 2022. Given the profusion of research on PST reflective thinking published annually, there is likely already valuable published research that I missed in my research.

Additionally, this systematic literature review was limited to PSTs. Further, only one study included reflective thinking in a social justice course for PSTs.

### **Implications and Recommendations for Practice**

This study validates that PST reflective thinking is a vital aspect of teacher education. To perform the complex work of reflective thinking well, educator preparation programs may be served by agreeing on a definition of reflective thinking for their program. Given that Calderhead (1989) cautioned that even similar terms for reflective thinking practice have varying applications for educator preparation programs, it may be wise for each educator preparation

program to agree to one definition as a foundation for supporting reflective thinking program-wide. Through a program-level consensus on what reflective thinking is, teacher educators may be more united and focused on studying the impact of frameworks and processes on PSTs' reflective thinking.

Additionally, Theme Two teacher educators pointed out that in several studies, reflective thinking was introduced in program-end courses that paralleled student teaching. Even more concerning, Behizadeh et al. (2019) noted that culturally sustaining reflective thinking was limited to one course on critical thinking in classroom social justice in their educator preparation program. Of the 62 empirical studies in my research, only Behizadeh et al. (2019) described a course for PSTs in social justice. Given the complexity and abstract nature of reflective thinking, it may serve educator preparation programs to systematically teach and support reflective thinking with a focus on critical reflection throughout the program. If the claims by Larrivee (2008b) and Reagan et al. (2000) are correct that reflective practice is more like a spiral than a linear process, educator preparation programs may be well-served in teaching and supporting reflective thinking to critical levels throughout the program.

Building on the program-wide approach, reflective thinking appears to benefit from structure, integrated coursework processes, and thoughtful feedback. In the studies that used unstructured processes and/or feedback (Barry & Caravan, 2020; Jones & Ryan, 2014), PSTs remained focused on themselves within the technical levels of survival and “getting it right” to pass the credentialing process. To perform the complex work of reflective thinking well, educator preparation programs must integrate feedback on levels of performance.

Further, educator preparation programs must embrace the sophistication of genuine reflective practice. Dewey cautioned that reflective thinking is a complex, rigorous, and

emotional endeavor (1933). An uninformed, happenstance approach is a barrier to the artful solutions Schön described in his reflective / action stages (Thompson & Pascal, 2011). Even with a coordinated program-level agreement and careful implementation, there is no guarantee that PSTs will reach critical levels of reflective thinking. While it may be tempting to simplify the abstract nature of reflective thinking, a step-by-step formula for developing reflective thinkers does not exist. Korthagen & Vasalos (2010) caution:

Reflection as it is currently being used in professional settings and educational programs for professional development, does not always lead to optimal learning or the intended professional development. Sometimes reflection seems to be used by practitioners as merely a technical tool generating quick, but often ineffective, solutions to problems that have been only superficially defined. If we look closely at how many practitioners reflect, we see that if there is any time for reflection at all, work pressure often leads to a focus on finding a “quick fix” - a rapid solution for a practical problem - rather than shedding light on the underlying issues determining the situation at hand. (p. 530)

One of the great and intolerable costs in approaches for programs that do not fully understand the purpose for defining, scaffolding, assigning, analyzing, and assessing reflective thinking is that teacher educators and PSTs may conclude that they *are* practicing reflective thinking.

Tragically, faux reflective practice does not inform or transform teaching practices. Further, an impartial understanding and implementation of reflective thinking undermine the research that aims to study and refine it for teacher educators. Finally, faux reflective practice is a barrier to InTASC standards that call for ongoing reflection and

self-assessment for teachers, as well as the importance of creating learning environments that support and encourage student reflective thinking (2017).

Another important aspect of a program-level approach is acknowledging the novel demands of learning a complex profession within the time constraints of coursework that are paralleled with clinical practice. Mascio (2018) found that PSTs claimed that reflection was important for their development as teachers, but also experienced reflection as challenging due to lack of time, exhaustion, and over-reliance on writing as a capture for reflective thought. Part of scaffolding PSTs' learning in reflective practice may mean the teacher educators balance time for reflective thinking within the bounds of clinical practice and during class meetings instead of assigned homework.

Mascio (2018) and Rodgers (2012) also noted that developing reflective thinkers happened more effectively in interaction with others. Dewey cautioned that to know without articulating to others is an incomplete act (1933). As a scholar-practitioner, Rodgers (2012) found at least three benefits of collaborative reflection: affirmation and value of reflective thinking processes; viewing common experiences "newly" (p. 857); and supporting inquiry. Rodgers noted that supporting inquiry was especially important given the overwhelming demands teachers face daily. The articles in my research showed improved PST reflective thinking through facilitated collaborative reflection. However, there may be an even more valuable reason for its practice: culturally sustaining practices. A collaborative reflective approach may provide Western educator preparation programs a path to developing PSTs with more awareness of the impact of their actions on students (Choy, 2021).

Educator preparation programs have developed and provided evidence of PSTs' reflective thinking through a variety of innovative captures. Mascio (2018) was not alone in concern about programs' over-reliance on writing as a capture for reflective thinking. Mann and Welsch (2006) called for a "rebalancing" of reflective thinking away from written reflection to spoken and collaborative forms of reflection that are "more dialogic, data-led" (p. 291). Cheng (2020), Demissie (2015), Gunizi and Derya (2020), and Hahl (2021) all used visual thinking that included concept maps, drawings, and photos to evidence improved PST reflective thinking.

Further, in acknowledging the intense demands PSTs face in clinical practice, educator preparation programs may benefit from applying affective frameworks to acknowledge emotions, along with cognitive frameworks. Shin (2021) and Yee (2022) found that once PSTs were able to express painful emotions to each other as they navigated the disequilibrium of clinical practice, they shifted reflective thinking from self-concern to concern about students. According to Gibbs (1988), emotions correlate with aspects of cognition, such as attention, memory, motivation, learning, reasoning, and rational thinking. Implementing affective-cognitive frameworks in coursework and clinical practice may lead to a clearer understanding of developing PST reflective thinking.

Of the diverse frameworks used in 62 studies, there is a sense of researchers reinventing the wheel in implementing reflective thinking. To implement the complex work of reflective thinking well, using generalized, common frameworks may be helpful. There was not much overlap within the frameworks in the 62 studies. And in the studies that used the same frameworks, the researchers adapted the frameworks to the point that

they were customized to a specific study. Generalized frameworks within specific grade levels and content areas may offer educator preparation programs data-led decisions for implementation. Using generalized frameworks may also offer a shared focus for teacher educators to analyze and assess PST reflective thinking.

### **Recommendations for Further Research**

While this systematic literature review was limited to PSTs, systematic literature reviews on diverse novice and experienced teachers may clarify to what degree reflective thinking continues to develop in professional educators. Furthermore, there is a need to study frameworks from other cultures to understand how to develop reflective thinking for diverse PSTs as well as practicing teachers.

In addition, only one study included reflective thinking in a social justice course for PSTs. Given the decades-long aim to ensure equity and inclusion in classrooms and schools, more research is needed on to what degree PSTs receive support in understanding and implementing social justice in classrooms. Finally, there is an urgency for more research and scholarship on reflective thinking practice for both PSTs and certified teachers. Specifically, using common frameworks to guide and measure reflective thinking within specific content areas and grade levels would help determine trends within the data. Using similar pedagogical processes to guide and measure reflective thinking within specific content areas and grade levels would help determine trends within the data.

### **Conclusion**

There is a significant body of research in the peer-reviewed literature on the processes of developing PST reflective thinking. From my close study of empirical research literature from January 2010 to October 2022, the evidence-based outcomes identified included:

1. Reflective thinking may help PSTs develop a deeper understanding of their teaching practices and the underlying theories and principles that inform them. This may lead to more effective and efficient teaching strategies, as well as a greater sense of confidence and efficacy in the classroom.
2. Reflective thinking involves analyzing and synthesizing information, evaluating evidence, and making informed decisions.
3. Reflective thinking may help PSTs become more aware of their own cultural biases and how these biases may influence their teaching practices. This increased awareness may lead to more inclusive and equitable teaching approaches.
4. Reflective thinking may help PSTs develop a deeper understanding of how students learn, as well as the unique needs and learning styles of individual students. This understanding may inform more effective teaching strategies and better meet the needs of all students in the classroom.
5. Reflective thinking may help PSTs develop better communication skills, both in terms of their ability to articulate their thoughts and ideas, as well as their ability to listen and respond to the needs and concerns of students and colleagues.

Research on PST reflectivity suggested that while reflectivity and reflective thinking are beneficial to the growth and development of PSTs, more research is needed to fully understand how to best support PSTs in developing these traits. Reflective thinking is complex, and the effectiveness of reflective thinking processes and protocols may vary depending on the context, teaching environment, and individual dispositions to reflectivity.



## References

- Acquah, E. O., & Commins, N. L. (2015). Critical reflection as a key component in promoting pre-service teachers' awareness of cultural diversity. *Reflective Practice*, 16(6), 790-805.
- Adams, P. (2006). Exploring social constructivism: Theories and practicalities. *International Journal of Primary, Elementary, and Early Years Education*, 24(3), 243-257.
- Adarlo, G., & Pelias, M. F. T. (2021). Teaching and learning with others: Situated encounters in service learning among pre-service teachers. *Asia-Pacific Journal of Teacher Education*, 49(2), 177-202.
- Adatepe, S., & Kul, M. (2018). Themes of reflective thinking as a predictor of physical education and sport pre-service teachers' entrepreneurial characteristics. *Journal of Education and Training Studies*, 6(10), 117-122.
- Addleman, Brazo, C. J., Dixon, K., Cevallos, T., & Wortman, S. (2014). Teacher Candidates' Perceptions of Debriefing Circles to Facilitate Self-Reflection During a Cultural Immersion Experience. *The New Educator*, 10(2), 112-128.
- Agurtzane, M., Nerea, A., de Arana, L., & Mariam, B. (2019). Analysis of interaction patterns and tutor assistance in processes of joint reflection in pre-service teacher education. *Journal of Education for Teaching*, 45(4), 389-401.
- Adie, Lenore, & Wyatt-Smith, Claire (2020). Fidelity of summative performance assessment in initial teacher education: The intersection of standardization and authenticity, *Asia-Pacific Journal of Teacher Education*, 48: 3, 267-286.
- Ajayi, L. (2011). Teaching alternative licensed literacy teachers to learn from practice: A critical reflection model. *Teacher Education Quarterly*, 38, 169.
- Alba, R. (2018). What Majority-minority Society? A Critical Analysis of the Census Bureau's Projections of America's Demographic Future. *Socius*, 4.
- Al-Hassan, O., Al-Barakat, A., & Al-Hassan, Y. (2012). Pre-service teachers' reflections during field experience. *Journal of Education for Teaching: International Research and Pedagogy*, 38(4), 419-434.
- Archibald, T. (2021). The role of evaluative thinking in the teaching of evaluation. *The Canadian Journal of Program Evaluation*, 35(3).
- Argyris, C. (1982). Reasoning, learning, and action: individual and organizational (1st ed.). Jossey-Bass.

