

THE RELATIONSHIP BETWEEN REFLECTION AND CREATIVITY: CAN TEACHER
PREPARATION COURSES BE DESIGNED TO CULTIVATE REFLECTIVE EDUCATORS?

by

SARAH MARIE CATALANA

(Under the Direction of Bonnie Cramond)

ABSTRACT

Teacher preparation programs strive to cultivate future educators who can successfully meet the unique needs of today's increasingly diverse student populations. Given the juxtaposition between pre-service teachers (PSTs) who are predominantly white and female (Bitterman, Goldring, & Gray, 2013) and student populations which have recently reached a "majority minority" (Maxwell, 2014), it is particularly important that PSTs resist temptations to teach the way they were taught and creatively adapt practices to meet the needs of all students (Badiali & Hammond, 2002; Badiali, Nolan, Zembal-Saul, & Manno, 2011; Borg, 2004; Gay, 2000; Lortie, 1975). Although teacher preparation programs emphasize the importance of cultivating reflective practitioners who critically examine and innovatively improve their practices (Grossman, 2008; NCTAF, 1996; 2007; Ostorga, 2006), reflection remains an enigmatic construct and efforts to develop the reflective practice are vague at best (Choy & Oo, 2012; James, 2007; Rodgers, 2002). The two studies included in this dissertation aimed to demystify reflection in order to inform the development of instructional strategies to enhance reflective practice. First, the investigatory study explored the relationship between reflective and creative thinking and commonalities across field experiences that encouraged PSTs to engage I

advanced reflection. Results supported the relationship between reflection and creativity, although future research should investigate the interaction between the two processes using different measurement tools to further verify the relationship. Analysis of reflection essays written by students categorized as advanced reflectors revealed the importance of frequently exposing PSTs to field placements that contrast their personal K-12 educational experiences. Second, the applied study investigated the impact of an experimental teacher preparation course designed to enhance reflection through creative teaching strategies. Pre-service teachers enrolled in the experimental course demonstrated more advanced reflective thinking and positive attitudes toward the reflective practice than those in the control group, suggesting that creativity training techniques can be used to guide PSTs throughout the reflective thinking process. Future studies should replicate these instructional strategies to examine their impact on more diverse populations of PSTs, and longitudinal research should investigate the reflective practice as it naturally unfolds when PSTs enter the real world of teaching.

INDEX WORDS: Reflection, teacher preparation, creativity

THE RELATIONSHIP BETWEEN REFLECTIVE AND CREATIVE THINKING: CAN
TEACHER PREPARATION COURSES BE DESIGNED TO CULTIVATE REFLECTIVE
EDUCATORS?

by

SARAH MARIE CATALANA

B.S., Wofford College, 2012

A Dissertation Submitted to the Graduate Faculty of The University of Georgia in Partial
Fulfillment of the Requirements for the Degree

DOCTOR OF PHILOSOPHY

ATHENS, GEORGIA

2017

© 2017

Sarah Marie Catalana

All Rights Reserved

THE RELATIONSHIP BETWEEN REFLECTIVE AND CREATIVE THINKING: CAN
TEACHER PREPARATION COURSES BE DESIGNED TO CULTIVATE REFLECTIVE
EDUCATORS?

by

SARAH MARIE CATALANA

Major Professor:	Bonnie Cramond
Committee:	Tarek Grantham
	Margaret Hines
	Mark Runco

Electronic Version Approved:

Suzanne Barbour
Dean of the Graduate School
The University of Georgia
Ma

DEDICATION

To the One who created all things. Studying creativity has continued to show me that the Lord is all-knowing, all-powerful, all-loving, and truly creative.

“When I consider your heavens, the work of your fingers, the moon and the stars, which you have set in place, what is mankind that you are mindful of them, human beings that you care for them?”

-Psalm 8: 3-4

“For this reason, I fall on my knees before the Father, from whom every family in heaven and earth receives its true name....I pray that you may have your roots and foundation in love, so that you, together with all God’s people, may have the power to understand how broad and long, how high and deep is Christ’s love. Yes, may you come to know his love—although it can never be fully known—and so be completely filled with the very nature of God.”

- Ephesians 3: 14; 17-19

ACKNOWLEDGEMENTS

It is not possible to thank all the individuals that have supported me throughout my doctoral studies. To my dissertation committee, thank you for your constant challenge and support. To Dr. Bonnie Cramond, from the moment I saw the “Imagine” sign perched above your office door during my first visit at UGA, I have felt your support and encouragement throughout this process. I am truly honored to work with you and even more honored to call you my friend. To Dr. Meg Hines, thank you for encouraging me to follow my heart and pursue my love for teaching. To Dr. Mark Runco, thank you for helping me unearth my interest in creativity research. And, to Dr. Tarek Grantham, thank you for the challenge and support you have provided as I continue to learn the importance of embracing diversity in my classroom. I would not be here today if it were not for you all.

To my friends, thank you for keeping me sane throughout the writing process. To Dr. Sarah Sumners, Dr. Desi Sharpe, and soon-to-be Dr. Sue Hyeon Paek, thank you for being such supportive colleagues and friends. To my roommate, Miranda, thank you for reminding me that I can do nothing without the Lord’s strength. To my community at Redeemer Presbyterian, thank you for providing a true home for me in Athens.

To my students, you got me through this writing process! I cannot express how much I love to be in the classroom with each of you. Thank you for reminding me that I am always a student.

Last, but most certainly not least, to my family: words cannot express how thankful I am for you. To my brother Michael, I cannot wait to be doctors together! To my sister Callie, thank you for your constant pep talks and reminders to keep things in perspective. To my brother Brian, your honesty and love for life reminds me to always be thankful for what the Lord has given me. To my daddy, thank you for your early morning texts, your constant prayers, and those days we worked together in your office. And to my mommy, thank you for getting me in every way, inside and out. Thank you for teaching me to always imagine. I love you more than you will ever know.

TABLE OF CONTENTS

	Page
ACKNOWLEDGEMENTS	v
LIST OF TABLES	x
LIST OF FIGURES	xi
CHAPTER	
1 INTRODUCTION	1
Statement of the Problem.....	3
Purpose of the Studies.....	6
Research Questions	7
Significance of the Studies.....	8
Overview of the Studies.....	9
Summary	10
References.....	12
2 REVIEW OF THE LITERATURE	17
Teacher Preparation	17
Reflection and Creativity	25
Development of Reflection and Creativity	34
Conclusion	38
References.....	40
3 THE INVESTIGATORY STUDY	56

Review of Key Literature.....	58
Research Methods.....	65
Results.....	79
Discussion.....	86
References.....	97
4 THE APPLIED STUDY.....	107
Review of Key Literature.....	109
Research Methods.....	118
Results.....	136
Discussion.....	143
References.....	158
5 A DISCUSSION OF THE FINDINGS	165
The Investigatory Study.....	166
The Applied Study	168
Discussion.....	170
Implications.....	173
Limitations	175
Future Research	176
Conclusion	177
References	178
APPENDICES	
A INSTRUMENTS	182
B FIELD EXPERIENCE PAPER DIRECTIONS	187

C	FRAMEWORK OF REFLECTION FOR TEACHER EDUCATION	189
D	THE EXPERIMENTAL COURSE	197

LIST OF TABLES

	Page
Table 2.1: The Evolution of Reflection	26
Table 2.2: Comparison of Reflection and Creativity	29
Table 3.1: Demographic Description of Participants in the Investigatory Study	67
Table 3.2: DoR Scores for Paragraphs Scored by All Judges: Investigatory Study	79
Table 3.3: Mean Scores and Standard Deviations on TTCT-Figural	80
Table 3.4: Inter-Rater Reliability of Scores on TTCT-Figural	81
Table 3.5: TTCT-Figural scores for Low and High Reflectors	82
Table 3.6: Themes of Paragraphs Scored as Reflection and Critical Reflection	83
Table 3.7: Field Experiences for Papers Scored as Reflection and Critical Reflection	86
Table 4.1: Application of Creative Thinking Strategies to Reflective Practice	114
Table 4.2: Demographic Description of Participants in Applied Study	126
Table 4.3: DoR Scores for Paragraphs Scored by All Judges: Applied Study	137
Table 4.4: HI-DoR Scores for Participants in Control and Experimental Group	138
Table 4.5: Scores on Each Subscale of the Reflection Questionnaire	138
Table 4.6: Participant Responses on the Conception of Reflection Survey	140
Table 4.7: Themes from Elaborations on How Views of Reflection Changed	141
Table A.1. Encouraging Reflection via Multiple Modalities.....	203

LIST OF FIGURES

	Page
Figure 4.1: Overlap Between the Incubation Model of Teaching and Reflection	117
Figure 4.2: Embedded Design of the Applied Study.....	124
Figure 4.3: Conception of Reflection: Control Group of Applied Study	142
Figure 4.4: Conception of Reflection: Experimental Group of Applied Study	143

CHAPTER 1

INTRODUCTION

The teaching profession is characterized by constant surprises. Each day brings new student dynamics, additional academic content to cover, unique social challenges, and unending real-world issues to resolve. No number of teacher preparation courses can fully prepare a first-year teacher for the moment when she walks into the classroom and realizes her teaching experiences are not commensurate with those described in educational textbooks. This clash between expectation and reality must be met with flexibility and innovation. Rather than relying on prescribed teaching methods, effective educators reflect upon their experiences and consider creative solutions to classroom challenges that progress beyond temptations to simply teach the way they were taught (Badiali & Hammond, 2002; Cochran-Smith & Lytle, 1999; Lortie, 1975).

Since it is not feasible to prepare future teachers for every classroom situation they will encounter throughout their teaching careers, teacher preparation programs strive to cultivate the professional dispositions that equip future educators to adapt to diverse teaching challenges (Badiali, Nolan, Zembal-Saul, & Manno, 2011). Successful adaptation requires educators to adopt an “inquiry stance” towards teaching, which is characterized by active problem-solving, rather than the passive application of prescribed teaching methods (Badiali & Hammond, 2002; Cochran-Smith & Lytle, 1999). Thus, successful teacher preparation programs prepare future educators to view the classroom through a problem-solving lens, equipping them to solve diverse, often ill-defined

problems. The inquiry stance is rooted in both reflective and creative thinking; educators reflect on their circumstances to recognize opportunities for growth and use creative thinking skills to consider diverse explanations for experiences and innovative responses to challenges.

Although cultivating reflective educators is a common goal among several teacher preparation programs (Grossman, 2008; NCTAF, 1996; 2007; Ostorga, 2006), future teachers seldom receive direct instruction on how to engage in meaningful reflective practices (Choy & Oo, 2012; James, 2007; Rodgers, 2002) and professional development that emphasizes the interaction between reflection and creativity remains quite vague (Brookfield 1988; Gibbs, 1988; James & Brookfield, 2014; Killeavy, Maureen & Moloney, 2010; Lucas, 1991; Hatton & Smith, 1995). As a result, reflection is often seen as a nebulous and superfluous activity rather than as a meaning-making experience that guides and informs future actions. Indeed, reflection assignments written by students in teacher preparation programs are often littered with cliché statements that simply restate misunderstandings and fail to demonstrate a critical and open-minded analysis of experiences (Harland & Wondra, 2011).

The ability to resist prescribed teaching methods and approach unfamiliar experiences with an inquiry stance is a crucial skill for today's educators. As teachers are confronted with increasingly multinational and multicultural issues, it is imperative they adapt to the needs of diverse student populations and recognize that their personal educational experiences may not match those of their students (Colley, Bilics, & Lerch, 2012). The marriage of creative and reflective thinking builds a strong foundation for culturally responsive education as teachers consider multiple explanations for their

experiences and adapt to the diverse needs and interests of their students (Valentiin, 2006; Darling-Hammond, 2006). However, although the literature on reflection often indirectly references the importance of creative thinking skills, nebulous assertions to “stretch imaginatively” while reflecting seem to scarcely skim the surface of the potentially rich intersection between the two thinking processes (James & Brookfield, 2014, p. 11).

Statement of the Problem

Teaching is a unique profession in that virtually all students who are studying to become educators (often referred to as pre-service teachers or PSTs) have spent thousands of hours observing and evaluating professionals in the field. In contrast to individuals who wish to become lawyers or doctors, for example, many PSTs enter formal training with what they believe to be a sophisticated understanding of what is necessary for success in their chosen profession. Lortie (1975) described this phenomenon as the apprenticeship of observation, claiming that PSTs enter teacher preparation programs with preconceived notions about teaching and learning that were formed throughout their experiences as students. If left unexamined, these preconceived notions often lead to intuitive and imitative forms of teaching, resulting in “ready-made recipes for action and interpretation that do not require testing or analysis while promising familiar, safe results” (Buchmann, 1987, p. 161).

Given the lack of resemblance between teachers who are primarily European American and the increasingly diverse student population, it is clear that teacher preparation programs must encourage PSTs to uncover potential misconceptions formed throughout the apprenticeship of observation and equip them to adapt to diverse student

needs instead of relying on past experiences (Gay, 2000). It is for this reason that nearly all teacher preparation programs encourage the development of the inquiry stance and put forth standards that specifically address the cultivation of reflective thinking skills (see Grossman, 2008; NCTAF, 1996; 2007; Ostorga, 2006). Reflection is often seen as the meaning-making process through which educators critically examine their experiences and unearth assumptions to reveal “taken-for-granted beliefs about reality” (Brookfield, 1992, p. 13). Thus, reflection is characterized by transformative power; individuals remain open-minded to question and transform misunderstandings, investigating the worth of knowledge in specific contexts free from the distortions of personal bias (Jay & Johnson, 2002; Kember, McKay, Sinclair, & Yuet Wong, 2008; Valli, 1990; Van Manen, 1977; Mezirow, 1998; 2000; 2003; Van Manen, 1977).

Pre-service teachers are often required to reflect on field experiences in which they serve various roles in classroom settings (Clarke, Triggs & Nielsen, 2014; Darling-Hammond, 2000; Gareis & Grant, 2014). However, instruction for such reflection is typically vague (Rodgers, 2002), and PSTs are likely to filter their interpretations of diverse field work through personal perceptions of teaching and learning formed throughout the apprenticeship of observation (Buchmann, 1987; Nicol, 2006). Although the assertion to cultivate reflective educators is clear, research has revealed little evidence of advanced reflective skills on the part of future teachers, many of whom attempt to apply educational theory to practice without considering the unique characteristics of diverse teaching and learning environments (Farr and Riordan, 2015; Hatton & Smith, 1995; King, 1997; Sellars, 2014; Yang, 2009).

As King (1997) reported,

Teaching candidates usually have not recognized or reflected critically upon the ideological qualities of their knowledge and their own misunderstandings and alienation from the struggle for justice. They have no concrete understanding of or commitment to teaching for change. (p. 157)

The cultivation of the inquiry stance forms the foundation to teach for change, equipping PSTs to become effective problem-solvers who reflect upon and creatively respond to diverse challenges in the classroom. Unfortunately, despite multiple assertions for reflective practice, PSTs seldom receive direct instruction that targets the development of reflective thinking abilities (Choy & Oo, 2012; James, 2007; Rodgers, 2002). As a result, reflection is often seen as tangential to effective teaching; PSTs may complete reflective journals or other related assignments throughout teacher-preparation experiences, but often fail to understand how reflection and teaching continually inform one-another (Loughran, 2002).

Although the literature on reflection often indirectly references the importance of creative thinking skills (Brookfield 1988; Gibbs, 1988; Killeavy, Maureen & Moloney, 2010; Lucas, 1991; Hatton & Smith, 1995), little work has explicitly investigated the relationship between creativity and reflection. Since the inquiry stance relies on both reflective and creative thinking, it is surprising that the understanding of the relationship between the two constructs remains vague at best. Furthermore, since several instructional techniques have been shown to help individuals fulfill their creative potential (see Runco & Sumners, 2015), such strategies could greatly inform the development of effective practices to guide PSTs throughout the reflective process.

The successful education of tomorrow's leaders depends on the cultivation of educators who are able to reflect on and adapt to diverse student needs. In response to the overwhelming lack of advanced reflection demonstrated by PSTs, these studies aimed to demystify the reflective practice by exploring the relationship between reflection and creativity, examining how the reflective practice of PSTs potentially varies across diverse types of field experiences, and finally analyzing the impact of instructional strategies to encourage PSTs to engage in meaningful reflection.

Purpose of the Studies

There were two studies: the investigatory study and the applied study. The purpose of the investigatory study was: (1) to examine the ability to reliably train judges to score writing samples for reflective ability; (2) to explore the relationship between reflective ability and creative potential; (3) to examine common themes of writing samples demonstrating advanced reflection; and (4) to investigate how the reflective practice of PSTs varies across diverse types of field experiences.

Results from the investigatory study informed the applied study, which examined the impact of an experimental teacher preparation course that was designed to enhance reflective thinking through creative teaching strategies. Responses of pre-service teachers enrolled in the experimental course were compared to those of a control group, and the applied study examined differences in (1) reflective ability; (2) attitudes toward reflection, and (3) conception of reflection.

Research Questions

The studies were driven by the juxtaposition between the demand for reflective educators and the lack of evidence of reflection in PSTs and instructional strategies to encourage reflective practice. The investigatory study addressed the following questions:

1. Can judges be trained to reliably score reflective essays using the Framework of Reflection for Teacher Education (Harland & Wondra, 2011)?
2. How do PSTs, categorized as different levels of reflectors, differ in regard to:
 - (a) overall creativity
 - (b) specific creative competencies
3. What common themes can be drawn from text segments coded at the highest levels of reflection, and how do participants demonstrating these advanced reflective skills describe their field experiences, in terms of:
 - (a) frequency in which they visited the field location
 - (b) degree to which the field location resembled their personal K-12 educational experiences.

The applied study examined the following questions:

1. How do PSTs who have completed the experimental teacher preparation course differ from those who have completed other course sections, in terms of:
 - (a) Reflective ability, as assessed by final reflection papers scored using the Framework of Reflection for Teacher Education (Harland & Wondra, 2011)
 - (b) Scores on each subscale of the Reflection Questionnaire (Kember et al., 2000)?

2. Do PSTs who have completed the experimental teacher preparation course display a different attitude toward reflective thinking than those who completed existing course sections? More specifically, are PSTs who completed the experimental class more likely than those who completed other course sections to agree that:
 - (a) The reflective practice is important to the teaching profession
 - (b) They have developed a greater understanding of reflection throughout the course
 - (c) Their views of reflection have changed as a result of the course?
3. How does the conception of reflection for PSTs who completed the experimental course differ from that of PSTs who completed existing course sections?

Significance of the Studies

The creation of culturally responsive classrooms depends on the cultivation of reflective educators who are aware of potential misunderstandings that could preclude them from meeting the needs of all students. Several education boards and commissions put forth teacher development standards related to reflection, and it is imperative that teacher preparation programs are designed to help PSTs develop the appropriate dispositions to view the classroom from an inquiry stance (Grossman, 2008; NCTAF, 1996; 2007; Ostorga, 2006). Reflection is not a one-size-fits-all process, and it is essential that teacher preparation programs expose future educators to experiences that encourage them to engage in the reflective practice and provide them with the necessary strategies and techniques to succeed in this endeavor.

The investigatory study is unique because it examined the intersection between reflective and creative thinking, a relationship that is often discussed throughout the

literature on teacher preparation but has yet to be explicitly investigated. The study also investigated common themes of advanced reflective writing samples and examined the nature of field experiences that encourage reflection, informing teacher preparation programs how to design meaningful learning experiences for future educators.

The applied study revealed common misconceptions that PSTs hold about the reflective practice, and demonstrated a significant positive impact of instructional strategies to encourage reflective thinking through creative teaching techniques.

Overview of the Studies

The Investigatory Study

The investigatory study used a mixed methods approach to examine the relationship between reflective and creative thinking in a sample of PSTs from a large public university and analyze how the reflective practice varied with diverse types of field experiences. A demographic questionnaire asked PSTs to describe how often they visited their field placement and indicate to what degree this placement resembled their personal educational experiences. In addition to completing the Torrance Test of Creative Thinking (TTCT) – Figural (Torrance, 1966), participants uploaded a field experience reflection paper that was completed in conjunction with their field placement.

Four judges were trained to score the field experience papers for reflective ability using Harland and Wondra's (2011) Framework of Four Levels of Reflection for Teacher Education. Quantitative analyses investigated how reflective ability differed with overall creativity scores and scores for specific creative competencies as measured by the TTCT-Figural. Qualitative analyses were then used to examine common contextual themes from field experience papers that received the highest reflection scores, and investigation of

participant descriptions of their field experience placements revealed the nature of field work that corresponded to the highest levels of reflection.

The Applied Study

The applied study examined the impact of a teacher preparation course designed to enhance reflective thinking through creative teaching techniques by comparing PSTs enrolled in the experimental class to a control group of PSTs in traditional course sections. In addition to completing the Reflection Questionnaire (Kember et al., 2000) and a Conception of Reflection survey, participants submitted a final field experience reflection paper that was scored using Harland and Wondra's (2011) Framework of Four Levels of Reflection for Teacher Education. Quantitative analyses compared scores on the reflection papers and the Reflection Questionnaire in order to examine differences in the reflective ability of PSTs in the experimental and control groups. Both quantitative and qualitative analyses compared participant responses on the Conception of Reflection survey to explore the how PSTs in the experimental and control group differed in terms of attitudes toward and conception of the reflection process.

Summary

This chapter highlighted the importance of reflection and creativity in the field of education and illustrated the need for well-designed teacher preparation experiences that cultivate successful reflective practice. The chapter introduced two studies that investigated the reflective practice of PSTs, examining the relationship between reflection and creativity and the impact of a course designed to enhance reflective thinking skills. In addition to providing a clear statement of the problem and purpose of

the studies supported by a brief a review of the literature, the paper summarized the research questions and methods to articulate the overall significance of the studies.

References

- Badiali, B. J. & Hammond, D.J. (2002, March). *The power and necessity for using inquiry in a PDS*. Paper presented at the Professional Development Schools National Conference, Orlando, FL.
- Badiali, B., Nolan, J., Zembal-Saul, C., & Manno, J. (2011). Affirmation and change: Assessing the impact of the professional development school on mentor's classroom practice. In J. Nath, W. Irma, & J.R. Guadarrama (Eds.), *Investigating university-school partnerships* (pp. 321-346). Charlotte, NC: Information Age Publishing.
- Brookfield, S. D. (1988). *Training educators of adults: The theory and practice of graduate adult education*. New York: Routledge.
- Brookfield, S. D. (1992). Uncovering assumptions: The key to reflective practice. *Adult Learning*, 3(4), 13-18.
- Buchmann, M. (1987). Teaching knowledge: The lights that teachers live by. *Oxford Review of Education*, 13(2), 151-164.
- Choy, S.C., & Oo, P.S. (2012). Reflective thinking and teaching practices: A precursor for incorporating critical thinking into the classroom? *International Journal of Instruction*, 5(1), 167-182.
- Clarke, A., Triggs, V., & Nielsen, W. (2014). Cooperating teacher participation in teacher education: A review of the literature. *Review of Educational Research*, 84(2), 163-202.

- Cochran-Smith, M., & Lytle, S.L. (1999). Relationships of knowledge and practice: teacher learning in communities. *Review of Research in Education*, 24, 249-305.
- Colley, B. M., Bilics, A. R., & Lerch, C. M. (2012). Reflection: A key component to thinking critically. *Canadian Journal for the Scholarship of Teaching and Learning*, 3(1), 213-224.
- Darling-Hammond, L. (2000). Reforming teacher preparation and licensing: Debating the evidence. *Teachers College Record*, 102(1), 28-56.
- Darling-Hammond, L. (2006). Constructing 21st century teacher education. *Journal of Teacher Education*, 57(3), 300-314.
- Farr, F., & Riordan, E. (2015). Tracing the reflective practices of student teachers in online modes. *ReCALL: Journal of Eurocall*, 27(1), 104-123.
- Gareis, C., & Grant, L. (2014). The efficacy of training cooperating teachers. *Teaching and Teacher Education*, 39, 77-88.
- Gay, G. (2000). *Culturally responsive teaching: Theory, research and practice*. New York, Teachers College Press.
- Gibbs, G. (1988). *Learning by Doing: A guide to teaching and learning methods*. Oxford Brookes University, Oxford: Further Education Unit.
- Grossman, R. (2008). Structures for facilitating student reflection. *College Teaching*, 57, 15-22.
- Harland, D. J., & Wondra, J. S. (2011). Teacher candidates' reflections on clinical experiences: A comparison of blog and final paper assignments. *Journal of Digital Learning in Teacher Education*, 27(4), 128–133.

- Hatton, N., & Smith, D. (1995). Reflection in teacher education: Towards definition and implementation. *Teaching and Teacher Education*, 11(1), 33-49.
- James, A. (2007). Reflection revisited: Perceptions of reflective practice in fashion learning and teaching. *Art, Design, and Communication in Higher Education*, 5(3), 179-196.
- James, A. & Brookfield, S. D. (2014). *Engaging imagination: Helping students become creative and reflective thinkers*. San Francisco, CA: Jossey-Bass.
- Jay, J. K. and Johnson, K. L. (2002). Capturing complexity: A typology of reflective practice for teacher education. *Teaching and Teacher Education*, 18, 73–85.
- Kember, D., Leung, D. Y. P., Jones, A., Loke, A. Y., McKay, J., Sinclair, K., Tse, H., Webb, C., Wong, F. K. Y., Wong, M., & Yeung, E. (2000). Development of a questionnaire to measure the level of reflective thinking. *Assessment and Evaluation in Higher Education*, 25(4), 381–395.
- Kember, D., McKay, J., Sinclair, K., & Yuet Wong, F. K. (2008). A four-category scheme for coding and assessing the level of reflection in written work. *Assessment and Evaluation in Higher Education*, 33(4), 369-379.
- Killeavy, M. & Moloney, A. (2010). Reflection in a social space: Can blogging support reflective practice for beginning teachers? *Teaching and Teacher Education*, 26, 1070-1076.
- King, J. (1997). "Thank you for opening our minds": On praxis, transmutation, and black studies in teacher development. In J. King, E. Hollins & W. Hayman (Eds.), *Preparing teachers for cultural diversity* (pp. 156-169). New York: Teachers College Press.

- Lortie, D. (1975). *Schoolteacher: A sociological study*. Chicago: University of Chicago Press.
- Loughran, J. (2002). Effective reflective practice: In search of meaning in learning about teaching. *Journal of Teacher Education*, 53, 33-43.
- Lucas, P. (1991). Reflection, new practices and the need for flexibility in supervising student-teachers. *Journal of Further and Higher Education*, 15(2), 84-93.
- Mezirow, J. (1998). On critical reflection. *Adult Learning Quarterly*, 48, 185-198.
- Mezirow, J. (2000). *Learning as transformation: Critical perspectives on a theory in progress*. San Francisco: Jossey-Bass.
- Mezirow, J. (2003). Transformative learning as discourse. *Journal of Transformative Education*, 1(1), 58-63.
- National Commission on Teaching and America's Future. (1996). *What matters most: Teaching for America's future*. Retrieved from <http://www.namodemello.com.br/pdf/tendencias/whatmattersmost.pdf>
- National Council for Accreditation of Teacher Education. (2007). *Professional standards for the accreditation of teacher preparation institutions*. Retrieved from <http://www.ncate.org/Standards/ProgramStandardsandReportForms/tabid/676/Default.aspx>
- Nicol, C. (2006). Designing a pedagogy of inquiry in teacher education: Moving from resistance to listening. *Studying Teacher Education*, 2(1), 25-41.
- Ostorga, A. N. (2006). Developing teachers who are reflective practitioners: A complex process. *Issues in Teacher Education*, 15(2), 5-20.

- Rodgers, C. (2002). Defining reflection: Another look at John Dewey and reflective teaching. *Teachers College Record*, 104(4), 842-866.
- Runco, M. A., & Sumners, S. (2015). Creativity training. In J. Wright (Ed.), *International encyclopedia of social and behavioral sciences* (2nd ed., Vol. 5, pp. 113-116). Oxford, England: Elsevier.
- Schon, D. A. (1983). *The reflective practitioner: How professionals think in action*. New York: Basic Books.
- Sellers, M. (2014). *Reflective practice for teachers*. London: SAGE.
- Torrance, E. P. (1966). *The Torrance Tests of Creative Thinking-norms: Technical manual research edition-verbal tests, forms A and B-figural tests, forms A and B*. Princeton, NJ: Personnel Press.
- Valentiin, S. (2006). Addressing diversity in teacher education programs. *Education*, 127(2), 196-202.
- Valli, L. (1990). Moral approaches to reflective practice. In R. Clift, W. R. Houston, & M. Pugach (Eds.). *Encouraging Reflective Practice in Education* (pp. 39-56). New York: Teacher College Press.
- Van Manen, M. (1977). Linking ways of knowing with ways of being practical. *Curriculum Inquiry*, 6, 205-228.
- Yang, S. H. (2009) Using blogs to enhance critical reflection and community of practice. *Educational Technology & Society*, 12(2): 11–21.

CHAPTER 2

REVIEW OF THE LITERATURE

Although many assume teaching to be common sense, the influx of research in teacher preparation clearly illustrates that successful educators progress beyond the simple imitation of their past teachers (Borg, 2004; Lortie, 1975). Several individuals spend a significant amount of their lives as students, and thus it is often tempting to conclude that successful teaching is merely the sum of one's positive perceptions of teachers throughout the educational experience. However, since observing the classroom through the lens of the student provides a limited view of the intricacies of teaching, teacher preparation programs must be carefully designed to combat assumptions about education and equip future teachers to successfully meet the needs of all students.

Teacher Preparation

Pre-Service Teachers and the Challenge of Expectation Versus Reality

Pre-service teachers (PSTs) are defined as students preparing to enter the field of education (Allen & Wright, 2014). The term PST can be used to describe a large population, ranging from students with minimal exposure to teaching to those who are participating in full-time student teaching experiences (Allen & Wright, 2014). Pre-service teachers straddle the gap between theory and practice, simultaneously studying educational theory in teacher preparation courses and serving various roles in real-world educational environments. Since PSTs identify as both teachers and students, they are constantly bombarded by the clash between expectation and reality. This juxtaposition brings about a cognitive dissonance that must be carefully addressed by teacher

preparation programs, lest PSTs conclude that educational research and theory cannot be realistically applied to the classroom (Spalding & Wilson, 2002). Successful teacher preparation programs cultivate the professional dispositions and skills that equip future educators to recognize this dissonance as an opportunity for growth, rather than a signal of defeat that triggers the reliance on comfortable, yet often flawed teaching practices.

Reflection and Creativity: Key Skills for Transformative Practice

Although teacher preparation was once seen as the mechanism to uniformly train teachers and send them into the field, over the past few decades a new paradigm of teacher education has emphasized that teacher development is a unique and ongoing endeavor, rather than a prescriptive process (Cochran-Smith & Lytle, 2001). Instead of solely arming future teachers with current best practices that are likely to change, successful professional development emphasizes how PSTs filter these practices through real-world experiences and equips future educators to approach teaching from a problem-solving, rather than solution-applying perspective (Barnes, 1989; Clark & Peterson, 1986). Thus, PSTs are encouraged to reflect on their experiences and approach the classroom with an inquiry stance, using creative thinking skills to identify problems, collect and interpret relevant data, and innovatively modify practices to bring about improvement (Badiali & Hammond, 2002; Cochran-Smith & Lytle, 1999). Such teacher preparation programs cultivate “adaptive experts who are marked by a disposition to move beyond existing routines, to rethink ideas and practices, to innovate within constraints, and to sacrifice temporarily efficient routines” (Badiali, Nolan, Zembal-Saul, & Manno, 2011, p. 325).

Since it is not feasible to fully prepare future educators for every possible classroom situation, teacher preparation programs strive to equip tomorrow's teachers with the necessary tools to approach classroom problems from an inquiry stance. Thus, PSTs are encouraged to actively recognize and solve problems rather than passively apply prescribed methods. This inquiry stance is rooted in both reflective and creative thinking; PSTs must actively reflect on experiences to recognize opportunities for growth and harness creative thinking skills to innovatively adapt to diverse student needs. Teacher accreditation standards are littered with assertions to cultivate reflective practitioners (Grossman, 2008; NCATE, 2007; Ostorga, 2006), but the development of creative thinking skills remains vague and enigmatic. Furthermore, although PSTs are often instructed to reflect, such assertions are seldom accompanied with direct instruction for reflection, and PSTs are likely to view reflective practice as a waste of time rather than an essential tool for learning from and improving teaching practices (Hartman, 2001; Spalding & Wilson, 2002).

The Apprenticeship of Observation

Teaching is a unique profession in that individuals entering the field have the opportunity to observe professional educators for thousands of hours throughout their experiences as students, unlike individuals entering other vocations such as medicine or law who have limited direct exposure to professionals (Borg, 2004). As Lortie (1975) suggested:

Participation in school has special occupational effect on those who move to the other side of the desk... There are ways in which being a student is

like serving an apprenticeship in teaching; students have protracted face-to-face and consequential interactions with established teachers. (p. 61)

Unfortunately, such an apprenticeship only provides a limited vantage point of teaching. Students are unaware of what happens behind the scenes, such as selecting goals, planning learning activities, or analyzing student work and behavior (Grossman, 1991). As a result, many individuals are prone to adopt a simplistic view of teaching, assuming the profession to be both intuitive and imitative (Borg, 2004; Lortie, 1975).

Through observation of their own teachers, future educators build an arsenal of default strategies to apply to their classrooms (Tomlinson, 1999). As Buchmann (1987) asserted, these “ready-made recipes for action and interpretation do not require testing or analysis, while promising familiar, safe results” (p. 161). Thus, teaching becomes a matter of imitation, which “being generalized across individuals becomes tradition” (Lortie, 1975, p. 63). Students who equate successful teaching to the expressed qualities of past models (e.g., previous teachers or coaches) are less attuned to sound theoretical explanation of teaching based in empirical investigations (Lortie, 1975; Nicol, 2006). Indeed, research with PSTs has revealed a propensity to resist unfamiliar educational practices, illustrating that the rejection of pedagogical theory and strategies is rooted in the unique educational backgrounds of future teachers (Boyd, Gorham, Justice, & Anderson, 2013).