- Argyris, C. (2002). Double-Loop Learning, Teaching, and Research. *Academy of Management Learning & Education*, 1 (2), 206–218.
- Argyris, C. (2004). Inhibiting double-loop learning in business organizations. *Reasons and rationalizations* (pp. 34). Oxford: Oxford University Press.
- Argyris, C. & Schön, D. A. (1974). *Theory in practice: increasing professional effectiveness* (1st ed.). Jossey-Bass Publishers.
- Arnold, G. H. (1993). Strengthening student teachers' reflective/critical thinking skills through collaborative research. *Teacher Education Quarterly*, 20(4), 97-105.
- Arslan, A. S., Aslan, A., & Arslan, S. (2022). Investigating pre-service mathematics teachers' self-assessment process. *Bartın University Journal of Faculty of Education*, 11(1), 137-150.
- Astika, G. (2014). Reflective teaching as alternative assessment in teacher education: A case study of pre-service teachers. *TEFLIN Journal*, 25(1), 16-32.
- Baker, E. & Rozendal, M. S. (2019). Cognitive-based rubrics: Examining the development of reflection among preservice teachers. *Teacher Education Quarterly*, 46(2), 58-80.
- Baran, E., Bilici, S. C., Aylin Albayrak Sari, & Tondeur, J. (2019). Investigating the impact of teacher education strategies on preservice teachers' TPACK. *British Journal of Educational Technology*, 50(1), 357-370.
- Barnatt, J., Gahlsdorf Terrell, D., D'Souza, L. A., Jong, C., Cochran-Smith, M., Viesca, K. M., Gleeson, A. M., McQuillan, P., & Shakman, K. (2017). Interpreting early career trajectories. *Educational Policy*, 31(7), 992–1032.
- Barry, N. H., & Caravan, L. R. (2020). Preservice music teachers' reactions to K-12 field experiences: A qualitative analysis of discussion board posts. *Contributions to Music Education*, 45, 81-103.
- Barth-Cohen, L., Little, A. J., & Abrahamson, D. (2018). Building reflective practices in a pre-service math and science teacher education course that focuses on qualitative video analysis. *Journal of Science Teacher Education*, 29(2), 83-101.
- Bartolome, S. J. (2017). Comparing field-teaching experiences; A longitudinal examination of preservice and first-year teacher perspectives. *Journal of Research in Music Education*, 65(3), 264-286.
- Bartow Jacobs, K. E. (2019). The role of critical narratives in deepening preservice teachers' understandings of professional practice. *AERA Online Paper Repository*.

- Batman, D., & Saka, A. Z. (2021). The effects of micro-reflective teaching practices on the professional skill development of pre-service physics teachers. *Turkish Online Journal of Educational Technology - TOJET*, 20(4), 117-131.
- Behizadeh, N., Thomas, C., & Behm Cross, S. (2019). Reframing for social justice: The influence of critical friendship groups on preservice teachers' reflective practice. *Journal of Teacher Education; Journal of Teacher Education*, 70(3), 280-296.
- Bell, Kelton, J., McDonagh, N., Mladenovic, R., & Morrison, K. (2011). A critical evaluation of the usefulness of a coding scheme to categorize levels of reflective thinking. *Assessment and Evaluation in Higher Education*, 36(7), 797-815.
- Bernhardt, V. L. (2018). *Data Analysis for Continuous School Improvement*. Routledge.
- Beynon, C., & Onslow, B. (1997). Developing a community of co-learners: A model for promoting critical reflection in preservice teacher educators. St. Catherines: Brock University. *Brock Education*, 7(1), 15-31.
- Bitterman, A, Goldrigh, R., & Gray, L. (2013). Characteristics of public and private elementary and secondary school principals in the United States: Results from the 2011-12 schools and staffing survey (NCES 2013-313). U.S. Department of Education. Washington, D.C.: *National Center for Education Statistics*.
- Bjuland, R. (2004). Student teachers' reflections on their learning process through collaborative problem solving in geometry. *Educational Studies in Mathematics*, 55(1), 199-225.
- Borton, T. (1970). *Reach, touch, and teach: Student concerns and process education*. New York: McGraw-Hill.
- Borton, T. (1977). Reaching them where they are: Guidelines for developing concomitant instruction. *Curriculum Inquiry*, 7(2), 131-143.
- Bowers, E., Laster, B., Gurvitz, D., Ryan, T., Cobb, J., & Vazzano, J. (2017). Using video for teacher reflection: Reading clinics in action. *Reflective theory and practice in teacher education* (pp. 141-160).
- Boyd, A., Gorham, J. J., Justice, J. E., & Anderson, J. L. (2013). Examining the apprenticeship of observation with preservice teachers: The practice of blogging to facilitate autobiographical reflection and critique. *Teacher Education Quarterly*, 40(3), 27-49.
- Bozan, S. (2021). Determining students' reflective thinking levels and examining their reflections on science concepts. *African Educational Research Journal*, 9(2), 544-550.

- Brandenburg, R., Glasswell, K., Jones, M., & Ryan, J. (Eds.). (2017). *Reflective theory and practice in teacher education* (pp. 24-26). Springer Singapore.
- Brandenburg, & McDonough, S. (2017). Using Critical Incidents to Reflect on Teacher Educator Practice. In *Reflective Theory and Practice in Teacher Education* (pp. 223–236). Springer Singapore.
- Broemmel, A. D., Swaggerty, E. A., & McIntosh, D. (2009). Navigating the waters of teacher induction: One beginning teacher's journey. *The New Educator*, 5(1), 67-80.
- Brookfield, Stephen D. (1998). Critically reflective practice. *Journal of Continuing Education in the Health Professions*. 18 (4): 197–205.
- Brookfield, S. D. (1990). The skillful teacher. *San Francisco: Jossey-Bass*.
- Brookfield, S. (2017). *Becoming a critically reflective teacher*. John Wiley & Sons.
- Brown, C. S., Cheddie, T. N., Horry, L. F., & Monk, J. E. (2017). Training to be an early childhood professional: Teacher candidates' perceptions about their education and training. *Journal of Education and Training Studies*, 5(6), 177-186.
- Brown, L., & Coles, A. (2012). Developing "deliberate analysis" for learning mathematics and for mathematics teacher education: How the enactive approach to cognition frames reflection. *Educational Studies in Mathematics*, 80(1-2), 217-231.
- Buckley, A. (2000). Multicultural reflection. *Journal of Teacher Education*, 51, 143-148; No. 2.
- Burbank, M., Ramirez, L., & Bates, A. (2012). Critically reflective thinking in urban teacher education: A comparative case study of two participants' experiences as content area teachers. *Professional Educator*, 36(2).
- Burke, W., Marx, G. E., & Berry, J. E. (2010). Maintaining, reframing, and disrupting traditional expectations and outcomes for professional development with critical friends groups. *The Teacher Educator*, 46(1), 32.
- Calandra, B., Brantley-Dias, L., Yerby, J., & Demir, K. (2018). Examining the quality of preservice science teachers' written reflections when using video recordings, audio recordings, and memories of a teaching event. *Contemporary Issues in Technology and Teacher Education (CITE Journal)*. 18(1).
- Calderhead, J. (1989). Reflective teaching and teacher education. *Teaching and Teacher Education*, 5(1), 43–51.

- Campoy, R. W., & Radcliffe, R. (2002). Reflective decision-making and cognitive development: A descriptive study comparing the reflective levels of pre-service and in-service teachers.
- Capobianco, B. M. (2007). A self-study of the role of technology in promoting reflection and inquiry-based science teaching. *Journal of Science Teacher Education*, 18(2).
- Carlson, J. R. (2019). "How am I going to handle the situation?" the role(s) of reflective practice and critical friend groups in secondary teacher education. *International Journal for the Scholarship of Teaching and Learning*, 13(1).
- Carpendale, J., Delaney, S., & Rochette, E. (2020). Modeling meaningful chemistry teacher education online: Reflections from chemistry preservice teacher educators in Australia. *Journal of Chemical Education*, 97(9), 2534-2543.
- Catalana, S. M. (2020). Indicators of impactful reflection in pre-service teachers: A case for creativity, honesty, and unfamiliar experiences. *International Journal for the Scholarship of Teaching & Learning*, 14(1), 1-12.
- Chen, A., & Seng, S. (1992). On improving reflective thinking through teacher education.
- Chang, S. (2020). Inquiry of reflective conversations applied to in-service preschool teachers' professional development. *Journal of Teacher Education and Professional Development*, 13(1), 53-72.
- Cheng, S., Cheng, A. Y. N., & Tang, S. Y. F. (2010). Closing the gap between the theory and practice of teaching: implications for teacher education programmes in Hong Kong. *Journal of Education for Teaching: JET*, 36(1), 91-104.
- Chepyator-Thomson, J., & Liu, W. (2003). Pre-service teachers' reflections on student teaching experiences: Lessons learned and suggestions for reform in PETE programs. *The Physical Educator*, 60, 2+.
- Chien, C. (2021). A case study of the use of the six thinking hats to enhance the reflective practice of student teachers in Taiwan. *Education 3-13*, 49(5), 606-617.
- Choy, S. C., Yim, & Tan, P. L. (2017). Reflective thinking among preservice teachers: A Malaysian perspective. *Issues in Educational Research*, 27(2), 234-251.
- Choy, S. C., Dinham, J., Joanne Sau, C. Y., & Williams, P. (2020). Comparing reflective practices of pre-service teachers in Malaysia and Australia: A mixed-methods approach. *Issues in Educational Research*, 30(4), 1264-1285.
- Choy, S. C., Dinham, J., Yim, J. S., & Williams, P. (2021). Reflective thinking practices among pre-service teachers: Comparison between Malaysia and Australia. *Australian Journal of Teacher Education*, 46(2), 1-15.

- Çimen, O., & Çakmak, M. (2020). The effect of feedback on preservice teachers' motivation and reflective thinking. *Ilkogretim Online*, 19(2), 932-943.
- Clarà, M., Mauri, T., Colomina, R., & Onrubia, J. (2019). Supporting collaborative reflection in teacher education: A case study. *European Journal of Teacher Education*, 42(2), 175-191.
- Clarke, M. (2011). Promoting a culture of reflection in teacher education: The challenge of large lecture settings. *Teacher Development*, 15(4), 517-531.
- Clayton, C. D. (2018). Policy meets practice in New York State: Understanding early edTPA implementation through preservice candidates' eyes. *Teacher Education Quarterly*, 45(3), 97-125.
- Clegg, S. (1999) Professional education, reflective practice, and feminism. *International Journal of Inclusive Education* 3:2, pages 167-179.
- Cochran-Smith, M., & Lytle, S. L. (2001). Beyond certainty: Taking an inquiry stance on practice. *Teachers caught in the action: Professional development that matters*, 45-58.
- Cochran-Smith, M., & Lytle, S. (2009). *Inquiry as stance: Practitioner research for the next generation*. New York: Teacher College Press.
- Cohen-Sayag, E., & Fischl, D. (2012). Reflective writing in pre-service teachers' teaching: What does it promote? *Australian Journal of Teacher Education*, 37(10).
- Coleman, B. M., Ferand, N. K., Bunch, J. C., & Israel, G. D. (2021). Examining preservice teachers' performance during a 14-week student teaching experience: A longitudinal study. *Journal of Agricultural Education*, 62(3), 258-274.
- Colwell, J., & Hutchison, A. C. (2018). Considering a Twitter-based professional learning network in literacy education. *Literacy Research and Instruction*, 57(1), 5-25.
- Connelly, A. S., Mosito, C., & Shaik, N. (2020). Grade R teachers' understanding of reflective practice. *South African Journal of Childhood Education; SAJCE*, 10(1), 1-10.
- Connell, M. (2014). Recovering the social dimension of reflection. *Journal of Catholic Education*, 17, 5+.
- Connolly, C., & Cosgrove, T. (2022). An action learning approach to mathematics learning in the light of the cognitional theory of Bernard Lonergan. *Action Learning*, 19(1), 33-48.
- Cowin, K. M. (2012). Enhancing student teacher reflective practice through poetry. *The New Educator*, 8(4), 308-320.

- Creswell, J. W. (2003). *Research design: Qualitative, quantitative, and mixed methods approach*. (2<sup>nd</sup> Edition). Sage Publications.
- Crow, R., Hinnant-Crawford, B. N., & Spaulding, D. T. (2019). *The educational leader's guide to improvement science*. Myers Education Press.
- Darling-Hammond, L. (2006). *Powerful teacher education*. San Francisco: Jossey-Bass.
- Darling-Hammond, L., & Bransford, J. (Eds.). (2005). *Preparing teachers for a changing world*. San Francisco: Jossey-Bass.
- Day, R. R. (2013). Peer observation and reflection in the ELT practicum. *Online Submission*.
- Day, S. P., Webster, C., & Killen, A. (2022). Exploring initial teacher education student teachers' beliefs about reflective practice using a modified reflective practice questionnaire. *Reflective Practice*, 23(4), 437-451.
- Dayal, H. C., & Alpana, R. (2020). Secondary pre-service teachers' reflections on their microteaching: Feedback and self-evaluation. *Waikato Journal of Education* (2382-0373), 25, 73-83.
- Demissie, F. (2015). Promoting student teachers' reflections through a philosophical community of enquiry approach (PCOE). *Australian Journal of Teacher Education*, 40(12).
- Denzin. (2010). *The qualitative manifesto: a call to arms*. Left Coast Press.
- Dewey, J. (1933). *How we think: A restatement of the relation of reflective thinking to the educative process*. Heath and Company.
- Dewey, J. (1938). *Experience and education*. New York: Collier Books, Macmillan Publishing Co.
- Dewey, J. (1958). *Experience and nature*. New York: Dover Publications.
- Dinham, J., Choy, S. C., Williams, P., & Yim, J. S. C. (2021). Effective teaching and the role of reflective practices in the Malaysian and Australian education systems: A scoping review. *Asia-Pacific Journal of Teacher Education*, 49(4), 435-449.
- Drisko, J. W., & Maschi, T. (2016). *Content analysis*. Oxford University Press.
- Falter, M. M., & Barnes, M. E. (2020). The importance of the "comfort zone" in preservice teachers' evaluation of video analysis sessions as a tool for enhanced reflection. *Teacher Education Quarterly*, 47(2), 64-85.

- Festinger, L. (1957). *A theory of cognitive dissonance* (Vol. 2). Stanford University Press.
- Fisher. (2003). Demystifying Critical Reflection: Defining criteria for assessment. *Higher Education Research and Development*, 22(3), 313–325.
- Eaton, S. E. (2016). From trainee to teacher: Reflective practice for novice teachers. *TESL Canada Journal*, 33, 85+.
- Edge, C., & Olan, E. (2021). Learning to breathe again: Found poems and critical friendship as methodological tools in self-study of teaching practices. *Studying Teacher Education*, 17(2), 228–252.
- Edwards, C. P., Hamel, E., Leeper Miller, J., & Ren, L. (2020). Improving reflective practice: A documentation rubric for mentoring preservice and in-service teachers. *Journal of Early Childhood Teacher Education*, 41(1), 2-17.
- Efe, R. (2018). The relation between science student teachers' approaches to studying and their attitude to reflective practice. *International Education Studies*, 11(4), 54.
- Egmir, E., & Ocak, I. (2020). The relationship between teacher candidates' critical thinking standards and reflective thinking skills. *International Journal of Progressive Education*, 16(3), 156-170.
- Elidóttir, J. (2019). The magic, the life, the others: How can the imaginative dimension in reflective practice be used with student teachers? A learning experience through self-study. *Reflective Practice*, 20(2), 160-174.
- Endacott. (2016). Using video-stimulated recall to enhance preservice-teacher reflection. *The New Educator*, 12(1), 28–47.
- Ethell, R. G., & McMeniman, M. M. (2000). Unlocking the knowledge in action of an expert practitioner. *Journal of Teacher Education*, 51, 87.
- ETS Home. PPAT Assessment Candidate and Educator Handbook. (2022, July). Retrieved December 12, 2022, from <https://www.ets.org/pdfs/ppat/ppat-candidate-educator-handbook.pdf>
- Farrell, T. S. (2012). Reflecting on reflective practice: (Re)visiting Dewey and Schön. *TESOL Journal*, 3(1), 7–16.
- Farr, F., & Riordan, E. (2015). Tracing the reflective practices of student teachers in online modes. *ReCALL (Cambridge, England)*; *ReCALL*, 27(1), 104-123.



- Fecho, B., Graham, P., & Hudson-Ross, S. (2005). Appreciating the wobble: Teacher research, professional development, and figured worlds. *English Education*, 37(3), 174–199.
- Feiman-Nemser, S. (2001). From preparation to practice: Designing a continuum to strengthen and sustain teaching. *Teachers College Record*, 103(6), 1013–1055.
- Fendler L. (2003). Teacher reflection in a hall of mirrors: Historical influences and political reverberations. *Educational Researcher*, 32(3), 16–21.
- Foong, L., Nor, M. B. M., & Nolan, A. (2018a). The influence of practicum supervisors' facilitation styles on student teachers' reflective thinking during collective reflection. *Reflective Practice*, 19(2), 225-242.
- Foong, L., Nor, M. B. M., & Nolan, A. (2018b). Individual and collective reflection: Deepening early childhood pre-service teachers' reflective thinking during practicum. *Australasian Journal of Early Childhood*, 43, 43+.
- Forkosh Baruch Alona, & Gadot Rivka. (2021). Social curation experience: Towards authentic learning in preservice teacher training. *Technology, Knowledge, and Learning*, 26(1), 105-122.
- Fukkink, R., Jilink, L., Rosanne Op den Kelder, Zeijlmans, K., Bollen, I., & Koopman, L. (2019). The development of interaction skills in preservice teacher education: A mixed-methods study of Dutch pre-service teachers. *Early Childhood Education Journal*, 47(3), 321-329.
- Fraser, M., & Wotring, A. (2022). Regenerating the teacher in a reflective space: Rethinking the capstone experience at the graduate level. *Asia - Pacific Journal of Teacher Education*, 50(1), 84-96.
- Friedman, & Schoen, L. (2009). Reflective Practice Interventions: Raising Levels of Reflective Judgment. *Action in Teacher Education*, 31(2), 61–73.
- Freidus, H. (1998). Mentoring portfolio development. In N. Lyons (Ed.), *With portfolio in hand: Validating the new teacher professionalism* (pp. 160–72). New York: Teachers College Press.
- Freire, Ramos, M. B., & Macedo, D. P. (2014). *Pedagogy of the oppressed* (Ramos, Trans.; 30th anniversary edition.). Bloomsbury Academic, an imprint of Bloomsbury Publishing.
- Fryer, C. L. (2013). Reflective thinkers: An examination of the development of the student teachers' journal reflections during the student teaching experience. *ProQuest LLC*.

- Furman, C. E., & Larsen, S. M. (2019). Interruptions: Reflecting-in-action in preservice math methods courses. *New Educator*, 15(2), 101-115.
- Gabriel. (2017). Rubrics and reflection: A discursive analysis of observation debrief conversations between novice teach for America teachers and mentors. *Action in Teacher Education*, 39(1), 85–102.
- Gahlsdorf Terrell, D., & Sherman, D. (2022). Mirror of mind: Eliciting critical reflections in preservice and novice teachers. *Action in Teacher Education (Routledge)*, 44(3), 230-251.
- Gambrill, E. (2006). *Critical thinking in clinical practice: Improving the quality of judgments and decisions*. John Wiley & Sons.
- Gardner, Fook, J., & White, S. (2006). Critical reflection: possibilities for developing effectiveness in conditions of uncertainty. *Critical reflection in health and social care*.
- Garza, R., & Smith, S. F. (2015). Pre-service teachers' blog reflections: Illuminating their growth and development. *Cogent Education*, 2(1).
- Gay, G. (2002). Preparing for culturally responsive teaching. *Journal of Teacher Education*, 53(2), 106–116.
- Gencel, I. E., & Saracoglu, A. S. (2018). The effect of layered curriculum on reflective thinking and on self-directed learning readiness of prospective teachers. *International Journal of Progressive Education*, 14(1), 8-20.
- Geng, Smith, P., Black, P., Budd, Y., & Disney, L. (2019). Learning from Reflective Pre-service Teachers: Introduction to the Book. In *Reflective Practice in Teaching*. Springer, Singapore.
- Gibbs, G. (1988). Learning by doing: A guide to teaching and learning methods. *Further Education Unit*.
- Glasswell, K., & Ryan, J. (2017). Reflective practice in teacher professional standards: Reflection as mandatory practice. *Reflective theory and practice in teacher education*, 3-26.
- Göker, S. D. (2020). Cognitive coaching: A powerful supervisory tool to increase teacher sense of efficacy and shape teacher identity. *Teacher Development*, 24(4), 559-582.
- Gorski, P.C. & Dalton, K. (2020). Striving for critical reflection in multicultural and social just teacher education: Introducing a typology of reflective practices. *Journal of Teacher Education*. Vol. 71, No. 3, May / June.

- Goulet, M. H., Larue, C., & Alderson, M. (2016). Reflective practice: A comparative dimensional analysis of the concept in nursing and education studies. *Nursing Forum*, 51(2), 139–150.
- Gourneau, B. (2009). Teacher educator as mentor: Reflections on a resident teacher program. *Teaching and Learning*, 23, 60+.
- Guðjónsdóttir, H., Jónsdóttir, S. R., & Gísladóttir, K. R. (2017). Collaborative supervision: Using core reflection to understand our supervision of master's projects. *Reflective theory and practice in teacher education* (pp. 237-255). Springer, Singapore.
- Grant, A. J., Vermunt, J. D., Kinnersley, P., & Houston, H. (2007). Exploring students' perceptions on the use of significant event analysis, as part of a portfolio assessment process in general practice, as a tool for learning how to use reflection in learning. *BMC Medical Education*, 7(1), 5.
- Graves, S. (2010). Mentoring pre-service teachers: A case study. *Australasian Journal of Early Childhood*, 35, 14+.
- Greene, M. (1995). *Releasing the imagination: Essays on education, the arts, and social change*. San Francisco: Jossey-Bass.
- Grossman, P., Hammerness, K., & McDonald, M. (2009). Redefining teaching, re-imagining teacher education. *Teachers and Teaching*, 15(2), 273–289.
- Grossman, P., & McDonald, M. (2008). Back to the future: Directions for research in teaching and teacher education. *American Education Research Association*, 45(1), 184–205.
- Guner, P., & Akyuz, D. (2020). Noticing student mathematical thinking within the context of lesson study. *Journal of Teacher Education*, 71, 568+.
- Güngör, M. N., & Güngör, M. A. (2019). Pre-service English language teachers' collaborative development: The emergence of research, rehearsal, and reflection (3R) model from an activity theory perspective: ATEE journal. *European Journal of Teacher Education*, 42(1), 98-115.
- Ha, Y. L. (2014). Who's the teacher? Who's the learner? Professional growth and development of a novice teacher in Hong Kong. *Childhood Education*, 90, 43+.
- Hahl, K. (2021). Student teachers' experiences of using photos in teacher reflection. *Reflective Practice*, 22(1), 115-127.
- Hagevik, R., Aydeniz, M., & Rowell, C. G., (2012). Using action research in middle level teacher education to evaluate and deepen reflective practice. *Teaching and Teacher Education*, 28, 675-684.

- Hamilton, E. & Van Duinen, D. V. (2018). Purposeful Reflections: Scaffolding Preservice Teachers' Field Placement Observations. *The Teacher Educator*, 53(4), 367–383.
- Hamlin, K., & Bryant, J. W. (2007). Leading examined lives: Research portfolios as self study. *Teaching and Learning*, 22, 47+.
- Hatton, N., & Smith, D. (1995). Reflection in teacher education: Towards definition and implementation. *Teaching and Teacher Education*, 11, 33–49.
- Harding, J., Hbaci, I., Hamilton, B., & Loyd, S. (2021). Transcribing: A tool for mathematics pre-service teachers to reflect on their own teaching. *Journal of Education*, 201(3), 225-235.
- Harrison, M. J. (2016). Release, reframe, refocus, and respond: A practitioner transformation process in a reflective consultation program. *Infant Mental Health Journal*, 37(6), 670–683.
- Harrison, M. J. (2017). Implicated reading: A method for reflecting on practice. *Reflective Practice*, 18(3), 312-325.
- Harrison, M. J. (2022). Deleuze-inspired action research in the university: Mobilizing Deleuzian concepts to rethink research on the reflective writing practices of student teachers. *Educational Action Research*, 30(3), 395-410.
- Hawkins, P., & Shohet, R. (2012). Supervision in the helping professions. *McGraw-Hill Education*.
- Hawkins, S., & Park Rogers, M. (2016). Tools for reflection: Video-based reflection within a preservice community of practice. *Journal of Science Teacher Education*, 27(4), 415-437.
- Healy, G., Walshe, N., & Dunphy, A. (2020). How is geography rendered visible as an object of concern in written lesson observation feedback? *Curriculum Journal*, 31(1), 7-26.
- Hedberg, P. R. (2009). Learning through reflective classroom practice: Applications to educate the reflective manager. *Journal of Management Education*, 33(1), 10.
- Heinrich, J. A., & Donham, J. (2015). Engaging students in authentic questions for reflective practice. *Teacher Education & Practice*, 28(4), 498-521.
- Henning, Dani, D. E., & Weade, G. (2012). The discourse and reflections of teacher candidates during an early field experience. *The New Educator*, 8(4), 283–307.