As students observe teachers throughout their personal educational experiences, they gradually construct a unique conceptualization of quality teaching. These conceptualizations profoundly impact future practices, since PSTs have a proclivity to manipulate current classroom circumstances to fit the mold of their personal educational

experiences (Amos, 2010). Thus, one of the central aims of teacher preparation is confronting these deeply rooted conceptualizations and challenging future teachers to juxtapose personal interpretation with research-based theory (Furlong, 2013). Careful analysis of personal educational experiences forms the foundation of the inquiry stance, equipping PSTs to approach classroom challenges with an open-mind and implement practices that successfully meet the needs of their students and do not necessarily reflect their personal preferences (Nicol, 2006).

Implicit Theories

Future educators form lay theories regarding learning and teaching throughout the apprenticeship of observation, and thus do not enter teacher education value free (Eick & Reed, 2002; Lortie, 1975; Sugrue, 1997). Dweck and her colleagues (1995) refer to these theories as implicit theories, defining them as “poorly articulated naïve beliefs about the self and social world” (p. 267). Implicit theories guide interpretations of the self and others, influencing both actions and behaviors (Dweck & Leggett, 1988; Fine & Buehl, 2008).

Dweck and her colleagues are most well-known for investigating the degree to which individuals assume attributes to be fixed or malleable (Dweck Chiu, & Hong, 1995; Dweck & Leggett, 1988). Individuals with entity theories view attributes such as intelligence to be unchangeable and those with incremental theories consider attributes to be dynamic and flexible. Such beliefs directly impact goal setting and behavior; individuals with incremental beliefs are more likely to challenge themselves since they believe improvement is possible, but those with entity theories are likely to give up if they don’t believe they have a natural talent.

Fives and Buehl (2008) extended this research to investigate implicit beliefs about teaching ability. Although investigations revealed that some future educators thought teaching could be learned, several viewed teaching as an innate calling or gift. Such entity beliefs blossom from experiences throughout the apprenticeship of observation; individuals admire educators who seem to have the “teaching gene” and often dislike those who seem less naturally gifted. These beliefs must be carefully addressed in teacher preparation programs, since they can have a significant constraining effect on future educators. The notion that teaching ability cannot be improved provides little motivation to implement new techniques and strategies in the classroom. Indeed, those with entity beliefs are quite content to simply teach the way they have always been taught and unlikely to approach the classroom with a problem-solving perspective (Calderhead & Robson, 1991; Garmon, 2005). As Furlong (2013) argued, it is “not teacher resistance but the powerful influence of lay theories, their time in school and culturally embedded archetypes of teaching, which influence the construction of personal identities around teaching” (p. 70).

Culturally Responsive Education

Given the ever-changing student population in America’s schools, it is clear that teacher preparation programs must cultivate educators who refrain from simply teaching the way they were taught. In the Fall of 2014, America’s public schools reached a demographic mile stone: for the first time, the overall number of Latino, African-American, and Asian students in public K-12 classrooms surpassed the number of non-Hispanic whites (Maxwell, 2014). The lack of resemblance between this increasingly diverse student population and the population of teachers and teacher candidates who are

predominantly female, European American, middle-class and English-speaking (Bitterman, Goldring, & Gray, 2013) calls for culturally responsive teaching in the classroom (Gay, 2000). According to Ford, Stuart, and Vakil (2014),

Culturally responsive teaching offers ways to best support diverse learners in an inclusive classroom as it approaches education by looking at the whole child where students are empowered intellectually, socially, emotionally and politically by using cultural referents to impart knowledge, skills, and attitudes. (p. 57)

With an increasingly global world, PSTs are confronted with multinational, multicultural, complex issues (Colley, Bilics, & Lerch, 2012). In order to teach in a manner that not only addresses, but also embraces diversity in the classroom, it is essential that teachers have a firm understanding of their personal beliefs concerning the nature of teaching and learning (Kendall, 1996). Teacher's beliefs are predictors of their behavior, influencing perceptions, judgments, and practices (Darling-Hammond, 2006). Thus, uncovering beliefs is an essential first step in developing culturally responsive educators.

If teachers consider their educational experiences to be comparable to that of their students, they neglect to address diversity in the classroom, assuming students from various backgrounds will benefit from teaching and learning strategies that are often biased towards dominant cultures (Aguilar, 2010; Castagno, 2008). Their experiences in school and life are likely to contrast the experiences of many of their students, who are increasingly diverse in socio-economic status, cultural background, and home language (Bitterman, Goldring, & Gray, 2013). Thus, the temptation for PSTs to teach the way they were taught may unintentionally favor certain student populations.

Although PSTs enter their program of study as students, they aim to leave as professionals. As Irwin and Boulton (2010) proposed, “through the year they need to undergo a transformation so by the end of the year they identify with being a teacher, and less with being a student” (p. 23). Research has suggested this transformation begins with an “examination of one’s own cultural assumptions and/or biases, which stem from our education, experiences with diverse groups, and our own student experience as part of a minority or majority population” (Markos, 2012 p. 43). Akiba (2011) proposed that reflective thinking is the vehicle for transformation and asserted that reflection is a key component to culturally responsive education. Indeed, reflection is the meaning-making experience through which PSTs unearth assumptions and develop a better understanding of themselves, as well as their students (Harland & Wondra, 2011; Rodgers, 2002; Spalding & Wilson, 2002).

Cultivating reflection in PSTs promotes ongoing learning and engagement, paving the way for innovative change. While stand-alone courses that emphasize diversity and multicultural education increase diversity awareness in PSTs, the transition to culturally responsive teaching occurs with exposure to diverse student populations that is coupled with reflection (Darling-Hammond, 2006). As Gay and Kirkland (2003) proposed,

Teachers knowing who they are as people, understanding the contexts in which they teach, and questioning their knowledge and assumptions are as important as the mastery of techniques for instructional effectiveness.

Critical racial and cultural consciousness should be coupled with self-reflection in both preservice teacher education and in-service staff development. (p. 181)

Reflection and Creativity

Several boards, commissions and foundations dedicated to teacher development have standards that specifically emphasize the importance of reflection and inquiry in future teachers (Grossman, 2008; NCATE, 2007; Ostorga, 2006). Although assertions for creative thinking are less clear than those for reflection, recent emphasis on cultivating the inquiry stance and equipping PSTs to solve unfamiliar problems in the classroom illustrates the necessity of both reflective and creative thinking skills. Indeed, the literature on reflection often indirectly references creativity (see, for example: Brookfield 1988; Gibbs, 1988; James & Brookfield, 2014; Killeavy, Maureen & Moloney, 2010; Lucas, 1991; Hatton & Smith, 1995), and research has demonstrated that reflection has a positive impact on creative production (Hao, Ku, Liu, Hu, Bodner, Grabner, & Fink, 2016)

Definitions of Reflection

Although teacher education programs enthusiastically embrace the reflective practice, there is no clear definition of reflection and methods to enhance reflective thinking in PSTs can be quite vague (Rodgers, 2002, Choy & Oo, 2012). As Rodgers (2002) claimed, “in becoming everything to everybody, it [reflection] has lost its ability to be seen” (pg. 843). In order to fully explain reflection, some researchers have proposed frameworks that sort reflective thinking into multiple levels (e.g., Jay & Johnson, 2002; Kember, McKay, Sinclair, & Yuet Wong, 2008; Valli, 1990; Van Manen, 1977; Mezirow, 1981; 1991; 1992) and others have examined the key stages in the reflective thinking process (e.g., Boud, Keogh, & Walker, 1985; Gibbs, 1988; Kolb, 1984; Rolfe, Freshwater, & Jasper, 2001). Although definitions of reflection vary in their nuances, a

common theme across definitions is the existence of an advanced or sophisticated level of reflective thought that is characterized by both uncovering and transforming an assumption or misunderstanding. As summarized in Table 2.1, many researchers have labeled this type of reflection as critical reflection, emphasizing its social impact and transformative nature.

Table 2.1. *The Evolution of Reflection*

Author	Discussion of Reflection
Dewey, 1933	Defined critical reflection as the “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 conclusions to which it includes a conscious and voluntary effort to establish belief upon a firm basis of evidence and rationality” (p. 16).
Van Manen, 1977	Proposed three levels of reflection: Technical rationality, practical action, and critical reflection. Critical reflection requires an open mind to question and transform misunderstandings in order to free oneself from personal bias and investigate the worth of knowledge in relationship to specific contexts.
Schon, 1983	Emphasized the importance of reflection both in and on action. Although reflection- on-action is mainly retroactive, reflection-in-action requires the learner to reflect as a situation unfolds.
Mezirow, 1990	Suggested that critical reflection is a key component to transformative learning, since it “involves a critique of the presuppositions on which our beliefs have been built” (p. 1).
Grimmett, Erickson, Mackinnon, & Riecken, 1990	Suggested that the highest level of reflection is dialectical, which is comparable to critical reflection. Individuals reflecting at this level consider theory and context simultaneously, and thus recognize that personal truths may differ from what others believe to be true.
Gore & Zeichner, 1991	Referred to critical reflection as social reconstructionist reflection. This reflection focuses on “political and social issues of schooling and on classroom interactions designed to promote greater student equity and justice” (p. 121).
Sparks-Langer & Colton, 1991	Defined three distinctive ways of looking at teaching/teacher education: cognitive, narrative, and critical. The critical approach requires ethical and moral reasoning, taking into account both social

and political contexts.

- Valli, 1993 Referred to five types of reflection: technical, reflection-in-action, reflection-on-action, deliberative, personalistic, and critical reflection. Similar to the work of Gore & Zeichner (1991), critical reflection focuses on social, moral, political and ethical issues, and involves the development of open-mindedness, rational judgment and creativity.
- Calderhead & Gates, 1993 Loosely used the term critical reflection to refer to constructive self-criticism of one's actions with a commitment to improvement.
- Reynolds, 1998 Suggested four characteristics which distinguish critical reflection from other types of reflection: (1) its focus on questioning assumptions; (2) its social rather than individual focus; (3) the attention it pays to the analysis of power relations; and (4) its pursuit of freeing oneself from misunderstandings.
- Jay & Johnson, 2002 Proposed three dimensions of reflection: descriptive, comparative, and critical. Critical reflection is the end result of thinking about issues, whereby "one makes a judgment or a choice among actions, or simply integrates what one has discovered into a new and better understanding of the problem" (p. 79).
- Ryan, 2005 Proposed that critical reflection is characterized by increased skepticism towards established truths. Critical reflection "requires skills that allow one to discern the basis of truth claims, the assumptions underlying assertions, and the interests that motivate people to promote certain positions" (p.11).
- Fook, White, & Garnder, 2006 Asserted that critical reflection can enable social change, beginning at the level of the individual: "Once individuals become aware of the hidden power of ideas they have absorbed unwittingly from their social contexts, they are freed to make choices on their own terms" (p. 9).
- Kimber, McKay, Sinclair, & Yuet Wong, 2008 Suggested a four-category framework of reflection: habitual action, understanding, reflection, and critical reflection. Critical reflection requires that individuals recognize and transform the "set of beliefs and values that have been almost unconsciously assimilated from experiences and the environment" (p. 374).

Boody, 2008	Suggested that critical reflection precludes learners from relying on quick fixes. Rather than simply doing things the way they have always been done, learners analyze and reconsider their beliefs, investigating experiences within a broad context of issues.
Harland & Wandra, 2011	Proposed a four-category framework of reflection in the unique population of PSTs: Nonreflection, Understanding, Reflection, and Critical Reflection. Pre-service teachers who engage in critical reflection demonstrate the uncovering of an assumption or misunderstanding and a commitment to implementing change in their educational environment.

Definitions of Creativity and its Similarities with Reflection

Like reflection, creativity is an enigmatic topic which several educators support but few can define (Makel & Plucker, 2010). Guilford's 1950 Presidential Address to the American Psychological Association sparked the widespread empirical investigation of creativity, leading some researchers to investigate creative potential and others to examine creative performance (Guilford, 1950; Makel & Plucker, 2010). Since creativity is a multifaceted construct, it is often discussed through Rhodes's (1961) framework of the Four P's of Creativity: (a) Person: Which characteristics are common among creative individuals; (b) Product: What qualifies as a creative product; (c) Process: What are the steps leading to creative production, and (d) Press: What makes an environment conducive to creative thought. Table 2.2 summarizes the literature on creativity across these Four Ps and illustrates how examining reflection through this lens reveals several similarities between the two constructs.

Table 2.2. *Comparison of Creativity and Reflection, as Structured by Rhodes's (1961) 4 P's of Creativity*

	Creativity	Reflection
Person	Openness to experience (Charyton & Snelbecerk, 2007; John, Naumann, & Soto, 2008)	Openness is essential for individuals to question their beliefs and consider experiences from multiple viewpoints (Van Manen, 1977).
	Strong sense of self-efficacy (Hill, Tan, & Kikuchi, 2008)	Since reflection involves risk, it is essential that individuals recognize reflection as an opportunity for growth and are confident in their ability to improve (Brookfield, 2012).
	Flexibility (Gulford, 1967; Runco, 1991) and risk-taking (Piirto, 2005)	Reflective individuals are flexible and willing to take risks to improve their understandings. Unearthing assumptions is risky, since individuals may realize they are operating under narrow viewpoints (Goleman, 1985).
	Tolerance of ambiguity (Barron, 1969; MacKinnon, 1962)	Reflective individuals recognize that reflection is an ongoing process that seldom reaches a clear conclusion (Schon, 1983).
	Group trust (Andriopoulos, 2001; Klimoski & Karol, 1976)	Group trust and collaboration is essential to engaging in discourse and investigating experiences from multiple viewpoints (Ramsey, 2004).
	Self-discipline, perseverance, and persistence (Csikszentmihalyi, 1996; Dacey, Lennon, & Fiore, 1988).	Reflection is challenging and requires a great degree of self-discipline and perseverance; individuals must resist making quick, easy conclusions.
Product	Creative products must be both original and appropriate (Runco & Jaeger, 2012).	Critical reflection results in new (original) understandings that pave the way for transformative (useful) learning.
	Creative products often have an element of surprise; original ideas challenge the expected, resulting in a surprising clash	Uncovering assumptions is often shocking; restructuring understandings often challenges the status quo, and individuals are surprised to learn their most basic

	between reality and expectation (Boden, 1996).	understandings could be narrow-minded (Brookfield, 2012).
Press	Environments that provide flexible time for problem solving are conducive to creativity. An individual's first ideas are seldom his most original, and it is essential to provide time for the production of remote associates (Mednick, 1962).	Environments that provide flexible time for reflection allow for the development and exercise of metacognitive skills necessary to consider experiences from multiple points of view. Without critical reflection, individuals are likely to rely on habits and routine, resorting to pre-determined interpretations of experiences (McNamara, 1990; Noffke & Brennan, 1988).
	Environments that encourage learners to express creativity in a plethora of modalities (e. g., art, writing, cooking) are likely to increase creative self-efficacy and combat common biases concerning what qualifies as creativity.	Flexible environments that encourage reflection through multiple modalities are likely to enhance critical reflection, since learners are free to explore their experiences in a manner that they find exciting and comfortable (James & Brookfield, 2014).
	Creativity is more likely if learners have the freedom to explore a topic that they find intrinsically motivating (Hennessey & Amabile 2010). Controlling extrinsic motivation is detrimental to creativity, but informational or enabling extrinsic motivation can be conducive to creativity (Amabile, 1997).	Guided reflection provides the appropriate extrinsic motivation for learners to engage in meaningful reflection (Ash & Clayton, 2009). However, critical reflection is unlikely if learners are required to follow strict instructions, and precluded from exploring content of interest.
	Collaborative environments that provide positive challenge and appropriate support are conducive to creativity (Hennessey & Amabile, 2010).	Collaboration encourages critical reflection; individuals share diverse viewpoints and challenge one-another to remain open-minded in their interpretations (Ramsey, 2004).
	Environments that promote tolerance encourage individuals to take the risk to propose new, often seemingly eccentric ideas (Runco & Sumners, 2015).	In order to engage in critical reflection, individuals must have a safe psychological space that provides appropriate support and challenge as they uncover potentially difficult assumptions or misunderstandings (Hartman, 2001).