- Hertzog, H. S., & O'Rode, N. (2011). Improving the quality of elementary mathematics student teaching: Using field support materials to develop reflective practice in student teachers. *Teacher Education Quarterly*, 38(3), 89-111.
- Hermann-Wilmarth, J. (2005). Listening to Anthony: The case of a disruptive preservice teacher. *Journal of Teacher Education*, 56, 471+.
- Hickson, H. (2011). Critical reflection: reflecting on learning to be reflective. *Reflective Practice*, 12:6, 829-839.
- Higgins, J.P.T., Thomas J., Chandler J., Cumpston M., Li T., Page M.J., Welch V.A. (editors). *Cochrane Handbook for Systematic Reviews of Interventions*. 2nd Edition. Chichester (UK): John Wiley & Sons, 2019.
- Hillocks, G. (1995). *Teaching writing as reflective practice*. New York: Teachers College Press.
- Hollingsworth, S. (1989). Prior beliefs and cognitive change in learning to teach. *American Educational Research Journal*, 26(2), 160–189.
- Hourani, R.B. (2013) Pre-service teachers' reflection: Perception, preparedness, and challenges. *Reflective Practice*, 14:1, 12-30.
- Hyatt, K. J. (2009). Improving teacher preparation through an electronic data management system: A lens for reflective practice. *International Journal of Information and Communication Technology Education*, 5, 26+.
- İlin, G. (2020). Reflection or description: A document analysis on ELT student teachers' reflective journals. *Journal of Language & Linguistics Studies*, 16(2), 1019-1031.
- Interstate New Teacher Assessment and Support Consortium [inTASC]. (2017). Model standards for beginning teacher licensing and development: A resource for state dialogue. Washington, DC. *Council of Chief State School Officers*.
- Jay, J. (2001). *Matters of reflection in quality teaching: a study of teachers' reflection in the contexts of their professional lives*. University of Washington.
- Jay, J. (2003). *Quality teaching: Reflection as the heart of practice*. Lanham, MD: Scarecrow Press.
- Jay, J. & Johnson, K. L. (2002). Capturing complexity: a typology of reflective practice for teacher education. *Teaching and Teacher Education*, 18(1), 73–85.
- Jasper, M. (2003), *Beginning reflective practice*. Nelson Thornes, pp. 93–95.

- Jez, R. J. (2022). "All of the things": Shifting from traditional to transformational teacher preparation. *Teacher Education Quarterly*, 49(2), 111-116.
- Johns, C. (2009). *Becoming a reflective practitioner*. John Wiley & Sons.
- Johns, C.; Burnie, Sally (2013). *Becoming a reflective practitioner* (4th ed.). Chichester, UK; Ames, Iowa: Wiley-Blackwell.
- Jones, M., & Ryan, J. (2014). Learning in the practicum: Engaging pre-service teachers in reflective practice in the online space. *Asia-Pacific Journal of Teacher Education*, 42(2), 132-146.
- Kagan, D. 1992. Professional growth among preservice teachers. *Review of Educational Research*, 62(2): 129-69.
- Kajder, S. B., & Parkes, K. A. (2012). Examining preservice teachers' reflective practice within and across multimodal writing environments. *Journal of Technology and Teacher Education*, 20, 229+.
- Karlström, M., & Hamza, K. (2019). Preservice science teachers' opportunities for learning through reflection when planning a microteaching unit. *Journal of Science Teacher Education*, 30(1), 44-62.
- Karlsson, G., & Nilsson, P. (2019). A web-based guiding framework for student teachers' self-reflective practice. *International Journal of Web-Based Learning and Teaching Technologies*, 14(3), 39-54.
- Kartal Günizi, & Kıcı Derya. (2020). Reflection through drama and concept maps for preservice teacher education in information communication technologies. *Education and Information Technologies*, 25(6), 4861-4881.
- Kavanagh, S. S. (2017). Practicing social justice: Toward a practice-based approach to learning to teach for social justice. *Reflective theory and practice in teacher education* (pp. 161-175). Springer, Singapore.
- Kaya, G., & Öz, S. (2021). Investigation of the effect of teacher training programs on reflective thinking: ALACT model. *International Journal of Progressive Education*, 17(2), 275-291.
- Kazazoglu, S., & Tokdemir Demirel, E. (2015). Reflective practicum class: Somebody's watching you. *ERIC: Reports* (pp. 425) *U.S. Department of Education*.
- Kennedy, K. & Archcambault, L. (2012) Offering preservice teachers field experiences in K-12 online learning: A national survey of teacher education programs. *Journal of Teacher Education*, 63(3), 185-200.

- Kent, A. M., & Simpson, J. L. (2009). Preservice teacher institute: Developing a model learning community for student teachers. *College Student Journal*, 43, 695+.
- Ketsing, J., Inoue, N., & Buczynski, S. (2020). Enhancing pre-service teachers' reflective quality on inquiry-based teaching through a community of practice. *Science Education International*, 31(4), 367-378. doi:10.33828/sei.v31.i4.5
- Kim, K., & Kim, J. (2017). Going beyond the gap between theory and practice: Rethinking teacher reflection with post structural insights. *Journal of Early Childhood Teacher Education*, 38(4), 289-303.
- Kim, Y., & Silver, R. E. (2016). Provoking reflective thinking in post observation conversations. *Journal of Teacher Education*, 67, 203+.
- Kincheloe, J. L. (2012). *Teachers as researchers (classic edition): Qualitative inquiry as a path to empowerment*. Routledge.
- Kitchenham, Barbara (2014). Procedures for Performing Systematic Reviews. *Keele, UK, Keele University*, 33(2004), 1-26.
- Kolb, D.A. (1984). *Experiential learning: Experience as the source of learning and development* (1st ed.). Prentice Hall.
- Kolb, D.A. (2015). *Experiential learning: Experience as the source of learning and development* (2nd ed.). Pearson Education.
- Kolb, D.A. & Fry, (1975). Toward an applied theory of experiential learning. *Theories of Group Process.*, 33-56.
- Korthagen, F. 1993. "The role of reflection in teachers' professional development". In *Teacher professional development: A multiple perspective approach*, Edited by: Kremer-Hayon, L., Vonk, H. and Fessler, R. 133–45. Amsterdam: Swets & Zeitlinger.
- Korthagen, F.A.J. (2001). *Linking practice and theory: The pedagogy of realistic teacher education*. Mahwah, NJ: Lawrence Erlbaum Associates.
- Korthagen, F.A.J., Vasalos, A. (2010). Going to the core: Deepening reflection by connecting the person to the profession. Lyons, N. (eds) *Handbook of Reflection and Reflective Inquiry*. Springer, Boston, MA.
- Kortjass, M. (2019). Reflective self-study for an integrated learning approach to early childhood mathematics teacher education. *South African Journal of Childhood Education*, 9.

- Körkkö, M. (2021). Towards meaningful reflection and a holistic approach: Creating a reflection framework in teacher education. *Scandinavian Journal of Educational Research*, 65(2), 258-275.
- Kosko, K. W., Ferdig, R. E., & Zolfaghari, M. (2021). Preservice teachers' professional noticing when viewing standard and 360 video. *Journal of Teacher Education*, 72, 284+.
- Kourieos, S. (2016). Video-mediated microteaching--A stimulus for reflection and teacher growth. *Australian Journal of Teacher Education*, 41(1).
- Kriewaldt, J., Walker, R., Morey, V., & Morrison, C. (2021). Activating and reinforcing graduates' capabilities: Early lessons learned from a teaching performance assessment. *Australian Educational Researcher*. Springer Science & Business Media B.V., 48(4), 681-696.
- Kuhn, D. (2005). *Education for thinking*. Cambridge, MA: Harvard University Press.
- Labaree, D. F. (2004). *The trouble with ed schools*. New Haven, CT: Yale University Press.
- LaBoskey, V. (1994). Development of reflective practice: a study of preservice teachers. New York: Teachers College Press.
- LaBoskey, V. (2003). A conceptual framework for reflection in preservice teacher. *Conceptualizing reflection in teacher development* (pp. 29-44). Routledge.
- LaBoskey, V. (2010). Teacher education and models of teacher reflection. *International Encyclopedia of Education*, (Vol. 7, pp. 629–634).
- Lamb, P., Lane, K., & Aldous, D. (2013). Enhancing the spaces of reflection: A buddy peer-review process within physical education initial teacher education. *European Physical Education Review*, 19(1), 21-38.
- Lamkin, S., & Nesloney, T. (2018). Spreading the practice of video reflection. *Educational Leadership*, 76(3), 50-54.
- Larrivee, B. (2000). Creating caring learning communities. *Contemporary Education*, 71(2).
- Larrivee, B. (2008a) Development of a tool to assess teachers' level of reflective practice. *Reflective Practice*, 9:3,341-360.
- Larrivee, B. (2008b). Meeting the challenge of preparing reflective practitioners. *The New Educator*, 4(2), 87–106.
- Larrivee, B. (2009). *Authentic classroom management: creating a learning community and building reflective practice* (3rd ed.). Pearson.



- Larrivee, B. (2010). What we know and don't know about teacher reflection. *The purposes, practices, and professionalism of teacher reflectivity: Insights for twenty-first-century teachers and students*, 137-162.
- Larrivee, B. (2012). *Cultivating teacher renewal: guarding against stress and burnout*. Rowman & Littlefield Publishers, Inc.
- Larrivee, B., & Cooper, J. M. (2006). *An educator's guide to teacher reflection*. Wadsworth Publishing Company.
- Lay, K., & McGuire, L. (2010). Building a lens for critical reflection and reflexivity in social work education. *Social Work Education*, 29(5), 539–550.
- Leaman, L. H., & Flanagan, T. M. (2013). Authentic role-playing as situated learning: Reframing teacher education methodology for higher-order thinking. *Studying Teacher Education*, 9(1), 45-61.
- Lebak. (2017). Using video-supported reflection in peer groups to increase instructional effectiveness. *Reflective Practice*, 18(1), 94–111.
- Ledger, S., & Fischetti, J. (2020). Micro-teaching 2.0: Technology as the classroom. *Australasian Journal of Educational Technology*, 36(1), 37-54.
- Lee, J. E. (2016). Toward a holistic view: Analysis of pre-service teachers' professional vision in field experiences and its implications. *Mathematics Teacher Education and Development*, 18(1), 4-19.
- Lee, O. (2010). Facilitating preservice teachers' reflection through interactive online journal writing. *The Physical Educator*, 67, 128+.
- Lehman, J., & Richardson, J. (2003). Virtual field experiences: Helping pre-service teachers learn about diverse classrooms through video conferencing connections with K-12 classrooms. In *EdMedia+ Innovate Learning* (pp. 1727-1728). Association for the Advancement of Computing in Education (AACE).
- Leighton, J. P., Guo, Q., & Tang, W. (2022). Measuring preservice teachers' attitudes towards mistakes in learning environments. *Learning Environments Research*, 25(1), 287-304.
- Lejonberg, E., Elstad, E., Sandvik, L.V., Solhaug, T., & Knut-Andreas, C. (2018). Mentors of preservice teachers: The relationships between mentoring approach, self-efficacy, and effort. *International Journal of Mentoring and Coaching in Education*, 7(3), 261-279.