Process	<p>Wallas (1926) asserted that creative thinking progresses through the following stages: preparation, during which the individual identifies a problem and gathers relevant resources, incubation, which involves setting the problem aside, illumination, which refers to the coveted “a-ha moment” of creative problem-solving, and verification, during which the individual tests his or her new ideas. An additional step, implementation, is often proposed to describe putting a new idea into action.</p>	<p>Reflection is often described through Kolb’s (1984) Experiential Learning Cycle, which includes the following stages: concrete experience, which refers to a real-world experience, reflective observation, during which individuals consciously and subconsciously ponder the differences between expectation and reality, abstract conceptualization, which is the a-ha moment that leads to a modified understanding, and active experimentation, during which newly formed beliefs are applied to the real world. Atkins and Murphy (1993) proposed a similar model: awareness of discomfort prepares the learner for action, leading to the exploration of multiple viewpoints and resulting in the development and application of new understandings. Gibbs’s (1988) reflective cycle also contains a final, implementation stage in which individuals create and implement action plans based on interpretations of their experiences.</p>
	<p>Assumption analysis is a central component to problem finding; individuals question rules and regulations in order to recognize areas for growth. A variety of potential solutions are then produced through divergent thinking (Fiorelli & Russ, 2010). While divergent thinking has been shown to predict creative potential, divergence alone is not sufficient for creativity (Guildford, 1968, Michael, 1999). Individuals must consider historical and cultural context in order to produce ideas that are appropriate and useful, as well as original.</p>	<p>Brookfield (1987; 1988) proposed four learning processes essential to critical reflection: assumption analysis, which unearths deeply held beliefs; contextual awareness, which considers assumptions within specific historical and cultural contexts, imaginative speculation, which involves the consideration of multiple viewpoints through divergent thinking, and reflective skepticism, which suspends or temporarily rejects assumptions in order to interpret experiences without bias.</p>

The Interaction of Creative and Reflective Thinking

The out of the box thinking which characterizes creativity requires an open-minded examination of deeply held truths, which is also essential to reflection. Nielsen (2014) described the importance of open-mindedness and reflection in his investigation of design teams attempting to create acceptable solutions that were also innovative and out of the box:

The box is a metaphor often used in creative processes, and in organizational practices, as a term for rules and regulations, everyday routines and tacit knowledge of ‘how things usually are’ and ‘what we know about the world’.

Such a challenge is meant to encourage participants to approach a situation with an open mind, challenge the most basic assumptions and be willing to do things differently. (p. 112)

Out of the box or creative thinking first requires an explicit understanding of the boundaries that “box in” a specific problem. For example, creative thinking in the field of technology requires a certain understanding of the most recent technological advances. In order to create something new and useful, an innovative technician must know the limitations of existing technology. Defining such limitations primes the creative process, guiding the innovator to break boundaries and expand the field. It would be useless, for example, if a technician spent years inventing a product that already exists. Thus, it is inappropriate to advocate for out of the box thinking without first considering the boundaries which define and box in the problem to be solved.

At times, the box which defines real-world problems can be quite nebulous, as it is largely formed by implicit beliefs that are rooted in personal interpretations of

experiences. As Mezirow (2003) proposed in his description of the transformative learning theory, “assumptions constrain us, making our view of the world subjective, often distorting our thoughts and perceptions” (p. 13). Reflective practice functions to make the boundaries that box in problems more explicit, uncovering potentially narrow-minded patterns of thinking and paving the way for transformative, creative thought. As Csikszentmihayli (1996) asserted, the creative process is “less linear than recursive”, driven by ongoing analysis of real-world problems that are uncovered through continual reflection (p.80). Guillaumier (2016) proposed:

Through this process of developing ownership of embodied reflection students are gradually enabled to recognize, articulate and question any intriguing problems or opportunities they may come across. It is through such reflection that creativity regenerates. (p. 362)

Reflection plays a valuable metacognitive role in the creative process. Individuals who stop to mentally evaluate generated ideas are more likely to produce additional ideas with higher originality, when compared to individuals who do not stop to reflect on the quality of idea production (Hao, Ku, Liu, Hu, Bodner, Grabner, & Fink, 2016).

Interestingly, although self-evaluation of one’s product against external standards has been shown to reduce creative production (see Bryon, Khazanchi, & Nazarian, 2010) reflection on one’s product without consideration of external standards enhances creative production (Hao et al., 2016). Such a mental evaluation of ideas could guide the alternation of idea generation and evaluation, encouraging the fluctuation between divergent and convergent thinking and enhancing creative productivity (Basadur, Graen, & Green, 1982; Sowden, Pringle, & Gabora, 2015).

Development of Reflection and Creativity

Given the interaction between reflection and creativity, it is not surprising that techniques to encourage the development of these skills are similar in nature.

Reflection Development

Pre-service teachers are quite accustomed to completing reflection assignments, but few have received any direct instruction focused on defining and improving reflective techniques (Choy & Oo, 2012; James, 2007 ; Rodgers, 2002). Reflection is seldom associated with teaching in the real world (Elbaz, 1988, McNamara, 1990), and many PSTs see reflection as something extra and, at times, useless (Hall, 1985; Zeichner & Liston, 1990). As a result, they often view reflection as a superfluous activity that is sprinkled on to teacher preparation lessons, rather than a meaning-making experience that is imperative to success in their future profession (Hartman, 2001). Choy and Oo's (2012) study of practicing teachers revealed a similar sentiment; while teachers reported that they engaged in self-assessment to ensure they did their jobs properly, they seemed ambiguous to using student feedback to inform and improve their teaching. Such alarming findings support Spalding and Wilson's (2002) assertion that we must "actively teach and model reflective skills in a variety of ways if we are to demystify reflection" (p. 1393).

Although reflection is unique to each learner, it does not occur by chance. Educators must provide exercises, strategies, and practical tools to promote reflective thinking (Harrison, Short, & Roberts, 2003). Effective techniques to encourage the development of the reflective practice include cooperative discussion (Edge 2002; 2010; Kroath, 1990), guided reflection activities (Ash & Clayton, 2009), online tools (Fox,

Muccio, White, & Tian, 2015), written assignments (Kuiper & Pesut, 2004), and open-ended portfolio activities (Farr & Riordan, 2015; Fox et al., 2015).

Kroath (1990) proposed teachers work together as Critical Friends in order to examine practices and engage in cooperative, reflective learning. Critical Friend Groups provide a safe environment for peers to confront assumptions and challenge beliefs. When students share their experiences with peers from diverse backgrounds, they encourage one another to consider circumstances from multiple perspectives and engage in meaningful reflection (Ramsey, 2004). Guided reflection techniques (see Ash & Clayton, 2009 for an extensive summary of guided reflection) provide the appropriate scaffolding for PSTs to uncover and transform assumptions. Activities such as mock trial, for example, force PSTs to consider experiences from multiple points of view, and carefully selected reading, video, and field work assignments expose PSTs to areas outside of their comfort zones. Thus, effective teacher educators select diverse learning experiences that guide PSTs through the reflective process, providing the appropriate balance between challenge and support (Campoy & Radcliffe, 2002; Feiman-Nemser, 2001; Walkington, 2005).

Online tools provide a non-threatening environment for reflective thinking, promoting both interaction and collaboration. For example, blogs foster narration and identity expression, and chats often promote emotional and affective engagement (Hughes, 2007, Hanson-Smith, 2006). Online tools are particularly effective when used over extensive time periods, providing an avenue for PSTs to examine the development of their reflective practice and trace their growth over time (Mair, 2012).

Written assignments, most commonly in the form of journaling, are the most popular techniques to encourage reflection in PSTs (Kuiper & Pesut, 2004). The writing process helps students find their voice, requiring them to make thoughts explicit and fueling future action (Freidus, 1991). However, written reflections vary greatly in their structure; some PSTs are simply instructed to reflect about their experiences and others are required to follow more explicit instructions (Andrews & Wheeler, 1990). Absent well-crafted instruction and guidance in the reflective writing process, PSTs are likely to view such assignments as a waste of time and fail to recognize reflection as a vehicle for learning (Spalding & Wilson, 2002).

Research has demonstrated that PSTs prefer to reflect in multiple modalities, and thus effective reflective training provides autonomy and choice (Spalding & Wilson, 2002). Flexible learning environments promote intrinsic motivation, creating an innate desire to learn (Ryan & Deci, 2000). For example, portfolios can be used to provide an open space for PSTs to reflect in a creative manner, unrestricted by particular modalities (Fox et al., 2015).

Unfortunately, techniques to encourage the development of reflective thinking are typically sporadic and disconnected, often bringing greater confusion rather than clarity to the importance of the reflective practice (Knowles & Holt-Reynolds, 1994; Zeichner, 2008). Nebulous instructions to take an imaginative stretch (see James & Brookfield, 2014) when reflecting may seem encouraging, but in reality such assertions often confirm PSTs' misconceptions of reflection as a expendable requirement and neglect to provide appropriate guidance towards the development of meaningful reflective practice (Floden & Klinzing, 1990; Hatton & Smith, 1995; Huntley, 2008; Palmer, 2000).

Creativity Development

Several techniques have been shown to encourage individuals to fulfill their creative potential, revealing that the development of creativity can be facilitated (Basadur, 1994; Meador, Fishkin, & Hoover, 1999; Runco & Sumners, 2015; Scott, Lentz, & Mumford, 2004). The diversity of these techniques reflects the multifaceted nature of creativity; several strategies focus on enhancing the cognitive capacities and skills necessary for creative thought, others emphasize affective factors such as motivation and attitude, and some target the development of environments that are conducive to creative productivity (see Runco & Sumners, 2015 for a summary).

Creativity training which focuses on the cognitive components of creativity addresses basic cognitive processes such as attention and memory, but typically emphasizes higher-order, metacognitive strategies such as strategic problem solving and divergent thinking (Kleibeuker, De Dreu, & Crone, 2016; Runco & Sumners, 2015). Interestingly, several of the metacognitive tactics shown to encourage the creative process point to the relationship between reflection and creativity. Indeed, creative thinking strategies such as change perspectives, question assumptions, and get another opinion are equally important to the reflective practice. As Runco and Sumners (2015) proposed,

Many creative persons make a habit of questioning assumptions [or focusing] on doing what has not been done before. Some have as their goals personal paradigm shifts, their intent being to break new ground. They may stretch and extend ideas, approaches, or work in entirely new directions. (p. 1)

Assumption analysis, or re-interpreting past information, is key to creative thought since it frees individuals from functional fixedness and, thus, facilitates the production of original ideas (Ohlson, 1992). As previously discussed, assumption analysis also paves the way for critical reflection, encouraging individuals to reconsider “the way things have always been done” and remain open-minded to consider innovative methods to improve their circumstances (Brookfield, 1988).

Some of the most impactful mechanisms to maximize creative potential address the affective components of creativity, progressing beyond the how to engage in the creative thinking process to address the why (Amabile, 1988; Mumford, 2003; Runco & Sumners, 2015). As Amabile (1988) noted, “No amount of skill in the domain or in the methods of creative thinking can compensate for a lack of appropriate motivation to perform an activity” (p.133). Successful creativity training promotes a culture of tolerance, which encourages individuals to take the risk to explore new ideas and become what Torrance (1995) referred to as a “minority of one” (p. 121). Such motivational aspects of creativity training mirror the assertions to create a safe psychological space for reflective thinking to occur (Hartman, 2001). As Runco and Sumners (2015) proposed, “Attitudinal changes may be necessary because people will need to expend effort to change their ways. They will need to break routines, to question assumptions, and to take risks” (p. 3).

Conclusion

Since future educators enter teacher preparation programs with preconceived notions concerning what qualifies as good teaching, it is imperative to strategically design teacher preparation experiences to facilitate the recognition and potential

transformation of such beliefs (Borg, 2004; Boyd, Gorham, Justice, & Anderson, 2013).

No two classrooms are the same, and teacher preparation programs must support the development of appropriate professional dispositions that equip PSTs to respond and adapt to the various needs and interests of diverse student populations (Darling-Hammond, 2006; Ford, Stuart, & Vakil, 2014; Gay, 2000; Gay & Kirkland, 2003; Markos, 2012). Although the plethora of assertions to encourage PSTs to adopt an inquiry stance is encouraging, such assertions must be met with well-designed instructional techniques that support the development of this problem-solving perspective.

Both reflective and creative thinking are essential to the inquiry stance; the marriage of the two constructs ensures that PSTs are continually evaluating their experiences with an open-mind and actively seeking opportunities to creatively adapt and improve their practices. In order to equip PSTs to engage in meaningful reflection, teacher preparation programs must progress beyond nebulous and intermittent support of the reflective practice to provide well-crafted experiences that encourage reflective thought, create safe places to address potentially difficult learning outcomes, and support future educators throughout the reflective thinking process. The intersection between reflection and creativity guides the development of such endeavors, illuminating how teacher preparation programs can be designed to equip future educators to be life-long problem solvers in the classroom.

References

- Aguilar, E. (2010). Teaching secrets: When the kids don't share your culture. *Education Digest*, 76(4), 52–54.
- Akiba, M. (2011). Identifying program characteristics for preparing pre-service teachers for diversity. *Teacher's College Record*, 113(3), 658-697.
- Allen, J., & Wright, S. (2014). Integrating theory and practice in the pre-service teacher education practicum. *Teachers & Teaching*, 20(2), 136-151.
- Amabile, T. M. (1988). A model of creativity and innovation in organizations. *Research in Organizational Behavior*, 10, 123-167.
- Amabile, T.M. (1997). Motivating creativity in organizations: On doing what you love and loving what you do. *California Management Review*, 40(1), 39-58.
- Amos, Y.T. (2010). They don't want to get it! Interaction between minority and white pre- service teachers in a multicultural education class. *Multicultural Education*, 17(4), 31– 37.
- Andrews, S., & Wheeler, P. (1990, November). *Tracing the effects of reflective classroom practice*. Paper presented at the annual meeting of the national reading conference, Florida.
- Andriopoulos, C. (2001). Determinants of organization creativity: A literature review. *Management Decision*, 39(10), 834-840.
- Ash, S. L., & Clayton, P. H. (2009). *Learning through critical reflection: A tutorial for service-learning students*. Raleigh, NC: PHC Ventures.

- Atkins, S., & K. Murphy (1993). Reflection: A review of the literature. *Journal of Advanced Nursing*, 18, 1188–1192.
- Badiali, B. J. & Hammond, D.J. (2002, March). *The power and necessity for using inquiry in a PDS*. Paper presented at the Professional Development Schools National Conference, Orlando, FL.
- Badiali, B., Nolan, J., Zembal-Saul, C., & Manno, J. (2011). Affirmation and change: Assessing the impact of the professional development school on mentor's classroom practice. In J. Nath, W. Irma, & J.R. Guadarrama (Eds.), *Investigating university-school partnerships* (pp. 321-346). Charlotte, NC: Information Age Publishing.
- Barnes, H. (1989). Structuring knowledge for beginning teaching. In M. Reynolds (Ed.), *Knowledge base for the beginning teacher* (pp. 13-22). New York: Pergamon Press.
- Barron, F. (1969). *Creative person and creative process*. New York: Holt.
- Basadur, M. S., Graen, G. B., & Green, S. G. (1982). Training in creative problem solving: Effects on ideation and problem finding in an applied research organization. *Organizational Behavior and Human Performance*, 30, 41-70.
- Basadur, M. (1994). Managing the creative process in organizations. In M.A. Runco (Ed.), *Problem Finding, Problem Solving, and Creativity* (pp. 237-268). Norwood, NJ: Ablex.
- Bitterman, A., Goldring, R., and 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, DC: National Center for Education Statistics. Retrieved from <https://nces.ed.gov/pubs2013/2013313.pdf>
- Boden, M. A. (1996). What is creativity? In M. A. Boden (Ed.), *Dimensions of creativity* (pp. 75-117). Cambridge, MA: The MIT Press.
- Boody, R. M. (2008). Teacher Reflection as Teacher Change, and teacher change as moral response. *Education, 128*(3), 498-506.
- Borg, M. (2004). The apprenticeship of observation. *English Language Teaching Journal, 58*(3), 274-276.
- Boud, D., Keogh, M., & Walker, D. (1985). *Reflection: Turning experience into learning*. London: Kogan Page.
- 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.
- Brookfield, S. D. (1987). *Developing critical thinkers: Challenging adults to explore alternative ways of thinking and acting*. San Francisco: Jossey-Bass.
- Brookfield, S. D. (1988). *Training educators of adults: The theory and practice of graduate adult education*. New York: Routledge.
- Brookfield, S. D. (2012). *Teaching for critical thinking*. San Francisco, CA: Jossey-Bass.
- Bryon, K., Khazanchi, S., & Nazarian, D. (2010). The relationship between stressors and creativity: A meta-analysis examining competing theoretical models. *Journal of Applied Psychology, 95*, 201-212.
- Buchmann, M. (1987). *Teaching knowledge: The lights that teachers live by*. Oxford

- Review of Education* 13(2), 151–64.
- Calderhead, J. & Gates, P. (1993). *Conceptualizing reflection in teacher development*. Washington, D.C.: The Falmer Press.
- Calderhead, J., & Robson, M. (1991). Images of teaching: Student teachers' early conceptions of classroom practice. *Teaching and Teacher Education*, 7(1), 1–8.
- Campoy, R., & Radcliffe, R. (2002). *Reflective decision-making and cognitive development: A descriptive study comparing the reflective levels of pre-service and in-service teachers*. Paper presented at the Annual Meeting of the American Educational Research Association, New Orleans, Louisiana. Retrieved from <http://files.eric.ed.gov/fulltext/ED465753.pdf>
- Castagno, A.E. (2008). "I don't want to hear that!": Legitimizing whiteness through silence in schools. *Anthropology & Education Quarterly*, 39(3), 314–333.
- Charyton, C., & Snelbecker, G. E. (2007). Engineers' and musicians' choices of self-descriptive adjectives as potential indicators of creativity by gender and domain. *Psychology of Aesthetics, Creativity, and the Arts*, 1, 91-99.
- Choy, S.C., & Oo, P.S. (2012). Reflective thinking and teaching practices: A precursor for incorporating critical thinking into the classroom? *International Journal of Instruction*, 5(1), 167-182.
- Clark, C., & Peterson, P. (1986). Teachers' thought processes. In M. Wittrock (Ed.), *Handbook of research on teaching* (pp. 255-296). New York: Macmillan.
- Cochran-Smith, M., & Lytle, S.L. (1999). Relationships of knowledge and practice: teacher learning in communities. *Review of Research in Education*, 24, 249-305.
- Cochran-Smith, M. & Lytle (2001). Beyond certainty: Taking an inquiry stance on

- practice. In A. Lieberman & L. Miller (Eds.), *Teachers caught in action* (pp. 45-58). New York, NY: Teacher College Press.
- Colley, B. M., Bilics, A. R., & Lerch, C. M. (2012). Reflection: A key component to thinking critically. *Canadian Journal for the Scholarship of Teaching and Learning*, 3(1), 213-224.
- Csikszentmihalyi, M. (1996). *Creativity: Flow and the psychology of discovery and invention*. New York: Harper Collins.
- Dacey, J.S., Lennon, K., & Fiore, L. (1998). *Understanding creativity: The interplay of biological, psychological and social factors*. San Francisco: Jossey-Bass.
- Darling-Hammond, L. (2006). Why teacher education is important—and difficult. In L. Darling-Hammond (Ed.), *Powerful teacher education* (pp. 19-42). San Francisco: Jossey-Bass.
- Dewey, J. (1933) *How we think: A restatement of the relation of reflective thinking to the educative process*. Boston: DC Heath and Company.
- Dweck, C. S., & Leggett, E. L. (1988). A social-cognitive approach to motivation and personality. *Psychological Review*, 95, 256–273.
- Dweck, C. S., Chiu, C. Y., & Hong, Y. Y. (1995). Implicit theories and their role in judgments and reactions: A world from two perspectives. *Psychological Inquiry*, 6, 267-285.
- Edge, J. (2002) Closings. In J. Edge (Ed.), *Continuing professional development. Some of our perspectives* (pp. 115-119). Whitstable: IATEFL.