- Letseka, & Zireva, D. (2013). Thinking: Lessons from John Dewey's how we think. *Academic Journal of Interdisciplinary Studies*.
- Liakopoulou, M. (2012). The role of field experience in the preparation of reflective teachers. *Australian Journal of Teacher Education*, 37(6), 42-54.
- Liston, D. and Zeichner, K. 1996. *Reflective teaching: An introduction*, Mahwah, NJ: Lawrence Erlbaum Associates, Inc.
- Littlewood, S. (2011). Transforming the practice of student teachers in the UAE through action research. *Education, Business and Society: Contemporary Middle Eastern Issues*, 4(2), 97-105.
- Liu, K. (2020). Critical reflection for transformative learning. *Springer International Publishing. DOI, 10*, 978-3.
- Lloyd, C. A. (2019). Exploring the real-world decision-making of novice and experienced teachers. *Journal of Further & Higher Education*, 43(2), 166-182.
- Loughran J. (2006). *Developing a pedagogy of teacher education: Understanding teaching and learning about teaching*. New York: Routledge.
- Loman, K., Nickens, N., Tye, N., Danley, A., Snider, K., McCoy, A., Gilbert, A. (2020). Peer coach during field experiences: Cultivating teacher candidates' peer feedback and reflective practices. *Journal of Early Childhood Teacher Education*, 41(1), 85-99.
- Lupinski, K., Jenkins, P., Beard, A., & Jones, L. (2012). Reflective practice in teacher education programs at a HBCU. *Educational Foundations*, 26, 81+.
- Lutovac, S., Kaasila, R., & Juuso, H. (2015). Video-stimulated recall as a facilitator of a preservice teacher's reflection on teaching and post-teaching supervision discussion: "A case study from Finland". *Journal of Education and Learning*, 4(3), 14-24.
- Lyons, N. (Ed.). (1998). *With portfolio in hand: Validating the new teacher's professionalism*. New York: Teachers College Press.
- Lyons, N. O. N. A. (2002). The personal self in a public story: The portfolio presentation narrative. *Narrative inquiry in practice: Advancing the knowledge of practice*, 87-100.
- Lyons, N. (2006). Reflective engagement as professional development in the lives of university teachers. *Teachers and Teaching: Theory into Practice*, 12(2), 151-68.
- Machi, L. A., & McEvoy, B. T. (2016). *The literature review: Six steps to success*. Corwin.
- Mann, Steve & Walsh, Steve. (2013). RP or 'RIP': A critical perspective on reflective practice. *Applied Linguistics Review*. 4. 10.1515/applirev-2013-0013.

- Mansour Almusharraf, A. (2020). Student teachers' development of reflective practice concerning teaching philosophy and peer observations. *Arab World English Journal*, 11(4), 547-564.
- Marcos, J. M., Sanchez, E., & Tillema, H. H. (2011). Promoting teacher reflection: What is said to be done: JET. *Journal of Education for Teaching*, 37(1), 21.
- Marshall, T. (2019). The concept of reflection: A systematic review and thematic synthesis across professional contexts. *Reflective Practice: International and Multidisciplinary Perspectives*, 20(3), 396–415.
- Marshall, T., Keville, S., Cain, A., & Adler, J. (2021) On being open-minded, wholehearted, and responsible: a review and synthesis exploring factors enabling practitioner development in reflective practice. *Reflective Practice*, 22:6,860-876.
- Mascio, B. (2018). Can you just tell me?!: A portrait of becoming a teacher. *Teacher Education Quarterly*, 45(4), 7-28.
- Mastrilli, T., & Sardo-Brown, D. (2002). Novice teachers' cases: A vehicle for reflective practice. *Education*, 123, 56+.
- Mau, & Harkness, S. S. (2020). The role of teacher educators and university supervisors to help student teachers reflect: From monological reflection toward dialogical conversation. *Reflective Practice*, 21(2), 171–182.
- Mauri, T., Clarà, M., Colomina, R., & Onrubia, J. (2017). Educational assistance to improve reflective practice among student teachers. *Revista Electrónica De Investigación Psicoeducativa Y Psicopedagógica*, 14(39), 287-309.
- McDonald, D., & Kahn, M. (2014). So, you think you can teach?' Reflection processes that support pre-service teachers' readiness for field experiences. *International Journal for the Scholarship of Teaching and Learning*, 8(2), n2.
- McDonald, M., Kazemi, E., Kelley-Petersen, M., Mikolasy, K., Thompson, J., Valencia, S. W., & Windschitl, M. (2014). Practice makes practice: Learning to teach in teacher education. *Peabody Journal of Education*, 89(4), 500–515.
- McEntee, G. H. (2003). *At the heart of teaching: A guide to reflective practice*. New York: Teachers College Press.
- McGarr, O. (2020). The use of virtual simulations in teacher education to develop pre-service teachers' behaviour and classroom management skills: Implications for reflective practice. *Journal of Education for Teaching: JET*, 46(2), 159-169.

- McGarr, O., & McCormack, O. (2014). Reflecting to conform? exploring Irish student teachers' discourses in reflective practice. *The Journal of Educational Research (Washington, D.C.)*, 107(4), 267-280.
- McGarr, O., McCormack, O., & Comerford, J. (2019). Peer-supported collaborative inquiry in teacher education: Exploring the influence of peer discussions on pre-service teachers' levels of critical reflection. *Irish Educational Studies*, 38(2), 245-261.
- McIntyre, & Dangel, J. R. (2009). Teacher candidate portfolios: Routine or reflective action? *Action in Teacher Education*, 31(2), 74-85.
- McNeilly, E., Nickel, J., Burns, A., Danyluk, P., Kapoyannis, T., & Kendrick, A. H. (2022). The Canadian preservice teacher education practicum: An examination of fostering university and school collaboration, mentor teacher guidance, and re-centering the practicum. *Interchange (0826-4805)*, 53(1), 65-74.
- Meder, A., Smalley, S., & Retallick, M. (2018). Evaluating first year agriculture teachers' use of reflection. *Journal of Agricultural Education*, 59(2), 289-304.
- Medina, R. A. (2020). Designing, facilitating, and supporting for the critical engagement of self-reflection, critical dialogue, and justice-oriented teaching. *Teacher Education Quarterly*, 47(1), 117-122.
- Medwell, J., & Wray, D. (2014). Pre-service teachers undertaking classroom research: Developing reflection and enquiry skills. *Journal of Education for Teaching*, 40(1), 65-77.
- Meierdirk, C. (2016). Is reflective practice an essential component of becoming a professional teacher? *Reflective Practice*, 17(3), 369-378.
- Meierdirk, C. (2017). Research and reflexivity: The discourse of female students completing teacher education. *Reflective Practice*, 18(4), 554-566.
- Mena-Marcos, J., Garcia-Rodriguez, M.L., & Tillman, H. (2013). Student teachers' reflective writing: What does it reveal? *European Journal of Teacher Education*, 36(2), 147-163.
- Menon, D., & Azam, S. (2021). Investigating preservice teachers' science teaching self-efficacy: An analysis of reflective practices. *International Journal of Science & Mathematics Education*, 19(8), 1587-1607.
- Menon, D., & Ngugi, R. (2022). Preservice secondary STEM teachers' reflective practice in microteaching: An analysis of journal writing and video-mediated reflections. *Teacher Education Quarterly*, 49(1), 29-52.

- Michalsky, T. (2021). Integrating video analysis of teacher and student behaviors to promote preservice teachers' teaching meta-strategic knowledge. *Metacognition & Learning*, 16(3), 595-622.
- Minitrop, Rick (2018). *Design-based school improvement: A practical guide for education leaders*. Harvard Education Press, Cambridge, MA.
- Minott, M. A. (2011). The impact of a course in reflective teaching on student teachers at a local university college. *Canadian Journal of Education*, 34(2), 131-147.
- Minott, M. A. (2012). A reflective approach to teaching practicum debriefing. *Teacher Education and Practice*, 25, 287.
- Miretzky, D. (2013). From rationalization to reflection: One teacher education law class. *Journal of the Scholarship of Teaching & Learning*, 13(5), 61-76.
- Moon, J. A. (2013). *Reflection in learning and professional development: Theory and practice*. Routledge.
- Moosa, R. (2019). Critical attributes of effective classrooms: Insights from classroom engagement. *Perspectives in Education*, 37(1), 87-100.
- Moseley, D., Baumfield, V., Elliott, J., & Higgins, S. (2005). *Frameworks for thinking: A handbook for teaching and learning*. Cambridge: Cambridge University Press.
- Moseley, C., & Ramsey, S. J. (2008). Elementary teachers' progressive understanding of inquiry through the process of reflection. *School Science and Mathematics*, 108, 49+.
- Muir, T., & Beswick, K. (2007). Stimulating reflection on practice: Using the supportive classroom reflection process. *Mathematics Teacher Education and Development*, 8(1), 74-93.
- Musaeva, C. (2013). The necessity of providing guidance for reflection in Inservice teacher training programs in Kyrgyzstan. *Advances in Research on Teaching*, 19, 443-456.
- Nagle, J. F. (2008, December). Becoming a reflective practitioner in the age of accountability. In *The Educational Forum* (Vol. 73, No. 1, pp. 76-86). Taylor & Francis Group.
- Nagro, S. A., Regan, K., Coogle, C., O'Brien, K. M., Raines, A. R., & Wade, C. B. (2022). Promoting reflective ability through a comprehensive field experience that combined video analysis and bug-in-ear coaching. *Journal of Special Education Technology*, 37(3), 399-412.

- Nagro, S. A. (2020). Reflecting on others before reflecting on self: Using video evidence to guide teacher candidates' reflective practices. *Journal of Teacher Education*, 71(4), 420-433.
- Nelson, F. L. (2015). What we see when we look in the mirror: Conceptions of and intentions for reflection by science teacher educators. *Cogent Education*, 2(1).
- Neuendorf, Kimberly A. (2002) *The content analysis guidebook*. Thousand Oaks, Calif.: Sage Publications.
- Nganga, L. (2019). Preservice teachers' perceptions and preparedness to teach for global mindedness and social justice using collaboration, critical thinking, creativity, and communication (4cs). *Journal of Social Studies Education Research*, 10(4), 26-57.
- Nishida, M. (2022). Sparking reflection in future educators: Haiku self-study. *Studying Teacher Education*, 18(3), 223-239.
- Nguyen, H. T. M., & Ngo, N. T. H. (2018). Learning to reflect through peer mentoring in a TESOL practicum. *ELT Journal: English Language Teaching Journal*, 72(2), 187-198.
- Oakley, G., Pegrum, M., & Johnston, S. (2014). Introducing e-portfolios to pre-service teachers as tools for reflection and growth: Lessons learnt. *Asia-Pacific Journal of Teacher Education*, 42(1), 36-50.
- Ogan-Bekiroglu. (2014). Quality of preservice physics teachers' reflections in their teaching portfolios and their perceived reflections: Do they intersect? *Action in Teacher Education*, 36(2), 157-170.
- Olson, J. D., & Rao, A. B. (2017). Adopting the edTPA as a high-stakes assessment: Resistance, advocacy, and reflection in Illinois. *Mid-Western Educational Researcher*, 29(4), 377-402.
- Oner, D., & Adadan, E. (2011). Use of web-based portfolios as tools for reflection in preservice teacher education. *Journal of Teacher Education*, 62, 477+.
- Oonk, W., Verloop, N., & Gravemeijer, K. P. E. (2020). Analyzing student teachers' use of theory in their reflections on mathematics teaching practice. *Mathematics Education Research Journal*, 32(4), 563-588.
- Osmanoglu, A., Isiksal, M., & Koc, Y. (2015). Getting ready for the profession: Preservice teachers' noticing related to teacher actions. *Australian Journal of Teacher Education*, 40(2), 29-51.
- Osmanoglu, A. (2016). Prospective teachers' teaching experience: Teacher learning through the use of video. *Educational Research*, 58(1), 39-55.

- Osterman, K. F., & Kottkamp, R. B. (2004). *Reflective practice for educators: Improving schooling through professional development*. Corwin Press.
- Ostorga, A. N. (2006). Developing teachers who are reflective practitioners: A complex process. *Issues in Teacher Education*, 15(2), 5-20.
- Özüdogru, M. (2021). Reflective thinking and teaching practices: A study on pre-service teachers' perceptions and improvement of reflection in the curriculum development course. *International Journal of Curriculum and Instruction*, 13(3), 2195-2214.
- Palacios, N., Onat-Stelma, Z., & Fay, R. (2021). Extending the conceptualization of reflection: Making meaning from experience over time. *Reflective Practice*, 22(5), 600–613.
- Panos, A. (2015). Reflections from preservice to novice teaching: One perspective on the role of ePortfolios. *Theory into Practice*, 54(4), 292-300.
- Paris, D., & Alim, H. S. (Eds.). (2017). *Culturally sustaining pedagogies: Teaching and learning for justice in a changing world*. Teachers College Press.
- Parker, J., & Heywood, D. (2013). Exploring how engaging with reflection on learning generates pedagogical insight in science teacher education. *Science Education*, 97, 410+.
- Parmigiani, D., Benigno, V., & Hidi, A. (2019). Cloud-based M-learning in a university context: Student-teachers' perspectives on the development of their own reflective thinking. *TechTrends: Linking Research and Practice to Improve Learning*, 63(6), 669-681.
- Pavlovich, K., Collins, E., & Jones, G. (2009). Developing students' skills in reflective practice: Design and assessment. *Journal of Management Education*, 33(1), 37-58.
- Pearson Education. (2022). *Resource Library - edTPA*. edTPA Resources. Retrieved December 12, 2022, from <https://edtpa.org/resource>.
- Penn-Edwards, S., Donnison, S., & Albion, L. (2016). Developing the inner teacher: Guiding the reflective practice of first year preservice teachers. *International Journal of Pedagogies & Learning*, 11(1), 10-21.
- Petticrew, M. & Roberts, H. 2006. *Systematic reviews in the social sciences: a practical guide*. Blackwell Publishing.
- Phan, H. P. (2008). Unifying different theories of learning: Theoretical framework and empirical evidence. *Educational Psychology*, 28(3), 325-340.

- Piaget, J. (1970). *Science of education and the psychology of the child* (D. Coltman, Trans.). Orion Press. (Original Work Published 1969).
- Piper, R. J. (2013). How to write a systematic literature review: a guide for medical students. *National AMR, fostering medical research*, 1, 1-8.
- Pita-Castro, A., & Castiblanco-Rincon, A. (2021). Pre-service English language teachers' levels of reflectivity during the process of identity construction in pedagogical practicum: A snowball? *HOW - A Colombian Journal for Teachers of English*, 28, 53+.
- Poole, J., & Wessner, J. (2003). *The transition from student to teacher: Developing a self-assessment culture for professionalism in teacher preparation programs*.
- Porntaweekul, S., Raksasataya, S., & Nethanomsak, T. (2016). Developing reflective thinking instructional model for enhancing students' desirable learning outcomes. *Educational Research and Reviews*, 11(6), 238-251.
- Power, E., & Waring-Thomas, P. (2019). Using an arts-based approach to develop critical reflection in initial teaching trainees. *Teacher Education Advancement Network Journal*, 11(1), 57-70.
- Prasad, G. (2021). Collage as a pedagogical practice to support teacher candidate reflection. *LEARNing Landscapes*, 14(1), 329-345.
- Pawan, F., & Fan, W. (2014). Sustaining expertise through collaborative/peer-mediated and individual reflections: The experiences of Chinese English language teachers. *Teacher Education Quarterly*, 41(4), 71-88.
- Pultrak, E. G., 2009. Guest editor's note. *Action in Teacher Education*, (31(2), 2-4.
- Pultrak, E. G. & Barnes, D. (2009). Reflectivity and teaching performance of novice teachers: Three years of investigation. *Action in Teacher Education*, 31(2), 33-46.
- Pultrak, E. G., Collier, S. T., Cristol, D., Dean, S., Dana, N. F., Foss, D. H., Fox, R. K., Gallavan, N. P., Greenwald, E., & Herner-Patnode, L. (2010). *The purposes, practices, and professionalism of teacher reflectivity: Insights for twenty-first-century teachers and students*. Lanham, MD: Rowman & Littlefield Education.
- Raider-Roth. (2011). The place of description in understanding and transforming classroom relationships. *The New Educator*, 7(3), 274-286.
- Ragawanti, D. T. (2015). Cultivating pre-service teachers' classroom management skills through teaching practicum: A reflective practice. *TEFLIN Journal*, 26(1), 117-128.
- Reagan, T.G., Case, C.W., and Brubacher, J.W. (2000). *Becoming a reflective educator: How to build a culture of inquiry in the schools*. Thousand Oaks, CA: Corwin Press.



- Redden, K. C., Simon, R. A., & Aulls, M. W. (2007). Alignment in constructivist-oriented teacher education: Identifying pre-service teacher characteristics and associated learning outcomes. *Teacher Education Quarterly*, 34, 149.
- Researchers from the University of Wageningen report on findings in computer-assisted learning (using 360-degree videos in teacher education to improve preservice teachers' professional interpersonal vision). (2019). *Education Letter*.
- Richards, K. A., Hemphill, M. A., & Wilson, W. J. (2015). Student-authored case studies as a reflective component of teacher education. *The Physical Educator*, 72, 117+.
- Rieger, A., Radcliffe, B. J., & Doepker, G. M. (2013). Practices for developing reflective thinking skills among teachers. *Kappa Delta Pi Record*, 49(4), 184-189.
- Rigney, J., Ferland, T., & Dana, N. F. (2019). Understanding teacher reflectivity in contemporary times: A (re) review of the literature. *The New Educator*, 15(4), 305-326.
- Russell, T. (2018). A teacher educator's lessons learned from reflective practice. *European Journal of Teacher Education*, 41(1), 4-14.
- Robertson, L., Hughes, J. M., & Smith, S. (2012). "Thanks for the assignment!": Digital stories as a form of reflective practice. *Language & Literacy: A Canadian Educational E-Journal*, 14(1), 78-90.
- Rosen. (2008). Impact of Case-Based Instruction on Student Teachers' Reflection on Facilitating Children's Learning. *Action in Teacher Education*, 30(1), 28-36.
- Robinson, K. (2021). Critical reflection: A student's perspective on a 'pedagogy of discomfort' and self-compassion to create more flexible selves. *Reflective Practice*, 22(5), 641-652.
- Robinson, M., & Rousseau, N. (2018). Disparate understandings of the nature, purpose, and practices of reflection in teacher education. *South African Journal of Childhood Education*, 8.
- Rodgers, C. (2002a). Seeing student learning: Teacher change and the role of reflection. *Harvard Educational Review*, 72(2), 230.
- Rodgers, C. (2002b). Defining reflection: Another look at John Dewey and reflective thinking. *Teachers College Record*, 104(4), 842-66.
- Rodgers, C., LaBoskey, V.K. (2016). Reflective Practice. Loughran, J., Hamilton, M. (eds) *International Handbook of Teacher Education*. Springer, Singapore.

- Rodgers, C. R., & Scott, K. H. (2008). The development of the personal self and professional identity in learning to teach. *Handbook of research on teacher education* (pp. 732-755). Routledge.
- Roessger, Kevin, M. (2015) But does it work? Reflective activities, learning outcomes and instrumental learning in continuing professional development. *Journal of Education and Work* 28:1, pages 83-105.
- Ruef, J. (2020). Visions of the possible: Using drawings to elicit and support visions of teaching mathematics. *Mathematics Teacher Educator*, 8(2), 59-80.
- Rust, F., & Bergey, N. L. (2014). Developing action-oriented knowledge among preservice teachers: Exploring learning to teach. *Teacher Education Quarterly*, 41(1), 63-83.
- Russell, T. (2018). A teacher educator's lessons learned from reflective practice. *European Journal of Teacher Education*, 41(1), 4–14.
- Ryan, P. A., & Townsend, J. S. (2012). Promoting critical reflection in teacher education through popular media. *Action in Teacher Education*, 34(3), 239-248.
- Ryken, A. E., & Hamel, F. L. (2016). Looking again at "surface-level" reflections: Framing a competence view of early teacher thinking. *Teacher Education Quarterly*, 43, 31.
- Sahin, F., Sen, M., & Dincer, C. (2019). Early childhood preservice teachers' experiences with reflective journal writing. *Eurasian Journal of Educational Research (EJER)*, (84), 93-114.
- Salajan, F. D., & Duffield, S. K. (2019). Enhancing pre-service teachers' professional practice through reflection on the action of others: The development of the heterospective reflection framework informed by virtual field experiences. *Teacher Educator*, 54(4), 333-358.
- Sams, B. L., & Dyches, J. (2016). Is this reflection? Examining reflective discourse in teacher education standards and performance assessments. *SoJo Journal: Educational Foundations and Social Justice Education*, 2(1), 75-85.
- Santagata, R., & Angelici, G. (2010). Studying the impact of the lesson analysis framework on preservice teachers' abilities to reflect on videos of classroom teaching. *Journal of Teacher Education*, 61, 339+.
- Schön, D. (1983). *The reflective practitioner: How professionals think in action*. New York: Basic Books.
- Schön, D. (1987). *Educating the reflective practitioner*. San Francisco: Jossey-Bass.

- Seitova, M. (2019). Student teachers' perceptions of reflective practice. *International Online Journal of Education & Teaching*, 6(4), 765-772.
- Shek, M. M., Leung, K., & To, P. Y. (2021). Using a video annotation tool to enhance student-teachers' reflective practices and communication competence in consultation practices through a collaborative learning community. *Education and Information Technologies*, 26(4), 4329-4352.
- Sherin, M. G., & Dyer, E. B. (2017). Teacher self-captured video: Learning to see. *Phi Delta Kappan*, 98(7), 49-54.
- Shin, J. (2021). Preservice music teachers in Korea and their collaborative reflection with peers. *International Journal of Music Education*, 39(4), 371-382.
- Siry, C., & Martin, S. N. (2014). Facilitating reflexivity in preservice science teacher education using video analysis and cogenerative dialogue in field-based methods courses. *EURASIA Journal of Mathematics, Science & Technology Education*, 10(5), 481-508.
- Slade, M. L., Burnham, T. J., Catalana, S. M., & Waters, T. (2019). The impact of reflective practice on teacher candidates' learning. *International Journal for the Scholarship of Teaching and Learning*, 13(2).
- Spatt, I., Honigsfeld, A., & Cohan, A. (2012). A self-study of culturally responsive pedagogy and reflective practice. *Teacher Education and Practice*, 25, 52.
- Spitzner, D. J., & Meixner, C. (2021). Significant conversations, significant others: Intimate dialogues about teaching statistics. *The International Journal for Academic Development*, 26(3), 292-306.
- Stahlhut, R. G., & Hawkes, R. R. (1997). *An examination of reflective thinking through a study of written journals, telecommunications, and personal conferences*.
- Stanley, C. (1998). A framework for teacher reflectivity. *TESOL Quarterly*, 32(3), 584-591.
- Stevenson, H. J., & Cain, K. J. (2013). Talking to paper doesn't work: Factors that facilitate preservice teacher reflection. *Teacher Education Quarterly*, 40, 75+.
- Strand, K. (2006). Learning to inquire: Teacher research in undergraduate teacher training. *Journal of Music Teacher Education*, 15, 29+.
- Stump, S. L. (2010). Reflective tutoring: Insights into preservice teacher learning. *School Science and Mathematics*, 110, 47+.
- Sulzen, J. T. (2011). Identifying evidence of reflective ability in preservice teacher electronic portfolios. *Journal of Technology and Teacher Education*, 19, 209+.

- Sun, J., & van Es, E. A. (2015). An exploratory study of the influence that analyzing teaching has on preservice teachers' classroom practice. *Journal of Teacher Education*, 66, 201+.
- Sutherland, K. A. (2013). The importance of critical reflection in and on academic development. *International Journal for Academic Development*, 18(2), 111–113.
- Sydnor, J. (2016). Using video to enhance reflective practice: Student teachers' dialogic examination of their teaching. *The New Educator*, 12(1), 67-84.
- Tak, L. C. (2020). Student teachers' perception of reflective journal writing in placement practicum: Experience from a Hong Kong institution. *Asia-Pacific Journal of Research in Early Childhood Education*, 14(2), 27-51.
- Terrell, S. R. (2016). *Writing a proposal for your dissertation: guidelines and examples*. The Guilford Press.
- Thompson, N. (2006). *Promoting workplace learning*. Bristol. The Policy Press.
- Thompson, N. & Pascal, J. (2012). Developing critically reflective practice. *Reflective Practice*, 13(2), 311–325.
- Thorvaldsen, S., & Madsen, S. S. (2020). Perspectives on the tensions in teaching with technology in Norwegian teacher education analyzed using Argyris and Schön's theory of action. *Education and Information Technologies*, 25(6), 5281-5299.
- Ting, K. (2013). Student teachers' reflective practice on a tutorial teaching approach. *International Education Studies*, 6(7).
- Töman, U., Odabasi Çimer, S., & Çimer, A. (2014). Analysis of pre-service science teachers' views about the methods which develop reflective thinking. *Online Submission*, 5(4), 162-172.
- Töman, U. (2017). Investigation of reflective teaching practice effect on training development skills of the pre-service teachers. *Journal of Education and Training Studies*, 5(6), 232-239.
- Toom, A., Husu, J., & Patrikainen, S. (2015). Student teachers' patterns of reflection in the context of teaching practice. *European Journal of Teacher Education*, 38(3), 320-340.
- Trier, J. D. (2000). Using popular "school films" to engage student teachers in critical reflection. *Annual Meeting of the American Educational Research Association*. April, (24-28), 2000.