- Edge, J. (2010) Elaborating the monolingual deficit. In D. Nunan & J. Choi (Eds.), *Language and culture: Reflective narratives and the emergence of identity* (pp. 89-96). London: Routledge.
- Eick, C., & Reed, C. (2001). What makes an inquiry-oriented science teacher? The influence of learning histories on student teacher role identity and practice. *Science Teacher Education*, 86(3), 401–416.
- Elbaz, F. (1988) Critical reflection on teaching: Insights from Freire. *Journal of Education for Teaching*, 14(2), 171-181.
- Farr, F., & Riordan, E. (2015). Tracing the reflective practices of student teachers in online modes. *ReCALL: Journal of Eurocall*, 27(1), 104-123.
- Feiman-Nemswor, S. (2001). From preparation to practice: Designing a continuum to strengthen and sustain teaching. *Teachers College Record*, 105(6), 1013-1055.
- Fiorelli, J.A., & Russ S.W. (2010). Developmental approaches to creativity. In J.C. Kaufman & R.J. Sternberg (Eds.), *The Cambridge handbook of creativity* (pp. 233-249). New York, NY: Cambridge University Press.
- Fives, H., & Buehl, M. M. (2008). What do teachers believe? Developing a framework for examining beliefs about teachers' knowledge and ability. *Contemporary Educational Psychology*, 33, 134-176.
- Floden, R., & Klinzing, H. (1990). What can research on teacher thinking contribute to teacher preparation? A second opinion. *Educational Researcher*, 19(5), 15-20.
- Fook, J., White, S. and Gardner, F. (2006) Critical reflection: A review of contemporary literature and understandings. In S.White, J.Fook & F.Gardner (Eds.), *Critical*

- reflection in health and social care* (pp. 3-20). Maidenhead, Berks: Open University Press.
- Ford, B. A., Stuart, D. H., & Vakil, S. (2014). Culturally responsive teaching in the 21st century inclusive classroom. *Journal of the International Association of Special Education*, 15(2), 56-62.
- Fox, R. K., Muccio, L. S., White, C. S., & Tian, J. (2015). Investigating advanced professional learning of early career and experienced teachers through program portfolios. *European Journal of Teacher Education*, 38(2), 154-179.
- Freidus, H. (1991, April). *Critical issues in the curriculum of teacher education programs*. Paper presented at the annual meeting of the American Educational Research Association, Chicago. Retrieved from <http://files.eric.ed.gov/fulltext/ED336348.pdf>
- Furlong, C. (2013). The teacher I wish to be: Exploring the influence of life histories on student teacher idealized identities. *European Journal of Teacher Education*, 36(1), 68-83.
- Garmon, M. A. (2005). Six key factors for changing preservice teachers' attitudes/beliefs about diversity. *Educational Studies: Journal of the American Educational Studies Association*, 38(3), 275-286.
- Gay, G. (2000). *Culturally responsive teaching: Theory, research and practice*. New York, Teachers College Press.
- Gay, G., & Kirkland, K. (2003). Developing critical consciousness and self-reflection in preservice teacher education. *Theory Into Practice*, 42, 181-187.
- Gibbs, G. (1988). *Learning by Doing: A guide to teaching and learning methods*. Oxford

- Brookes University, Oxford: Further Education Unit.
- Goleman, D. (1985). *Vital lies, simple truths: The psychology of self-deception*. New York: Simon & Schuster.
- Gore, J. & Zeichner, K. (1991). Action research and reflective teaching in preservice teacher education: A case study from the United States. *Teaching and Teacher Education*, 7(2), 119-136.
- Grimmett, P.P., Erickson, G.L., Mackinnon, A.M., & Riecken, T.J. (1990). Reflective practice in teacher education. In R.T. Clift, W.R. Houston, & M.C. Pugach (Eds.), *Encouraging reflective practice in education: An analysis of issues and programs* (pp. 20-38). New York: Teachers College Press.
- Grossman, P. L. (1991). Overcoming the apprenticeship of observation in teacher education coursework. *Teaching and Teacher Education*, 7(4), 345-357.
- Grossman, R. (2008). Structures for facilitating student reflection. *College Teaching*, 57, 15-22.
- Guilford, J. P. (1967). *The nature of human intelligence*. New York: McGraw-Hill.
- Guilford, J.P. (1950). Creativity. *American Psychologist*, 5, 444-454.
- Guillaumier, C. (2016). Reflection as creative process: Perspectives, challenges and practice. *Arts and Humanities in Higher Education*, 15(3-4), 353-363.
- Hall, G. (1985). *A stages of concern approach to teacher education*. Paper presented at the annual meeting of the American Educational Research Association, Chicago.
- Retrieved from <http://files.eric.ed.gov/fulltext/ED265126.pdf>

- Hanson-Smith, E. (2006). Communities of practice for pre- and in-service teacher education. In P. Hubbard & M. Levy (Eds.), *Teacher education in CALL* (pp. 301-315). Amsterdam: John Benjamins.
- Hao, N., Ku, Y., Liu, M., Hu, Y., Bodner, M., Grabner, R.H., & Fink, A. (2016). Reflection enhances creativity: Beneficial effects of idea evaluation on idea generation. *Brain Cognition, 103*, 30-37
- Harland, D. J., & Wondra, J. S. (2011). Teacher candidates' reflections on clinical experiences: A comparison of blog and final paper assignments. *Journal of Digital Learning in Teacher Education, 27*(4), 128–133.
- Harrison, M., Short, C., & Roberts, C. (2003). Reflecting on reflective learning: The case of geography, earth and environmental sciences. *Journal of Geography in Higher Education, 27*, 133-152.
- Hartman, H. J. (2001). Developing students' metacognitive knowledge and skills. In H. J. Hartman (Ed.), *Metacognition in Learning and Instruction: Theory, Research and Practice* (pp. 33-63). Boston: Kluwer.
- Hatton, N., & Smith, D. (1995). Reflection in teacher education: Towards definition and implementation. *Teaching and Teacher Education, 11*(1), 33-49.
- Hennessey, B.A., & Amabile, T.M. (2010). Creativity. *Annual Review of Psychology, 61*(1), 569-598.
- Hill, A., Tan, A., & Kikuchi, A. (2008). International high school students' perceived creativity self-efficacy. *Korean Journal of Thinking and Problem Solving, 18*(1), 105-115.
- Hughes, G. (2007) Being and belonging: The importance of identity in online learning

- groups and in teacher preparation. *Teaching and Teacher Education*, 25, 783–789.
- Huntley, C. (2008). Supporting critical reflection in pre-service teacher education. *Journal of the Scholarship of Teaching and Learning for Christians in Higher Education*, 3(1), 18-28.
- Irwin, B. & Boulton, H. (2010) Analysing the development of professional identity in blogging discourse. In C. Rust, C. (Ed.), *Improving student learning: For the twenty-first century learner. Proceedings of the 17th Improving Student Learning Symposium* (pp. 22-32). Oxford: Oxford Centre for Staff and Learning Development.
- James, A. (2007). Reflection revisited: Perceptions of reflective practice in fashion learning and teaching. *Art, Design, and Communication in Higher Education*, 5(3), 179-196.
- James, A. & Brookfield, S. D. (2014). *Engaging imagination: Helping students become creative and reflective thinkers*. San Francisco, CA: Jossey-Bass.
- Jay, J. K. & Johnson, K. L. (2002). Capturing complexity: A typology of reflective practice for teacher education. *Teaching and Teacher Education*, 18, 73–85.
- John, O. P., Naumann, L. P., & Soto, C. J. (2008). Paradigm shift to the integrative Big Five trait taxonomy. In A. P. John, R. W. Robins, & L.A. Pervin (Eds.), *Personality handbook: Theory and research* (pp. 114-158). New York: Guilford.
- Kember, D., McKay, J., Sinclair, K., & Yuet Wong, F. K. (2008). A four-category scheme for coding and assessing the level of reflection in written work. *Assessment and Evaluation in Higher Education*, 33(4), 369-379.

- Kendall, F. E. (1996). *Diversity in the classroom: New approaches to the education of young children*. New York, NY: Teachers College Press.
- Killeavy, Maureen & Moloney (2010). Reflection in a social space: Can blogging support reflective practice for beginning teachers? *Teaching and Teacher Education*, 26, 1070– 1076.
- Kleibeuker, S.W., De Dreu, C.W., & Crone, E. A. (2016). Creativity Development in Adolescence: Insight from Behavior, Brain, and Training Studies. *New Directions For Child and Adolescent Development*, 151, 73-84.
- Klimoski, R. J. & Karol, B. L. (1976). The impact of trust on creative problem solving groups. *Journal of Applied Psychology*, 61(5), 630-633.
- Knowles, S. & Holt-Reynolds, D. (1994). Shaping pedagogies through personal histories in preservice teacher education. *Teachers College Record*, 93(1), 87-113.
- Kolb, D. (1984). *Experiential learning: Experience as the source of learning and development*. Upper Saddle River, NJ: Prentice Hall.
- Kroath, F. (1990). *The role of the critical friend in the development of teacher expertise*, Communication présentée au symposium international: Research on effective and responsive teaching, Université de Fribourg, Suisse.
- Kuiper, R. & Pesut, D. (2004). Promoting cognitive and metacognitive reflective reasoning skills in nursing practice: Self-regulated learning theory. *Journal of Advanced Nursing*, 45(4), 381-391.
- Lortie, D. (1975). *Schoolteacher: A sociological study*. Chicago: University of Chicago Press.

- Lucas, P. (1991). Reflection, new practices and the need for flexibility in supervising student-teachers. *Journal of Further and Higher Education*, 15(2), 84-93.
- MacKinnon, D. W. (1962). The nature and nurture of creative talent. *American Psychologist*, 17, 484-495.
- Mair, C. (2012). Helping students succeed through using reflective practice to enhance metacognition and create realistic predictions. *Psychology Teaching Review*, 18(2), 42-46.
- Makel, M.C., & Plucker, J.A. (2010). Assessment of creativity. In J.C. Kaufman & R.J. Sternberg (Eds.), *The Cambridge handbook of creativity* (pp. 48-73). New York, NY: Cambridge University Press.
- Markos, A. M. (2012). Mandated to learn, guided to reflect: Pre-Service teachers' evolving understanding of English Language Learners. *Issues in Teacher Education*, 21(1), 39-57.
- Maxwell, L. A. (2014). U.S. schools become 'majority minority'. *Education Week*, 34(1), 1-16.
- McNamara, D. (1990). Research on teachers' thinking: Its contribution to educating student teachers to think critically. *Journal of Education for Teaching*, 16(2) 147-160.
- Meador, K.S., Fishkin, A.S., Hoover, M., 1999. Research-based strategies and programs to facilitate creativity. In A.S. Fishkin, B. Cramond, & P. Olszewski- Kubilius (Eds.), *Investigating creativity in youth: Research and methods* (pp. 389-416). Cresskill, NJ: Hampton Press.

- Mednick, S. A. (1962). The associative basis of the creative process. *Psychological Review*, 69, 220-232.
- Mezirow, J. (1981). A critical theory of adult learning and education. *Adult Education Quarterly*, 32(3), 3-24.
- Mezirow, J. (1990). *Fostering critical reflection in adulthood: A guide to transformative and emancipatory learning*. San Francisco: Jossey-Bass.
- Mezirow, J. (1991). *Transformative dimensions of adult learning*. San Francisco: Jossey-Bass.
- Mezirow, J. (1992). Transformation theory: critique and confusion. *Adult Education Quarterly*, 42(4), 185-198.
- Mezirow, J. (2003). Transformative learning as discourse. *Journal of Transformative Education*, 1(1), 58-63.
- Michael, W.B. (1999). Guilford's view. In M.A. Runco & Pritzker, S.R. (Eds.), *Encyclopedia of creativity* (pp. 785-797). San Diego, CA: Academic Press.
- Mumford, M. (2003). Where have we been, where are we going to? Taking stock in creativity research. *Creativity Research Journal*, 15, 107-120.
- National Council for Accreditation of Teacher Education. (2007). *Professional standards for the accreditation of teacher preparation institutions*. Retrieved from <http://www.ncate.org/Standards/ProgramStandardsandReportForms/tabid/676/Default.aspx>
- Nicol, C. (2006). Designing a pedagogy of inquiry in teacher education: Moving from resistance to listening. *Studying Teacher Education*, 2(1), 25-41.
- Nielsen, M. F. (2014). Sizing up 'the box' in order to fit in. *Codesign*, 10(2), 112-134.

- Noffke, S., & Brenna, M. (1988, April). *The dimensions of reflection: A conceptual and contextual analysis*. Paper presented at the annual meeting of the American Educational Research Association, New Orleans. Retrieved from <http://files.eric.ed.gov/fulltext/ED296968.pdf>
- Ohlsson, S. (1992). Information processing explanations of insight and related phenomena. In M. T. Keane & K. J. Gilhooly (Eds.), *Advances in the psychology of thinking* (pp. 1–44). London, England: Harvester Wheatsheaf.
- Ostorga, A. N. (2006). Developing teachers who are reflective practitioners: A complex process. *Issues in Teacher Education*, 15(2), 5-20.
- Palmer, P. J. (2000). *Let your life speak: Listening for the voice of vocation*. San Francisco: Jossey-Bass.
- Piirto, J. (2005). The creative process in poets. In J. C. Kaufman & J. Baer (Eds.), *Creativity across domains* (pp. 1-22). Mahwah & London: Lawrence Erlbaum.
- Ramsey, P. G. (2004). *Teaching and learning in a diverse world*. New York, NY: Teachers College Press.
- Reynolds, M. (1998) Reflection and Critical Reflection in Management Learning. *Management Learning*, 29(2), 183-200.
- Rhodes, M. (1961). An analysis of creativity. *Phi Delta Kappan*, 42, 305-311.
- Rodgers, C. (2002). Defining reflection: Another look at John Dewey and reflective teaching. *Teachers College Record*, 104(4), 842-866.
- Rolfe, G., Freshwater, D. & Jasper, M. (2001). *Critical reflection for nursing and helping professions: A user's guide*. Basingstoke, Palgrave MacMillan.

- Runco, M. A. (1991). *Divergent thinking*. Norwood, NJ: Ablex Publishing Corporation.
- Runco, M. A., & Jaeger, G., J. (2012). The standard definition of creativity. *Creativity Research Journal*, 24(1), 92-96.
- Runco, M. A., & Sumners, S. (2015). Creativity training. In J. Wright (Ed.), *International encyclopedia of social and behavioral sciences* (2nd ed., Vol. 5, pp. 113-116). Oxford, England: Elsevier.
- Ryan, J. (2005, April). *Working toward inclusive leadership*. Paper presented at the Annual Meeting of the American Educational Research Association, Montreal, Canada.
- Ryan, R. M. & Deci, E. L. (2000). Intrinsic and extrinsic motivation: Classic definitions and new directions. *Contemporary Educational Psychology*, 25(1), 54-67.
- Scott, G., Leritz, L.E., Mumford, M.D., 2004. The effectiveness of creativity training: a quantitative review. *Creativity Research Journal* 16(4), 361–388.
- Sowden, P.T., Pringle, A., & Gabora, L. (2015). The shifting sands of creative thinking: Connections to dual-process theory. *Thinking & Reasoning*, 21, 40-60.
- Spalding, E. & Wilson, A. (2002). Demystifying reflection: A study of pedagogical strategies that encourage reflective writing. *Teachers College Record*, 104(7), 1393-1421.
- Sparks-Langer, G., & Colton, A. (1991). Synthesis of research on teachers' reflective thinking. *Educational Leadership*, 3, 37-44.
- Sugrue, C. (1997, May). *Student teachers' lay theories and teaching identities: Their implications for professional development*. Paper presented at the ISSAT Conference, Copenhagen. Retrieved from

<http://www.tandfonline.com/doi/abs/10.1080/0261976970200302?journalCode=cete20>

- Tomlinson, P. (1999). Conscious reflection and implicit learning in teacher preparation part II: Implications for a balanced approach. *Oxford Review of Education*, 25(4), 533–44.
- Torrance, E. P. (1995). *Why fly? A philosophy of creativity*. Norwood, NJ: Ablex.
- Valli, L. (1990). Moral approaches to reflective practice. In R. Clift, W. R. Houston, & M. Pugach (Eds.). *Encouraging Reflective Practice in Education* (pp. 39-56). New York: Teacher College Press.
- Valli, L. R. (1993). Reflective teacher education programs: An analysis of case studies. In J. Calderhead & P. Gates (Eds.). *Conceptualizing Reflection in Teacher Development* (pp. 11-22). London: Falmer.
- Van Manen, M. (1977). Linking ways of knowing with ways of being practical. *Curriculum Inquiry*, 6, 205-228.
- Walkington, J. (2005). Becoming a teacher: Encouraging development of teacher identity through reflective practice. *Asia Pacific Journal of Teacher Education*, 33(1), 53–64.
- Wallas, G. (1926). *The art of thought*. New York: Harcourt Brace and World.
York: Basic Books.
- Zeichner, K. M., & Liston, D. P. (1996). *Reflective teaching: An introduction*. Mahwah, NJ: Lawrence Erlbaum Associates.
- Zeichner, K.M. (2008). A critical analysis of reflection as a goal for teacher education. *Educação & Sociedade*, 29(103), 535-554.

CHAPTER 3

THE INVESTIGATORY STUDY

The successful education of tomorrow's children relies on the cultivation of effective educators who are able to adapt and respond to the unique needs and interests of diverse student populations. As social and cultural gaps between teachers and students continue to widen, it becomes increasingly vital that teacher preparation programs develop professionals who are cognizant of their own backgrounds and able to reflect on experiences to inform future practice (Darling-Hammond, 2006).

Pre-service teachers (PSTs), defined as students preparing to enter the field of education, simultaneously fulfill the roles of both teacher and student (Allen & Wright, 2014). The dance between these roles requires a fair amount of flexibility, and future educators are likely to question their understanding of teaching and learning as they begin to view the classroom from the other side of the desk (Furlong, 2013). Teacher preparation programs strive to prepare PSTs to approach the classroom from an inquiry stance, equipping them to solve unfamiliar problems and adapt to the diverse needs of students, rather than relying on the rote application of prescriptive teaching methods (Badiali & Hammond, 2002; Cochran-Smith & Lytle, 1999). Such an inquiry stance requires both reflective and creative thinking, since educators must critically examine their experiences, resist familiar solutions, and innovatively adapt to the needs of all students.

The cultivation of reflective thinking is a common standard across several teacher preparation programs, since reflection is often seen as the driving mechanism through

which future educators critically examine and improve their teaching practice (Grossman, 2008; NCTAF, 1996; 2007; Ostorga, 2006). Unfortunately, assertions for the development of creative thinking are less prominent, and the influx of demands for reflection are convoluted with discrepancies about the nature of reflective thinking and clear methods to support its development (Badiali & Hammond, 2002; Farr and Riordan, 2015; Hatton & Smith, 1995; King, 1997 Sellars, 2014; Yang, 2009).

Although teacher preparation programs often stress the importance of the reflective practice, research has revealed a general lack of evidence of advanced reflection among PSTs and a vague understanding of the factors that impact reflective thinking (Farr and Riordan, 2015; Hatton & Smith, 1995; King, 1997 Sellars, 2014; Yang, 2009). Furthermore, while there are several tools to assess reflective thinking, many of these have not been critically examined for appropriate reliability and often require extensive time commitment from multiple researchers (see, for example: Ash & Clayton, 2009; Kember, McKay, Sinclair, & Yuet Wong, 2008, 2008; Sparks-Langer, Simmons, Pasch, Colton, & Starko, 1990). Thus, although there is an influx of research investigating reflection in teacher preparation, findings can seldom be related from one study to another (Sellars, 2014). As Rodgers (2002) claimed, “in becoming everything to everybody, it [reflection] has lost its ability to be seen” (p. 843).

The literature on reflection often references the importance of creative thinking skills, asserting that successful reflectors examine experiences with an open mind, investigate situations from multiple perspectives, recognize opportunities for growth, and develop new and often innovative ideas (Brookfield 1988; Gibbs, 1988; Killeavy, Maureen & Moloney, 2010; Lucas, 1991; Hatton & Smith, 1995). Indeed, the marriage of

reflective and creative thinking primes future educators for success in the 21st century classroom, equipping them not only to adapt to, but also capitalize on the unique characteristics of today's increasingly diverse student population. Unfortunately, this potentially rich relationship between reflection and creativity has yet to be explicitly examined, and strategies to simultaneously develop the two processes are vague at best.

Educators are quick to agree that teaching is not a one-size-fits-all process, and neither is reflection. This study was designed to analyze the reliability of the Framework of Reflection for Teacher Education (Harland & Wondra, 2011) and demystify reflective thinking by exploring its interaction with creativity and examining commonalities across advanced reflectors. Such an in-depth analysis of reflection moves beyond the cliché, informing teacher educators how to successfully cultivate the reflective practice of PSTs and equip them to implement change in their future classrooms.

Review of Key Literature

Reflection in Teacher Education

Pre-service teachers identify as both teachers and students, and are thus constantly bombarded by the clash between expectation and reality (Furlong, 2013). The content presented in teacher preparation classes often contradicts beliefs concerning education, and PSTs are tempted to teach the way they were taught rather than adapting methods according to educational research (Lortie, 1975). Although teacher preparation programs aim to cultivate teachers that are knowledgeable in both academic and pedagogical content, PSTs are likely to resist educational theory that conflicts with their personal learning experiences (Furlong, 2013; Garmon, 2005; Rosaen, 2003). One method often used to counter such resistance is the encouragement of reflective thinking (Killeavy &

Moloney, 2010; Rodgers, 2002). Theoretically, reflection serves as a vehicle for change in education; PSTs remain open-minded to consider multiple explanations of their experiences, investigating underlying assumptions and consulting various sources for additional information.

The literature on reflection is often traced back to the work of John Dewey, who defined critical reflection as the

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 conclusions to which it leads...it includes a conscious and voluntary effort to establish belief upon a firm basis of evidence and rationality. (1933, p. 16)

In an effort to fully explain reflection, many researchers have proposed framework or hierarchical models of the construct, of which critical reflection is typically considered the most sophisticated (e.g., Harland & Wondra, 2011; Jay & Johnson, 2002; Kember et al., 2008; Mezirow, 1981; 1991; 1992; Valli, 1990; Van Manen, 1977). For example, Harland and Wondra (2011) proposed that reflective writing be sorted into four levels: Nonreflection, Understanding, Reflection, and Critical Reflection. The lower levels of Nonreflection and Understanding are mainly reactive in nature, but Reflection and Critical Reflection are characterized by an intentional analysis of past experiences to inform future action.

Other researchers have emphasized the reflective process, investigating the stages through which individuals cycle in order to engage in meaningful reflection (Atkins & Murphy, 1933; Boud, Keogh, & Walker, 1985; Gibbs, 1988; Killion and Totdnem, 1991; Kolb, 1984; Rolfe, Freshwater, & Jasper, M., 2001; Schon, 1983). Such process theories

illustrate the importance of moving beyond the simple explanation of experiences, emphasizing that meaningful reflection is both retro and proactive. For example, the ‘What? So what? Now What?’ process model (Rolf, Freshwater, & Jasper, 2001) often used in teacher preparation settings encourages PSTs to consider how their experiences can impact future action in the classroom.

Pre-service teachers gradually evolve from students to professionals as they participate in various field experiences and courses throughout their teacher preparation programs. The transformation from student to teacher begins with an “examination of one’s own cultural assumptions and/or biases, which stem from our education, experiences with diverse groups, and our own student experience as part of a minority or majority population” (Markos, 2012 p. 43). Thus, PSTs form new and sophisticated understandings of teaching and learning as they juxtapose their personal educational experiences with the content and experiences offered throughout teacher preparation programs.

Unfortunately, research has demonstrated a steady lack of critical reflection on the part of student teachers (Farr & Riordan, 2015; Hatton & Smith, 1995; King, 1997; Sellars, 2014; Yang, 2009), many of whom have not “reflected critically upon the ideological qualities of their knowledge and their own misunderstandings...and have no concrete understanding of or commitment to teaching for change” (King, 1977, p. 157). The majority of PSTs have demonstrated reflective thinking that is characteristic of lower levels on reflection frameworks, such as Harland and Wondra’s (2011) Nonreflection and Understanding categories. Such reflections often over-emphasize descriptions

experiences and neglect to critically analyze how experiences can inform future action (Harland & Wondra, 2011; Yang, 2009).

Assessment of Reflective Thinking Using the Framework of Reflection for Teacher Education

The successful cultivation of reflective thinking depends on the ability to reliably assess the construct and investigate the impact that various factors have on its development. Reflective writing is often schematized for assessment purposes; essays, blogs, and other forms of writing are sorted based upon the sophistication of reflection demonstrated (e.g., Harland & Wondra, 2011; Kember et al., 2008; Lee, 2005; Sparks-Langer et al., 1990; Wong, Kember, Chuny, & Yan, 1995). As previously mentioned, Harland and Wondra's (2011) Framework of Reflection for Teacher Education sorts reflective writing into four levels: Nonreflection, Understanding, Reflection and Critical Reflection. Nonreflection is characterized by simple descriptions of experiences that make no effort to connect educational theory with practice. Pre-service teachers at the Understanding level describe their educational experiences in light of the content discussed in teacher preparation courses. However, in order for writing to be categorized as Reflective, PSTs must demonstrate how their interpretations of these experiences aid in the construction of personal philosophies of education and inform future practices. Finally, Critical Reflection involves the transformation of basic assumptions and conceptual frameworks.

Although tools such as the Framework of Reflection for Teacher Education are useful in assessing reflective practice, they often require a fair amount of commitment from multiple judges. Harland and Wondra (2011), for example, reported 100% inter-

rater agreement among four judges who scored 67 reflective writing samples using the Framework. Although this agreement is impressive, judges met to discuss discrepancies in scores for each of the writing samples until a consensus was reached. Such a commitment from judges is, for the most part impractical, and further investigations of the reliability of the Framework are needed. Kember and his colleagues (2008) reported “very good agreement” among judges who independently scored reflective writing samples using their assessment protocol (p. 376). However, this vague assertion was based on the comparison of four judges’ scores for a small sample of four reflective papers, and no statistical evidence of such agreement was provided. Thus, while frameworks to schematize reflective writing can be useful, it is imperative to examine the reliability of such frameworks more closely in order to determine their practical application to the investigation of reflection.

Relationship between Reflection and Creativity

The literature on reflection often indirectly references creativity, revealing similarities between the two processes and demonstrating how creative thinking strategies can potentially be used to encourage reflective thinking (Brookfield 1988; Gibbs, 1988; James & Brookfield, 2014; Killeavy, Maureen & Moloney, 2010; Lucas, 1991; Hatton & Smith, 1995). However, despite the multitude of claims that creativity is important for reflection, vague statements such as the assertion to stretch imaginatively when reflecting reveal a general lack of understanding concerning the relationship between the two constructs (James & Brookfield, 2014, p. 11).

Although definitions of creativity are as diverse and plentiful as those of reflection, the majority of definitions have suggested that creative ideas must be both

original and appropriate (Runco & Jaeger, 2012). Just as creativity results in new ideas that are useful to society, meaningful reflection is the mechanism through which individuals uncover new understandings that pave the way for positive change.

The out of the box thinking which characterizes creativity requires an open-minded examination of deeply held truths (Nielsen, 2014). Reflective practice functions to make the boundaries that box in problems more explicit, uncovering potentially narrow-minded patterns of thinking and paving the way for transformative, creative thought. Reflection also plays a valuable metacognitive role in the creative process, potentially guiding the fluctuation between convergent and divergent thinking as individuals evaluate their ideas and consider methods of improvement (Hao et al., Fink, 2016). As Csikszentmihayli (1996) asserted, the creative process is “less linear than recursive”, driven by ongoing analysis of real-world problems that are uncovered through continual reflection (p. 80).

James and Brookfield (2014) advocated for a creatively reflective classroom in which “challenging questions are raised and multiple sensory domains are engaged” (p. 65). Drawing on Robinson’s (2011, p. 158) assertion that creativity can “breach the boundaries between different frames of reference” they concluded that creativity is a fundamental aspect of reflection. Teaching creative reflection jerks students out of their usual patterns of interpretation and understanding, encouraging engagement through stimulating teaching techniques. Unfortunately, the majority of references to creative thinking in the literature on reflection seem to be based on a socially driven conceptualization of creativity, and little research has explicitly investigated the relationship between the two processes.

Pre-Service Teachers who Demonstrate Advanced Reflective Thinking

The sophistication of reflective practice is deeply intertwined with the experiences the individual is critically examining (Boud and Walker, 1998; Lee, 2005). Analysis of assumptions often stems from experiences that jerk individuals out of their comfort zones and starkly contradict expectations. These critical incidents or disorienting dilemmas lead individuals to check their assumptions and seek explanations through consulting multiple viewpoints (James & Brookfield, 2014; Mezirow, 1998). Thus, PSTs working in unfamiliar or challenging environments are likely to demonstrate advanced reflective thinking skills because such experiences fuel reflection and trigger individuals to search for something that is missing from their existing worldview (James & Brookfield, 2014; Mezirow, 1998; Taylor, 1998).

Although future educators have spent a significant amount of time observing teachers throughout the apprenticeship of observation, they are likely to form misconceptions about teaching and learning during this time since they only see the classroom from the limited vantage point of the student (Borg, 2004; Lortie, 1975). One of the central aims of teacher preparation is to confront such misconceptions and challenge PSTs to filter personal interpretations through research-based theory (Furlong, 2013). As Lortie (1975) proposed, “the mind of the education student is not a blank awaiting inscription” (p. 66).

Since PSTs enter teacher preparation programs with unique perceptions of teaching and learning built throughout the apprenticeship of observation, no two future educators will have identical reflective practices. However, a common characteristic among advanced reflectors is the critical examination of the contradiction between

expectation and reality (Boody, 2008). Pre-service teachers who demonstrate advanced reflective skills move beyond trite and cliché generalizations and take the emotional risk to critically examine their interpretations of experiences (Harland & Wondra, 2011; Kendall, 1996; King, 1997).

Research Methods

The purpose of this study was to investigate the ability to reliably assess reflective practice in order to explore the potential relationship between pre-service teachers' reflective and creative thinking, examine common themes of writing samples demonstrating advanced reflection, and investigate potential commonalities in how advanced reflectors describe their field experiences.

The study was guided by three major questions:

1. Can judges be trained to reliably score reflective essays using the Framework of Reflection for Teacher Education (Harland & Wondra, 2011)?
2. How do PSTs, categorized as different levels of reflectors, differ in regard to:
 - (a) overall creativity
 - (b) specific creative competencies
3. What common themes can be drawn from text segments coded at the highest levels of reflection, and how do participants demonstrating these advanced reflective skills describe their field experiences, in terms of:
 - (a) frequency in which they visited the field location
 - (b) degree to which the field location resembled their personal K-12 educational experiences

Research Design

This study used a mixed methods approach. Judges were trained to score field experience reflection essays using Harland and Wondra's (2011) Framework of Four Levels of Reflection for Teacher Education, and participants were sorted into four levels based on the level of reflective ability demonstrated. Creative potential was assessed by the Torrance Tests of Creative Thinking-Figural, and quantitative analyses were used to investigate potential differences in creative thinking across levels of reflection. Qualitative analyses were used to determine overall themes from text segments coded at the highest level of reflection and investigate how participants who produced these texts described their field experiences, in terms of frequency of visits and resemblance of the field experience location and personal K-12 educational experiences.

Participants

All participants were undergraduate students enrolled in an introductory educational psychology course at a large university in the Southeastern United States during the Spring Semester of 2016. Participants received one research credit in exchange for participating in the study, but they had other options for fulfilling this requirement. The educational psychology course is mandatory for all education majors and is foundational to the teacher preparation program. Students in other related majors, such as counseling or psychology, are also likely to enroll in the course. Students enrolled in the course are required to complete ten field experience hours in which they are actively engaged in an educational environment. Due to this requirement, as well as the fact that the course is foundational to the teacher preparation program, participants in the study were considered to be PSTs. A total of 47 PSTs signed up to participate in the

study, five of which did not arrive at the research location, resulting in a final sample of 42 participants. Table 3.1 summarizes the demographic information of the participants.