- Turan, M. B., & Koç, K. (2019). The analysis of the relationship between teaching/learning conceptions and reflective thinking in physical education teacher candidates. *International Education Studies*, 12(3), 116-123.
- Ungunmerr, M. R. (2017). To be listened to in her teaching. Dadirri: Inner deep listening and quiet still awareness. *Earth Song Journal: Perspectives in Ecology, Spirituality and Education*, 3(4), 14-15.
- van Manen, M. (1977). Linking ways of knowing with ways of ways of being practical. *Curriculum and Inquiry*. 6(3), 205-28.
- van Seggelen-Damen, I. C., Van Hezewijk, R., Helsdingen, A. S., & Wopereis, I. G. (2017). Reflection: A Socratic approach. *Theory & Psychology*, 27(6), 793-814.
- Vijaya Kumari, S. N., & Naik, S. P. (2016). Effect of reflective teaching training and teaching aptitude on teaching skills among elementary teacher trainees. *Journal on Educational Psychology*, 9(3), 11-23.
- Vogelsang, C., Kulgemeyer, C., & Riese, J. (2022). Learning to plan by learning to reflect?—Exploring relations between professional knowledge, reflection skills, and planning skills of preservice physics teachers in a one-semester field experience. *Education Sciences*, 12(7), 479.
- Vogt, P. W., Vogt, E. R., Gardner, D. C., & Haeffele, L. M. (2014). *Selecting the Right Analyses for Your Data Quantitative, Qualitative, and Mixed Methods*. Guilford Publications.
- Vogt, W. P., Gardner, D. C., & Haeffele, L. M. (2012). *When to use what research design* (First). Guilford Press.
- Voss, T. & Kunter, M. (2020). “Reality shock” of beginning teachers? Changes in teacher candidates’ emotional exhaustion and constructivist-oriented beliefs. *Journal of Teacher Education*, Vol. 71, Number 3, May/June.
- Wackerhausen, S. 2015. “Erfaringsrom, handlingsbåren kunnskap og refleksjon [Spaces of experience, practical knowledge and reflection.” In *Praktisk kunnskap som profesjonsforskning [Research on Practical Knowledge]*, edited by J. McGuirk and J. Methi. Bergen: Fagbokforlaget 81-100.
- Wagner, K. (2006). Benefits of reflective practice. *Leadership*, 36(2), 30-32.
- Walker, J. (2015). Cats, kayaks, and other artifacts: Using play props to explore reflective practice with early childhood student teachers. *YC Young Children*, 70(5), 34-41.
- Wall, A. (2018). Encouraging teacher candidates to cultivate habits of reflection. *Becoming: Journal of the Georgia Association for Middle Level Education*, 29(1), 21-24.

- Walter, C. M. (2020). *Developing reflective practitioners online: How can anticipatory reflection support an internship?* (Ph.D.). Available from *ProQuest Dissertations & Theses Global*. (2572712565).
- Walshe, N., & Driver, P. (2019). Developing reflective trainee teacher practice with 360-degree video. *Teaching & Teacher Education*, 78, 97-105.
- Ward, J. R., & McCotter, S. S. (2004). Reflection as a visible outcome for preservice teachers. *Teaching and teacher education*, 20(3), 243-257.
- Weber. (2013). *Can preservice teachers be taught to become reflective thinkers during their first internship experience?* ProQuest Dissertations Publishing.
- Wei, A. O., Swanto, S., AlSaqqaf, A., & Jia, W. O. (2021). Promoting reflective practice via the use of 5-step copora reflective model: A case study of east Malaysian ESL pre-service teachers. *TEFLIN Journal: A Publication on the Teaching & Learning of English*, 32(1), 72-96.
- Weiner, J. M., & Lamb, A. J. (2020). Exploring the possibilities and limits to transfer and learning: Examining a teacher leadership initiative using the theory of action framework. *Journal of Educational Change*, 21(2), 267-297.
- Wegner, C., Remmert, K., & Strehlke, F. (2014). Professionalizing the self-reflection of student teachers by using a wiki. *Educational Technology*, 54(4), 38-42.
- Wetzel, M., Hoffman, J. V., Maloch, B., Saba, K.V., Taylor, L. A., Svrcek, N. S., Lavender, H. (2018). Coaching elementary preservice teachers: Hybrid spaces for cooperating teachers and university field supervisors to collaborate. *International Journal of Mentoring and Coaching in Education*, 7(4), 357-372.
- Wetzel, M. M., Hoffman, J. V., Roach, A. K., & Russell, K. (2018). Practical knowledge and teacher reflection from a practice-based literacy teacher education program in the first years: A longitudinal study. *Teacher Education Quarterly*, 45(1), 87-111.
- Wideen, M., Mayer-Smith, J., & Moon, B. (1998). A critical analysis of the research on learning to teach: Making the case for an ecological perspective on inquiry. *Review of educational research*, 68 (2), 130-178.
- Wiens, P. D., LoCasale-Crouch, J., Cash, A. H., & Escudero, F. R. (2021). Preservice teachers' skills to identify effective teaching interactions: Does it relate to their ability to implement them? *Journal of Teacher Education*, 72, 180+.
- Williams, A. T. (2020). Growing student teachers' reflective practice: Explorations of an approach to video-stimulated reflection. *Reflective Practice*, 21(5), 699-711.

- Woody, R. H. (2001). Reflective classroom management. *Teaching Music*, 8, 46.
- Wright, N. (2010). Twittering in teacher education: Reflecting on practicum experiences. *Open Learning*, 25(3), 259-265.
- Yaegashi, S. F. R., Neto, A. S., Ruiz, N. F., & Gasparin, J. L. (2021). Leontiev's theory of activity and Donald Schon's reflective professor: Reflections on teacher education. *Acta Scientiarum: Education*, 43, 1.
- Yee, B., Abdullah, T., Abdullah, M. (2022). Exploring pre-service teachers' reflective practice through an analysis of six-stage framework in reflective journals. *Reflective Practice* 23:5, pages 552-564.
- Yuan, R., Mak, P., & Yang, M. (2022). 'We teach, we record, we edit, and we reflect': Engaging pre-service language teachers in video-based reflective practice. *Language Teaching Research*, 26(3), 552-571.
- Yüksel, İ, & Başaran, B. Ç. (2020). Reflective peer feedback in the practicum: Qualitative and quantitative practices. *Turkish Online Journal of Qualitative Inquiry*, 11(1), 85-109.
- Xiao, B., & Tobin, J. (2018). The use of video as a tool for reflection with preservice teachers. *Journal of Early Childhood Teacher Education*, 39(4), 328-345.
- Zawacki-Richter, O., Kerres, M., Bedenlier, S., Bond, M., & Buntins, K. (Eds.). (2020). *Systematic reviews in educational research: Methodology, Perspectives*. SPRINGER VS.
- Zeichner, K. (1999). The new scholarship in teacher education. *Educational Researcher*, 28(9), 4-15.
- Zeichner, K. (2006). Reflection of a university-based teacher educator on the future of college-and university-based teacher education. *Journal of Teacher Education*, 57(3), 326-40.
- Zeichner, K., McDonald, M., Cohan, A., & Honigsfeld, A. (2011). Practice-based teaching and community field experiences for prospective teachers. *Breaking the mold of preservice and inservice teacher education: Innovative and successful practice for the 21st century*, 45-54.
- Zeichner, K., & Bier, M. (2015). Opportunities and pitfalls in the turn toward clinical experience in US teacher education. In *Rethinking field experiences in preservice teacher preparation* (pp. 20-46). Routledge.

- Zoellner, B. P., Chant, R. H., & Lee, K. (2017). Do we do Dewey? Using a dispositional framework to examine reflection within internship professional development plans. *Teacher Educator*, 52(3), 203-221.
- Zulfikar, T. & Mujiburrahman (2018) Understanding own teaching: becoming reflective teachers through reflective journals, *Reflective Practice*, 19:1, 1-13.
- Zwozdiak-Myers, P. (2012). *The teacher's reflective practice handbook: Becoming an extended professional through capturing evidence-informed practice*. New York: Routledge.



## APPENDIX A

## Diverse Frameworks for Analyzing the Structure of Reflective Thinking

Researcher(s)	Framework	Purpose	Results
Astika, 2014	Researcher-adapted framework (adapted from Smith, 2011)  Framework included emotions	To study the levels of reflective thinking in written self-reflections	Improved reflective thinking for 40, PSTs, English Language Arts, 6-12
Barry & Caravan, 2020	Lee's Framework (Lee, 2005)	To study the levels of reflective thinking in online discussion posts	No change for 20 PSTs, Music, Middle School
Cohen-Sayag & Fischl, 2012	Journal Analysis (Zimmet, Roznau & Verner, 1999)	To study the impact of facilitation on reflective thinking	Mixed results: improved reflective thinking for PSTs receiving feedback; no change for control group receiving no feedback; 24 PSTs, Special Education  Evidence of critical reflective thinking
Day et al., 2022	Reflective Practice Questionnaire (Priddis & Rogers, 2018)	To study differences between three programs in developing reflective thinking	Improved levels of reflective thinking; significant statistical differences between two programs for 467 PSTs, K-12
Endacott, 2016	The Framework for Teaching Evaluation (adapted from a teacher evaluation framework)	To study course-level effectiveness in developing reflective thinking	Improved reflective thinking in two key areas of the framework: instructional decisions and classroom management for 10, PSTs, Social Studies, 6-12
Foong et al., 2018	Framework for Reflective Learning (Boud et. al, 1985)  Framework on Facilitation Style (Young and MacPhail, 2016)	To study the impact of facilitation on reflective thinking	Mixed results: improved reflective thinking for PSTs receiving collaborative facilitation; no change for PSTs receiving instructive facilitation; 4 PSTs, pre-K  Evidence of critical reflective thinking
Jones & Ryan, 2014	Hierarchy of Reflection (Kreber & Cranton, 2000)	To study course-level effectiveness in developing reflective thinking	No change for 8, PSTs, K-12

Kaya & Oz, 2021	ALACT Model (Korthagen, 2001)  Researcher-adapted framework (adapted from the Reflective Thinking Scale, Semerci, 2007)	To study program effectiveness in developing reflective thinking	Improved reflective thinking, for 277 PSTs, K-12
Lebak, 2017	Researcher-adapted framework (adapted from Dewey, 1910; Rodgers, 2002; van Es & Sherin, 2010)	To study course-level effectiveness in developing reflective thinking	Improved reflective thinking for 5, PSTs, grades 4-7
Slade et al., 2019	Framework for Reflective Practice (Rolfe et al., 2001)  Levels of Reflection (Harland & Wondra, 2011)	To study program effectiveness in developing reflective thinking	Improved reflection; 2 examples of critical reflection for 243 PSTs, K-12
Toom et al., 2015	Researcher-adapted framework (Husu, Toom, and Patrikainen 2008)	To study program effectiveness in developing reflective thinking	Improved reflective thinking for 8 PSTs, K-5  Evidence of critical reflective thinking
Zoellner et al., 2017	Reflective Dispositions Framework (Dewey, 1964)	To study effectiveness in developing dispositions for reflective thinking in a program-level annual professional development plan	Improved dispositions for reflective thinking; uneven development within the three categories for PSTs, Math, Science, & Social Studies, 6-12