Table 3.1. *Demographic Description of Investigatory Study Participants*

	Frequency	Percent
Indicated Gender		
Female	33	78
Male	9	21
Indicated Ethnicity		
White	34	81
African American	1	2
Hispanic	3	8
Asian Pacific	4	10
Age Category		
18-20	28	67
21-23	13	31
24-26	0	0
27-29	1	2
Major		
Education-Content Specific	19	45
Education-Age Specific	10	24
Special Education	2	5
Psychology	2	5
Com. Sciences & Disorders	5	12
Linguistics	1	2
Political Science	1	2
Music Therapy	1	2
Social Studies	1	2

Notes. Total sample size = 42. Percentages are rounded to the nearest whole number. Education-Content Specific majors include majors in art, English, mathematics, science, music, family and consumer science, physical, and social studies education. Education-Age Specific majors include majors in early childhood education, middle grades education, and high school education. Com. Sciences & Disorders = Communication Sciences and Disorders.

Materials

Demographic questionnaire. The demographic questionnaire (see Appendix A) was designed specifically for this study and was composed of eight questions. The first three questions were multiple choice and asked participants to indicate their age range, gender, and ethnic origin (participants had the option to choose “Would rather not say”

for each question). The fourth question asked participants to indicate their major(s)/area(s) of study.

The remainder of the questionnaire was structured to collect information about the diversity of participants' field experience placements. Question five asked participants to indicate the frequency with which they visited their field experience placement (responses included short one-to-two hour segments throughout the semester, three or four segments of three-to-four hours throughout the semester, two segments of about five hours, and one large segment of approximately ten hours). Question six asked participants to indicate the location of their field experience. Question seven asked participants to indicate whether their field experience placement was very similar, somewhat similar, somewhat different, or very different from their K-12 educational experiences, and the final question asked participants to elaborate on this response.

Torrance Test of Creative Thinking-Figural form A. The Torrance Tests of Creative Thinking-Figural (TTCT-Figural) is the most widely used and referenced measure of creative or divergent thinking, and has been translated to over thirty-five languages (Davis, 1997; Kim, 2011). The test was developed by E. Paul Torrance in the late 1950s, and has since been normed five times, most recently in 2016 (see Torrance, 1962; 1963 for Torrance's first published descriptions of the test). The TTCT-Figural displays adequate reliability and validity (Kim, 2006, Treffinger, 1985), and scores on the TTCT-Figural predict ($r=.33$) creative achievement better than any other measure of creative or divergent thinking (Kim, 2008). The TTCT-Figural has impressively large norming samples, with longitudinal validations (Davis, 1997), as well as high predictive validity over a wide age range (Cropley, 2000).

Although there are two parallel forms (A and B) of the TTCT-Figural, this study used just Form A to facilitate data analyses. The TTCT-Figural form A is composed of three activities, each of which is ten minutes in length. In Activity I, participants construct a picture using a single figural stimulus. Activity II requires participants to create a picture or pictures using ten incomplete figures. Finally, Activity III contains three pages of lines that participants use to create a picture or pictures (Torrance, 1966; Kim, 2006).

The TTCT-Figural is scored for five norm-referenced subscales: Fluency (number of ideas), Originality (number of statistically infrequent ideas), Elaboration (number of added ideas), Abstractness of Titles (degree beyond concrete labeling), and Resistance to Premature Closure (degree of psychological openness), as well as a Creative Strengths Subscale composed of thirteen creative personality traits (Torrance & Ball, 1984; Torrance, 1990). Artistic quality is not required to receive credit for any subscales (Chase, 1985). An overall Creativity Index (CI) score can be calculated by averaging the standard scores of the five normed-referenced measures and awarding additional points for Creative Strengths, as indicated in the TTCT Norms-Technical Manual (Torrance, 1998).

Field experience reflection paper. All participants completed the field experience reflection paper before data collection, since it was a mandatory assignment for students enrolled in the educational psychology course. Pre-service teachers completed ten hours of field experience in an educational environment of their choice and reflected on this experience in the final paper, which was due for course credit three days before data collection began.

Reflection papers were required to be about three pages in length, and PSTs were instructed to address the following general topics in their writing: (a) describe the learning environment where they volunteered/worked; (b) relate their experience to class content, and (c) reflect on how the experience expanded their view of learning and teaching. Pre-service teachers in all sections of the educational psychology course received the same directions and grading rubric for this assignment, which can be found in Appendix B.

Framework of Four Levels of Reflection for Teacher Education. Harland and Wondra (2011) created the Framework of Four Levels of Reflection for Teacher Education (see Appendix C) to capture the transformative nature of reflection within the specific population of PSTs. Based on an extensive review of the literature on reflection (Kember et al., 2008; Wong et al., 1995; Hatton & Smith 1995; Gulwadi, 2009; Spalding & Wilson 2002), the authors modified the four level structures for assessment of reflection from Kember et al. (2008) and Hattan and Smith (1995) to fit the unique construct of future educator reflections on field experiences.

As previously described, the Framework sorts reflective writing into four depth of reflection (DoR) levels: Nonreflection, Understanding, Reflection, and Critical Reflection. Reflective writing samples are scored for instances of each level of reflection, and a Highest-Incidence DoR (HI-DoR) score is assigned based on the highest level of reflection identified at any point in the writing sample. Thus, writing samples are coded at the whole paper, rather than text segment level. This facilitates inter-rater reliability, since coders are unlikely to agree on DoR scores for specific text segments, but typically

reach 100% consensus on the HI-DoR score (see Harland & Wondra, 2011; Kember et al., 2008).

Harland and Wondra (2011) pilot tested the Framework by asking four trained judges to analyze five writing samples at a time. Judges independently scored each sample, marking instances of each level of reflection, and then met to discuss HI-DoR scores until 100% consensus was reached. Based upon the discussions during the piloting process, the framework was revised to contain descriptions of subcategories of reflection specific to issues that PSTs are likely to face. After the piloting process, trained judges scored 67 reflective blogs and essays based on the revised protocol, and 100% scoring consensus was reached after judges met to discuss any discrepancies.

Procedures

Data collection spanned the third and fourth weeks of April 2016 (April 18th to April 28th). Participants used an online management system to sign up for one of eight time slots, and arrived at the assigned research location. All participants completed all components of the research study, which took approximately one hour. The first portion of the study was completed online at the research location, and data were collected via Qualtrics, an online survey software (Qualtrics, <https://www.qualtrics.com/>). After reviewing the consent form and agreeing to participate in the study, participants completed the demographic questionnaire and uploaded a confidential copy of their field experience reflection paper. Once all participants in the research group completed the online measures, I asked participants to take a short break before transitioning to the TTCT-Figural, which was a paper-and-pencil measure. The TTCT-Figural took about

forty minutes to complete, including a warm-up exercise and a short break between the second and third activities.

Data Analysis

Research Question One: Can judges be trained to reliably score reflective essays using the Framework of Reflection for Teacher Education (Harland & Wondra, 2011)?

Three trained judges and I collaborated to score the field experience reflection papers according to Harland and Wondra's (2011) Framework of Four Levels of Reflection for Teacher Education (Details about the judges and their training follows this section). The following scores were reported for each paper: (a) number of paragraphs, (b) Depth of Reflection (DoR) score for each paragraph, (c) contextual theme for each paragraph, and (d) tally of DoR scores for the entire paper (instances of Nonreflection, Understanding, Reflection, and Critical reflection). Reflection papers were assigned a Highest Incidence Depth of Reflection (HI-DoR) score based on the most advanced level of reflection demonstrated throughout the paper (see Harland & Wondra, 2011; Kember et al., 2008), and thus sorted into four levels (Nonreflection, Understanding, Reflection, and Critical Reflection) for comparison analyses.

Although the DoR scores for each paragraph were not used for comparison analyses, requiring judges to assign a DoR score for each paragraph facilitated scoring because it split the paper into predefined segments and helped judges remain focused throughout the scoring process. Furthermore, as explained in detail later, inter-rater reliability of judges was determined by comparing DoR scores assigned to each

paragraph, and consultation of DoR scores and corresponding contextual themes for each paragraph facilitated qualitative thematic analyses.

Judges for field experience reflection papers. All four judges were female; two were 24-26 years old and two were 27-29 years old. All judges identified as white/Caucasian. Two had master's degrees in education, one had a master's degree in library and information science, and one was a doctoral student in educational psychology. Two judges were teachers, one worked as a library assistant, and the other worked as an administrative assistant. Three of the judges reported previous experience grading student work in various educational settings.

Training of judges. I developed and delivered a training session to the three additional judges to ensure inter-rater reliability for scoring of the field experience essays (all training materials can be found in Appendix C). Training involved a brief review of the key literature that has investigated reflection in PSTs, as well as an extensive description and discussion of Harland and Wondra's (2011) Framework of Four Levels of Reflection for Teacher Education. Each judge received a copy of Harland and Wondra's (2011) article, as well as a handout describing the four levels of the framework and corresponding tips for appropriately assigning Depth of Reflection scores. After I presented and explained the framework, judges independently assigned DoR scores to eighteen practice text segments and we discussed the scoring of each segment until 100% consensus was reached.

After the training session, each judge had one week to independently score four practice essays. Procedures for scoring an entire essay were as follows: (a) quickly read the essay; (b) count the number of paragraphs in the essay; (c) assign a contextual theme

(e.g., “teaching is not common sense” or “it is important to make connections with students”) to each paragraph; (d) assign a DoR score to each paragraph, and (e) tally the instances of each level of the framework and write the totals on the top right hand corner of the essay.

I hosted a second training session to discuss the scoring of the four practice essays and address any questions that came up during the scoring process. Depth of Reflection scores for each paragraph were discussed until 100% consensus was reached. When discussion was complete and all questions were answered, I distributed a second set of four practice essays. Judges had one week to score these essays and send me their results electronically so I could address any major discrepancies in the scoring and answer final questions before distributing the essays to be scored for the investigatory study.

Reliability of judges. Forty-two field experience papers were analyzed for the investigatory study. Since it was impractical for judges to meet and discuss DoR scores for each paragraph of each paper, all judges scored 12 papers (in order to access inter-rater reliability), one judge scored nine additional papers, and the remaining three judges scored seven additional papers. Two measures of inter-rater reliability, percent majority adjacent agreement and average kappa between judges, were calculated in order to assess the degree that judges consistently coded each paragraph of the 12 papers scored by all judges.

Percent majority adjacent agreement. As suggested in Harland and Wondra’s (2011) description of the Framework of Four Levels of Reflection for Teacher Education, judges discussed their scoring of each paragraph of the practice essays until 100% consensus was reached. When the majority of the judges (three out of four) agreed on the

DoR score for a particular paragraph, they were able to quickly convince the final judge to change his or her scoring so that the group reached 100% consensus. However, it was difficult for judges to reach consensus when there was not a majority that initially agreed on the DoR score. For example, if two judges gave a DoR score of understanding and the other two gave a score of reflection, there was typically a significant amount of discussion before consensus was reached.

Given the fact that a majority of judges was able to quickly convince the final judge to adjust her scoring during the training sessions, it was decided that a majority agreement (3 out of 4) between judges was acceptable if the remaining judge assigned an adjacent DoR score. For example, if DoR scores from each judge were “Understanding, Understanding, Understanding, and Reflection”, this was considered an instance of agreement. However, if the scores for a paragraph were “Understanding, Understanding, Understanding, and Critical Reflection”, this was not considered an instance of agreement since the final judge awarded a DoR score that was not adjacent to understanding. This technique is similar to Stemler’s (2004) suggestion to broaden the definition of agreement by including the adjacent scoring categories on the rating scale. Although it is possible that broadening the definition of agreement to include adjacent scoring categories potentially inflates IRR estimates, the current modified definition only allowed for one adjacent score.

Indeed, if all four scores could be adjacent, this would likely inflate the IRR estimate. For example, under this broad definition, an instance in which judges assigned DoR scores of “Understanding, Reflection, Reflection, and Understanding” would be in agreement, since all scores are adjacent to one another. However, discussions amongst

judges during the training sessions revealed that such cases should not be considered to be in agreement, since they required a significant amount of discussion before 100% consensus in scoring was reached. Since the current definition allows only one score to be adjacent, while the others must perfectly agree (such as “Understanding, Understanding, Understanding, and Nonreflection”), the IRR estimate is unlikely to be inflated. Thus, percent majority adjacent agreement was calculated by tallying the number of paragraphs for which the majority of judges assigned the same score (with the remaining judge assigning an adjacent score) and dividing this by the total number of paragraphs in the sample.

Average kappa. Percent agreement should not be used as the sole IRR estimate, since it does not account for agreement due to chance (Cohen, 1960). For this reason, Cohen’s kappa for each pair of judges was calculated, and the arithmetic mean of these estimates was determined in order to provide an overall agreement for scoring of all paragraphs for the twelve papers (Light, 1971).

DoR scores for paragraphs scored by all judges. Depth of Reflection scores for paragraphs scored by all judges (which were used to assess inter-rater reliability) were determined by examining the majority score. For example, if judges assigned scores of understanding, understanding, understanding, and reflection, the paragraph was coded as understanding. In cases for which DoR scores were split down the middle (e. g., two judges awarded scores of understanding and the other two awarded scores of reflection), the paragraph was coded as the higher of the two scores in order to ensure that participants received the highest DoR possible and were not penalized by lack of agreement between the judges.

Research Question Two: How do PSTs, categorized as different levels of reflectors, differ in regard to:

(a) overall creativity

(b) specific creative competencies

Assignment of Highest Incidence Depth of Reflection scores. After assessing inter-rater reliability, I assigned a Highest Incidence Depth of Reflection (HI-DoR) score to each essay, based on the highest DoR score awarded for any paragraph of the paper. Thus, essays were sorted into four levels (nonreflection, understanding, reflection, and critical reflection), and comparison analyses were used to investigate how levels of reflectors differed in scores on the TTCT-Figural.

Scoring of the TTCT-Figural. All participants in the study completed Form A of the TTCT-Figural, which was scored for all subscales (Fluency, Originality, Elaboration, Resistance to Premature Closure, and Abstractness of Titles) and the Checklist of Creative Strengths, according to protocol in the scoring manual (Torrance, 1990). Overall Creativity Index (CI) scores were calculated by averaging the standard scores for grade 13 (college and above) for Fluency, Originality, Closure, and Titles, and adding the score on the Checklist of Creative Strengths. I scored all of the TTCTs and a second judge scored eight of the 42 tests, and inter-rater reliability was assessed by calculating the Intraclass Correlation Coefficient (ICC) for Creativity Index scores, as well as scores for each subscale and the Checklist of Creative Strengths. Both of us were trained to score the TTCT and received certificates of scoring reliability.

TTCT-Figural scores across levels of reflection. Comparison analyses were limited due to uneven sample size across Highest Incidence Depth of Reflection Scores.

Thus, the four levels of reflection were collapsed into two (Low and High) levels as follows: HI-DoR scores of Nonreflection or Understanding = Low Reflectors, and HI-DoR scores of Reflection and Critical Reflection = High Reflectors. Means and standard errors of overall and individual index scores on the TTCT-Figural for both the Low and High Reflector groups were calculated and compared using independent-samples t-tests.

Research Question Three: What common themes can be drawn from text segments coded at the highest levels of reflection, and how do participants demonstrating these advanced reflective skills describe their field experiences, in terms of:

(a) frequency in which they visited the field location

(b) degree to which the field location resembled their personal K-12 educational experiences

Analyses of paragraphs coded at the highest levels of reflection. Thematic analysis (see Boyatzis, 1998; Braun & Clarke, 2006; Roulston, 2001) was used to examine patterns and overarching themes in paragraphs with DoR scores of Reflection and Critical Reflection. Engagement with the literature related to the qualitative data being analyzed has been shown to enhance thematic analysis by sensitizing the researcher and improving the ability to recognize more subtle features of the data (Tuckett, 2005). Thus, I read all of the field experience papers and generated initial codes based on her knowledge of the literature on reflection. These initial codes were then compared to contextual themes assigned by all judges, and a concise list of over-arching themes across all paragraphs with a DoR Reflection or Critical Reflection was created. Field experience papers were then analyzed through the lens of these themes in order to create a vivid and

informative overview of text segments indicative of advanced reflective thought (Braun & Clarke, 2006; Guest, 2012).

Description of field experiences from PSTs who demonstrated advanced reflective writing. A contingency table was created to investigate how participants who earned HI-DoR scores of Reflection or Critical reflection responded to question five (how frequently did you visit your field experience placement) and six (to what degree did your field experience placement resemble your personal K-12 educational experiences) of the demographic questionnaire.

Results

Reliability of Judges' Depth of Reflection Scores for Each Paragraph of Field

Experience Papers

After judges reached 100% consensus in scoring of practice text segments, each judge independently scored 12 of the 42 field experience papers. The 12 papers scored by all judges ranged between three to ten paragraphs in length ($M = 5.50$ paragraphs, $SD = 1.99$), resulting in a total of 66 paragraphs. Three out of four judges awarded the same DoR score to 58 out of the 66 paragraphs. In each of these cases, the judge that disagreed with the majority assigned an adjacent DoR score. Thus, there was 88% majority adjacent agreement between judges for DoR scores (See Table 3.2).