## APPENDIX B

## Diverse Frameworks to Assess Levels of Reflective Thinking

Researcher(s)	Framework	Purpose	Results
Catalana, 2020	Framework of Four Levels of Reflection for Teacher Education (Harland & Wondra, 2011)  Researcher-adapted Torrance Tests of Creative Thinking-Figural, form a (Torrance, 1998)	To study the levels of reflective thinking in written self-reflections and to compare levels of reflection with levels of creative thinking	Improved reflective thinking; a strong correlation between levels of reflection and levels for creativity for 47 PSTs, K-12
Calandra et al., 2018	Researcher-adapted rubric (adapted from Hatton & Smith, 1995)	To study the levels of reflective thinking in written self-reflections through comparative uses of video and audio recall	Improved reflective thinking; a strong correlation between high levels of reflection and access to video-recall of a lesson observation for 28 PSTs, Science, 6-12
Hagevik et al., 2012	Researcher-adapted Rubric for Critical Reflection (Ward & McCotter, 2004)	To study the levels of reflective thinking in teaching portfolios	Improved reflective thinking; for 20 PSTs, Science, Social Studies, English Language, 6-8
Mena-Marcos et al., 2013	Levels of Reflection (adapted from Hatton & Smith, 1995)	To study the levels of reflective thinking in written self-analysis of teaching	Improved reflective thinking; for 104 PSTs, K-2
Ogan-Bekiroglu, 2014	Reflective Learning Model (Brown & Irby, 2001)  Researcher-designed domain-specific rubric (Ogan-Bekiroglu, 2014)	To study the levels of reflective thinking in teaching portfolios.	Improved reflective thinking; the researcher concluded that a formative assessment approach might improve the levels of reflective thinking for 12 PSTs, Physics, 6-12
Oner & Adadan, 2011	Reflective Thinking Levels (adapted from Hatton & Smith, 1995)	To study the levels of reflective thinking in teaching e-portfolios.	Improved reflective thinking in recognizing discrepancies between experiences, goals, and observations for 19 PSTs, Science, 6-12
Santagata & Angelici, 2010	Learning to Notice Framework (van Es, 2002)  Researcher-adapted Lesson Analysis Framework (Santagata et al., 2007)	To study the levels of reflective thinking in written lesson analysis	Improved reflective thinking on lesson observations for 38 PSTs, Math

## APPENDIX C

## Integrated Processes Teacher Educators used to Develop Preservice Teacher Reflective Practice

Researcher(s)	Framework	Processes	Results
Addleman et al., 2014	Courage to Lead Group Framework (Palmer, 2004)	Collaborative discussions while in the Study Abroad program	Improved reflective thinking for 9 PSTs, K-12
Cheng, 2020	Reflective Thinking Levels (Hatton & Smith, 1995)	Photos, interviews, journals	Improved reflective thinking for 5 PSTs, kindergarten
Dayal & Alpana, 2020	Metacognitive Framework (Krathwohl, 2010)	Video-recorded lessons with peer, TE, feedback; written self-assessment	Improved reflective thinking for 25 PSTs, grades 6-12
Demissie, 2015	Philosophical Community of Enquiry (Lipman, 2003)	Drawn reflections of conceptual knowledge of teaching, self and collaborative reflections, surveys, interviews	Improved reflective thinking for 11 PSTs, K-12
Günizi, K. & Derya, K. (2020)	Framework for Concept Maps (Schaal, 2010)	Concept maps, drama, written reflection	Improved reflective thinking; improved number of PSTs entering a teaching career upon graduation for 40 PSTs, Technology, Secondary
Harding et al., 2021	Learning to Notice Framework (van Es & Sherin, 2002)	Audio transcriptions, written reflections, verbal reflections with TE	Improved reflective thinking for 81 PSTs, Math, grades K-5
Hawkins & Park Rogers, 2016	Situated Learning Framework (Lave, 1991)  Pedagogical Content Knowledge Framework (Shulman, 1986)	Community of Practice with video-assisted recall of lesson observations	Improved reflective thinking for 5 PSTs, Science, grades K-5
Heinrich & Donham, 2015	Unlearning Certainty Framework (Kuhlthau, 2004)  Framework included emotions	Inquiry study that included capstone paper; focus groups; questionnaires	Improved reflective thinking for 48 PSTs, K-12
Kajder & Parkes, 2012	Levels of Reflection (Larrivee, 2008)	Unstructured blogs, vlogs, and blogs on blogs	Improved reflective thinking for 6 PSTs, ELA, Music, grades K-12
Karlstrom & Hamza, 2019	Researcher-adapted framework (adapted from Dewey, 1910; Rodgers, 2002)	Peer planning, co-teaching, peer lesson observations, video, peer debriefing, written reflections	Improved reflective thinking for 36 PSTs, Science, grades 6-8
Karlsson & Nilsson, 2019	Content Representation for Planning and Reflection (Hume & Barry, 2011)	Planning and video-annotated lesson observations	Improved reflective thinking; improved pedagogical insight for 56 PSTs, Science

			evidence of critical thinking
Kourieos, 2016	Researcher-adapted framework (adapted from Schön, 1987; Lee & Wu, 2006)	Video and peer debriefings, written reflections	Improved reflective thinking for 11 PSTs, ESOL, grades K-12
Lamb et al., 2013	Researcher-adapted survey for reflective thinking (adapted from van Manen, 1977; Zeichner & Liston, 1987)	Self and peer reflection through online discussion boards, surveys, video record lessons	Improved thinking for 16 PSTs, Physical Education, grades K-12
Loman et al., 2020	Researcher-adapted Peer Coaching Framework (adapted from Lu, 2010)	Peer coaching and feedback	Improved reflective thinking for 40 PSTs, Math, Science, English Language, grades 1-2
Lutovac et al., 2015	Learning to Notice Framework (Sherin & van Es, 2008)	Video-recorded lessons, mentor teacher debriefs, written reflections, TE interviews	Improved reflective thinking for 15 PSTs, Math, grades K-5
McGarr et al., 2019	Differentiation of Two Dimensions of Reflections (Lane et al., 2014)	Vignette scenario as content for baseline essay, collaborative discussions, “hunting assumptions” final reflection	Improved reflective thinking; shift self-focus to multiple perspectives for 52 PSTs, Physical Education, Technology, ELA, Math, Geography, Science, 6-12
Nagro, 2020	Danielson Framework, (Danielson, 2018)	Videos teaching; self-videos of teaching; reflective essays	Improved reflective thinking for 13 PSTs, Special Education, K-12
Parker & Heywood, 2013	Subject Matter Learning Audit (adapted from Shulman, 1986, 1987)	Subject matter learning audit; collaborative discussions	Improved reflective thinking; improved pedagogical insight for 12 PSTs, Science, grades K-2
Shek et al., 2021	Researcher-adapted framework (adapted from Ryan & Ryan, 2013)	Video-recorded lessons, video annotation, peer debriefs, written reflections	No change in quality of reflective thinking for 80 PSTs, K-12
Shin, 2021	Researcher-adapted framework (adapted from Taggart & Wilson, 1999; van Manen, 1977)  TE noted emotions	Video of exemplar teaching; journals, interviews, observations	Mixed results: technical levels of reflective thinking in isolation; improved reflective thinking with peer support for 18 PSTs, Music, grades 6-12
Siry & Martin, 2014	Researcher-adapted framework (adapted from Schön, 1987; Sherin & van Es, 2009)	Co-planning, video-recorded lessons, collaborative debriefing, written reflections	Improved reflective thinking for 36 PSTs, Science, grades K-12
Sydnor, 2016	Researcher-adapted framework (adapted from Vygotsky, 1978; Lave & Wenger Communities of	Video-recorded lessons, written reflections, mentor feedback & integration with	Improved reflective thinking; a shift in focus from self to others and from on-action to

	Practice, 1991)	professional goals	for-action reflective thinking for 5 PSTs, grades K-5
Williams, 2020	Researcher-adapted framework (adapted from Mackinnin's Clue Structure, 1987)	Video-stimulated reflection (VSR); collaborative reflection, TE interviews	Improved reflective thinking with cautious concerns on facilitation for 8 PSTs, Science, K-12
Yee et al., 2022	Researcher-adapted framework (adaPSTed from Gibbs, 1988)  Framework included emotions	Lesson observations, peer feedback, reflective journals, interviews for 20 PSTs, grades K-2.	Mixed results: descriptive levels of reflective thinking in isolation; deepened reflective thinking with peer support for 20 PSTs, grades K-2
Yuan et al., 2022	Researcher-adapted framework (adapted from Rodgers, 2002)	Video-recorded lessons, written reflections	Improved reflective thinking for 6 PSTs, ESOL

## APPENDIX D

### Pedagogical Tools: Collaborative Discussions, Writing, Video, and Visual Thinking

Collaborative Discussions	Researcher(s)	Framework	Pedagogical tool	Results
	Carlson, 2019	Researcher-adapted framework (adapted from Zeichner & Liston, 2013)	Critical Friends Group	Mixed results; some improved reflective thinking for 3 PSTs, 6-12
	Çimen & Çakmak, 2020	Reflective Thinking Tendency Scale (Semerci, 2007)  Researcher-adapted framework (adapted from Pintrich et al., 1991)	Written and verbal feedback from peer and expert mentors	Improved reflective thinking for 33 PSTs, K-12
	Clarà et al., 2019	Continuum of Facilitation Styles (Foong, Nor, & Nolan, 2018)	Collaborative groups: facilitation with a focus on problem solving	Improved reflective thinking; caution on the contextual nature of study for 14 PSTs / 1 TE, grades K-5
	Clarke, 2011	Researcher-adapted survey for reflective thinking (adapted from Cochran-Smith, 1991)	Think aloud strategies (peer reflective verbalization)	Mixed results: some improved reflective thinking for 156 PSTs, grades K-12
	Day, 2013	Peer Observation Teacher Reflection (Cosh, 1999)  Peer Coaching Framework (Vacilotto & Cummings, 2007)	Self and peer reflections from lesson observations	Improved reflective thinking for 15 PSTs, ESOL, K-12
	Kesting et al., 2020	Levels of Reflection (Hatton & Smith, 1995)  5 E Framework (Biological Sciences Curriculum Study, 1987)	Community of Practice, cycles of plan, study, do, act	Improved reflective thinking for 2 PSTs, Science, grades 6-12  evidence of critical levels of reflective thinking
	Nguyen & Ngo, 2018	Levels of Reflection (Hatton & Smith, 1995)	Peer observations and debriefings	Improved reflective thinking for 32 PSTs. ESOL, grades K-12.
Writing	Boyd et al., 2013	Apprenticeship of Observation (Feiman-Nemser, 1983)	Blogs	Mixed results: some improved reflective thinking for 31 PSTs, K-5
	Farr & Riordan, 2015	Community of Inquiry Framework (Garrison & Anderson, 2000)  Framework included emotions	Blogs	Mixed results; some improved reflective thinking for 21 PSTs, ESOL
	Ilin, 2020	Researcher-adapted framework (adapted from Hatton & Smith,	Journals	Mixed results; some improved reflective

Writing continued		1995) Reflective Thinking (Taggart & Wilson, 2005)		thinking for 59 PSTs, ESOL, grades K-12
	Ozudogru, 2021	Levels of Reflection (Hatton & Smith, 1995)	Journals	Mixed results; some improved reflective thinking for 12 PSTs, K-5
	Parmigiani & Hidi, 2019	Reflective Thinking (Taggart & Wilson, 2005)	Guided questions via mobile devices	Improved reflective thinking for 12 PSTs, P-K
Video	Theelen et al., 2019	Learning to Notice Framework (van Es & Sherin, 2002)	Video	Improved reflective thinking for 141 PSTs, English Language, Econ, Geography, Math, Science, World Languages, grades 6-12
	Xiao & Tobin, 2018	Researcher-adapted framework (adapted from Fuller & Manning, 1973)	Video	Improved reflective thinking for 23 PSTs, grades K-5
Visual Thinking	Hahl, 2021	Reflective Thinking (Korthagan & Valoso, 2005)	Photo report	Improved reflective thinking for 27 PSTs, World Languages, grades 6-12