Table 3.2. *Depth of Reflection (DoR) Scores for the 66 Paragraphs Scored by All Judges in the Investigatory Study*

	J1	J2	J3	J4
DoR Score	Frequency (%)	Frequency (%)	Frequency (%)	Frequency (%)
Nonreflection	24 (36)	27 (41)	20 (30)	21 (32)
Understanding	36 (55)	28 (42)	32 (48)	33 (50)
Reflection	6 (10)	10 (15)	11 (17)	11 (17)
Critical Reflection	0 (0)	1 (2)	3 (5)	1 (2)

Notes. Percentages are rounded to the nearest whole number. J1= Judge one; J2 = Judge two; J3 = Judge three; J4 = Judge four.

Cohen's kappa was computed for each pair of judges, and all values were statistically significant ($p < .001$): κ (Judge One and Two) = .63 (95% CI, .47 to .78); κ (Judge One and Three) = .60 (95% CI, .45 to .76); κ (Judge One and Four) = .52 (95% CI, .34 to .69); κ (Judge Two and Three) = .55 (95% CI, .39 to .72); κ (Judge Two and Four) = .55 (95% CI, .37 to .72); and κ (Judge Three and Four) = .57 (95% CI, .40 to .74). These values were averaged to provide a single index of IRR (Light, 1971), and the resulting kappa indicated moderate agreement, $\kappa = .57$ (Landis & Koch, 1977).

Relationship Between Reflection and Creativity

Highest Incidence Depth of Reflection Scores for field experience papers.

Highest Incidence Depth of Reflection scores were assigned based on the highest instance of reflection demonstrated throughout the entire paper. Of the 42 papers analyzed, one (2%) received a HI-DoR score of nonreflection, 14 (33%) of understanding, 22 (52%) of reflection, and five (12%) of critical reflection.

Scores on the TTCT-Figural. Means and standard deviations of scores on the TTCT-Figural are presented in Table 3.3.

Table 3.3. *Mean Scores and Standard Deviation of the TTCT-Figural for the Investigatory Study*

TTCT-Figural Score	Mean	Standard Deviation
Creativity Index	136.40	10.97
Fluency (SS-G)	103.60	13.88
Originality (SS-G)	102.36	14.24
Elaboration (SS-G)	156.62	6.32
Titles (SS-G)	126.10	14.92
Closure (SS-G)	104.55	23.10
Checklist	17.14	2.47

Notes. SS-G = Standard Score for Grade 13 (college and above). Creativity Index scores were calculated by determining the arithmetic mean of the standard scores for each subscale and adding the points from the Checklist of Creative Strengths.

A high degree of reliability was found between the two judges' scores of the TTCT-Figural, as shown in Table 3.4.

Table 3.4. *Inter-Rater Reliability of Scores on the TTCT-Figural*

TTCT-Figural Score	ICC _(2,1)	95% CI	<i>F</i> (7, 7)
Creativity Index	.95	.78 - .99	40.31 *
Fluency	.88	.56 - .98	18.50*
Originality	.90	.58 - .98	18.89*
Elaboration	.08	-.62 - .71	1.18
Titles	.88	.50 - .97	14.93*
Closure	.65	-.03- .92	4.67**
Checklist	.51	-.24 - .88	3.05

Notes. ICC = Intraclass Correlation Coefficient. 95% CI = 95% Confidence Interval. * $p \leq .001$. ** $p \leq .05$.

TTCT-Figural Scores Across Levels of Reflection. Highest Incidence Depth of Reflection scores were collapsed into two categories, Low and High Reflectors, in order to allow for comparison of means on creativity measures across levels of reflection. Fifteen participants were categorized as Low Reflectors (one participant with a HI-DoR score of Nonreflection and 14 with HI-DoR scores of Understanding) and twenty-seven as High Reflectors (22 with HI-DoR scores of reflection and five with HI-DoR scores of Critical Reflection). Table 3.5 summarizes scores on the TTCT-Figural for participants categorized as Low and High Reflectors.

Table 3.5. *TTCT-Figural Scores for Low and High Reflectors in the Investigatory Study*

TTCT-Figural Score	Low Reflectors Mean (SD)	High Reflectors Mean (SD)
Creativity Index	132.83 (11.35)	138.39 (10.44)
Fluency	99.87 (13.16)	105.67 (14.07)
Originality	99.13 (16.10)	104.15 (13.08)
Elaboration	155.40 (8.10)	157.30 (5.12)
Titles	119.47 (11.32)	129.78 (15.57)
Closure	103.87 (15.78)	104.93 (26.56)
Checklist	17.20 (2.73)	17.11 (2.36)

Notes. SD = Standard deviation. Creativity Index scores were calculated by determining the arithmetic mean of the standard scores for each subscale and adding the points from the Checklist of Creative Strengths. Standard scores for grade 13 (college and above) were used for these calculations.

An independent samples t-test was conducted to compare scores on the TTCT-Figural in the Low and High Reflector groups. There were no potential outliers. Normality was assessed using the Kolmogorov-Smirnov test, and homogeneity of variances was assessed by Levene's test. Residuals were normally distributed ($p = .20$) and there was homogeneity of variances ($p = .88$).

Although the mean Creativity Index score for High Reflectors was higher than that of the Low Reflectors, the difference was not statistically significant, $t(40) = 1.60$, $p = .12$. However, examination of the Cohen's effect size value ($d = .51$) revealed a moderate effect despite this lack of significance (Cohen, 1988). Mean scores on each subscale of the TTCT-Figural for High Reflectors were higher than those of Low Reflectors, and one of these differences, in the scores for Abstractness of Titles, was statistically significant: $t(40) = 2.25$, $p < .05$, $d = .70$. However, since six separate t -tests were conducted, the alpha value of .05 was adjusted to .008 ($\alpha = .05/6$), and it is important to note that the difference in Abstractness of Title scores for High and Low Reflectors is no longer considered significant with this adjustment.

Analysis of Paragraphs Coded at the Highest Levels of Reflection

Thematic analysis techniques revealed overarching themes of paragraphs which received DoR scores of reflection or critical reflection, as summarized in Table 3.6.

Table 3.6. *Overarching Themes for Paragraphs with DoR Scores of Reflection or Critical Reflection*

DoR	Theme	Example Learning Outcome
Reflection	Application of teaching techniques/ planning for future teaching	We wanted the students to shift toward a more intrinsic form of motivation. It is important that we instill in them a sense of being able to accomplish tasks without having someone constantly checking in on them because there isn't always going to be someone who can be there for them all the time (Miranda, para. 3).
	Analysis of student behavior	It took me about three meetings with him to pin-point the reason why he was struggling. The problem lied within his self-concept. He knew that he played multiple sports, and was pretty good at those sports, so his self-concept was that of the stereotypical "jock". Somewhere in his mind the stereotype of him being athletic was telling him he couldn't be smart, which was ruining his grades (Campbell, para. 3).
	Teaching goes beyond academic responsibilities	Sometimes it is more important for teachers to foster social skills that increase children's self-esteem and self-worth than to focus so heavily on what is right and wrong academically (Holly, para. 4).
	Recognizing underlying needs/teaching the whole student	Seeing their desire to move forward in life has brought me joy, but I often find this desire is overridden by a lack of confidence to actually take the steps that will carry them to success. Based on this observation, I decided to use my time volunteering to not only teach mathematics, but to teach the importance of confidence and self-determination (Jake, para. 1).

		Both experiences showed me how people learn differently, and about how learning and development are greatly affected by the students' social environment. Sometimes their inability to learn or find motivation to learn is a result of poor influences in their life (Jessa, para. 4).
	All students learn differently	After my field experience, I came to understand that not every child is alike (Max, para. 3).
		I think being able to find an angle to the assignments that the students like has been effective in getting them to complete their work because they like writing about things that have to do with themselves or things that they personally experience (Miranda, para. 4).
	Importance of relationships	The most valuable asset a teacher has is their connection to the student. Learning cannot occur without mutual respect and trust, and activities should allow the student to demonstrate knowledge along with personality. I have a lot more to learn about education. (Veronica, para. 4).
		I have seen how important it is to get to know my students. It stops me from stereotyping them and subconsciously forcing them to be something they are not (Faith, para. 7).
		If I don't make a point to get to know my students on a more personal level, they're not going to trust, respect, or listen to me (Jessa, para. 4).
Critical Reflection	Dissatisfaction with status quo	I believe that the law about inclusion is very helpful in many ways, but I sometimes felt as if these children that had different learning disabilities should be pulled out to better focus on what they are learning, so that switching to different concepts quickly doesn't overwhelm them (Hanna, para. 3).
	Shift in perspective	I do believe that I saw a different aspect to

about the teaching profession	teaching that I never had before. I kind of always thought that teaching came naturally and all it took was having a good vision and being good with children (Jada, para. 5).
Realization of a misconception or underlying assumption	Before tutoring a student with ADHD, I did not believe it was a real disorder. I thought that it was an excuse to give to misbehaving students (Vincent, para. 8).

Note. DoR = Depth of Reflection. Themes were determined by generating initial codes from a holistic review of all field experience papers in light of current literature on reflection, comparing these codes to contextual themes assigned by judges, and defining over-arching themes that clearly captured the nature of the data. Pseudonyms are used in order to ensure participant confidentiality.

Description of Field Experiences from PSTs who Demonstrated Advanced

Reflective Writing

Comparison analyses between PSTs who demonstrated advanced reflective writing and their descriptions of field experiences were limited due to small sample size and unequal distribution of types of field experiences (in terms of frequency and similarity to personal K-12 educational experiences) reported in the Demographic Questionnaire. Although Fisher's Exact test did not reveal a significant association between advanced reflective ability and descriptions of field experiences ($p > .05$), it is still informative to investigate the descriptive statistics that summarize how advanced reflectors described their field experiences. Table 3.7 summarizes responses describing the nature of field experiences from participants who earned HI-DoR scores of reflection or critical reflection.

Table 3.7. *Nature of Field Experiences Corresponding Papers with HI-DoR Scores Reflection or Critical Reflection*

		Reflection Freq (%)	Critical Reflection Freq (%)
Similarity to K-12 Experience	Very Similar	3 (14)	0 (0)
	Somewhat Similar	4 (18)	1 (20)
	Somewhat Different	3 (14)	3 (60)
	Very Different	9 (41)	1 (20)
	NA	3 (14)	0 (0)
Timeline of Field Experience	One session	1 (5)	0 (0)
	2 sessions	3 (14)	0 (0)
	3-4 sessions	3 (14)	1 (20)
	≥ 5 sessions	15 (68)	4 (80)

Notes. Freq = Frequency. NA = Not Applicable. Percentages are rounded to the nearest whole number.

Discussion

One of the most important findings from this study is the ability to train judges to reliably score writing samples using the Framework of Reflection for Teacher Education, as indicated by evidence of inter-rater reliability between the four trained judges (88% percent majority agreement; average $\kappa = .57$). Harland and Wondra (2011) suggested that judges reach reliability by discussing each writing sample until a consensus is determined, but this procedure is both time-consuming and oftentimes impractical. Thus, a major outcome of this study is the creation of succinct training materials that provide an overview of the literature on reflection to orient judges to the Framework of Reflection for Teacher Education and prepare them to be reliable scorers. If judges are appropriately trained, the time commitment can be reduced, which makes scoring procedures for future research less daunting.

Results also supported the hypothesized relationship between reflection and creativity. Although unequal sample sizes across the four levels of reflection precluded

comparison of TTCT-Figural scores, a positive trend between creative potential and reflective ability was evident when the four levels of reflection were collapsed into two (Low and High) groups. One of these differences in mean scores (for Abstractness of Titles) was statistically significant, $t(40) = -2.25, p < .05, d = .70$. A larger sample size would allow a more sophisticated analysis of the relationship between the two processes.

It is important to note that the comparison of reflection and creativity was most likely impacted by the nature of the assessments that attempted to quantify the two constructs. The Field Experience Reflection Paper was clearly a verbal measure, while the TTCT-Figural only had a small verbal component (Abstractness of Titles). Thus, it is possible that there are stronger similarities between reflection and creativity that were overshadowed by the contrasting natures of the two assessments. Future research should employ more verbal measures of creative potential, such as Torrance's (1974) Tests of Creative Thinking -Verbal in order to investigate the relationship between reflection and creativity in a manner that is potentially less impacted by mode of expression. It would also be interesting to use other methods to assess reflective thinking, since research has indicated that it is important to encourage PSTs to reflect in multiple modalities (Spalding & Wilson, 2002).

It is not surprising that the most significant difference in TTCT-Figural scores between Low and High reflectors was in Titles, since this subscale is predominantly verbal in nature. Higher Abstractness of Titles scores could also relate to the ability to consider multiple explanations for an event and attribute non-obvious meanings to experiences. On the TTCT-Figural, if a participant drew a girl smiling and titled it "girl", he or she would receive a low score for Abstractness of Titles. A title such as "elation",

however, would receive a high score. This ability to abstract is also important to critical reflection. For example, PSTs who see students misbehaving may be quick to label them as “trouble makers”, but those who consider multiple viewpoints may consider less obvious explanations for the behavior, suggesting that the students express creativity in unique manners, or are motivated to entertain and support their peers. This ability to resist quick fixes and consider multiple explanations for experiences that are beyond the obvious is essential to reflective thought (Boody, 2008).

Findings indicated a general lack of evidence of critical reflection among PSTs, a somewhat alarming incident that has been demonstrated by several past studies that investigated reflection in populations of future teachers (Farr and Riordan, 2015; Harland & Wondra, 2011; Hatton & Smith, 1995; King, 1997; Sellars, 2014; Yang, 2009). However, although only five instances of critical reflection were found in the entire sample, it is important not to conclude that PSTs are generally unable to engage in critical reflection. Reflection is an ongoing process, and critical reflection is characterized by the unearthing of assumptions and a commitment to change, both of which require a high degree of vulnerability and self-efficacy (Kendall, 1996; King, 1997). Categorizing reflective thought can be useful for research purposes, but it is essential to remember that the actual reflective process is continual, and oftentimes messy. Pre-service teachers should not be expected to present extensive evidence of critical reflection since they are gradually transitioning from student to teacher and beginning to view themselves as change agents, rather than passive consumers of information (Irwan & Boulton, 2010; Farr & Riordan, 2015).

Analysis of text segments that received the DoR scores of reflection or critical reflection suggested that the nature of fieldwork had an impact on reflective thought, supporting Boud and Walker's (1998) assertion that "context is perhaps the single most important influence on reflection and learning" (p. 196). Eighty percent of the participants who demonstrated critical reflection indicated that they worked in environments somewhat or very different from their personal K-12 educational experiences, and all of these individuals completed fieldwork in small segments (one in three to four sessions, and four in five or more sessions) throughout the semester.

Working in unfamiliar environments is likely to jerk individuals out of their comfort zones, stimulating assumption analysis when expectations do not match reality (Brookfield, 1987; 1988). It is quite likely that PSTs working in unfamiliar environments encountered several critical incidents that lead them to check their assumptions through critical reflection (James & Brookfield, 2014). Engaging in fieldwork throughout the semester, rather than in one large chunk of time, encourages PSTs to continually challenge their expectations with real-world experiences. Indeed, as PSTs shift from learning about educational theory in teacher preparation classes and working in educational environments, they are truly embodying the gap between theory and practice.

The impact of working in environments that contrast personal educational experiences is particularly important in light of the notion of culturally responsive teaching. As student populations continue to diversify, pre-service teachers are confronted with increasingly multinational and multicultural issues (Colley, Bilics, & Lerch, 2012). In order to teach in a manner that not only addresses, but also embraces diversity in the classroom, it is essential that teachers have a firm understanding of their

personal beliefs (Kendall, 1996). Qualitative analysis of text segments indicative of higher levels of reflection further supported transformative power of reflective thinking. As one participant suggested, “I have seen how important it is to get to know my students. It stops me from stereotyping them and subconsciously forcing them to be something they are not.” (Faith, para. 7).

Participants who produced text segments coded at the highest levels of reflection progressed beyond simple explanation of their experiences to articulate personal teaching philosophies, as illustrated by Holly’s assertion to support the social development of her future students and Max’s realization that “not every child is alike” (para. 3). Text segments that received DoR scores of reflection were characterized by the general realization that teaching is “more than meets the eye”, and a more informed and mature understanding of the relational component of the teaching profession.

Text segments with DoR scores of critical reflection level progressed beyond the creation of personal teaching philosophies to express dissatisfaction with the status quo and demonstrate fundamental shifts in understanding. Most field experience papers followed a general linear progression (first describing the logistics of the field placement, next relating a specific experience to class content and finally reflecting on the experience as a whole), but papers with HI-DoR scores of critical reflection demonstrated meaningful learning outcomes throughout the entire paper. Hannah, for example, expressed a concern for students with special needs in the regular classroom in the third sentence of her paper as she reflected on a harsh experience in which she witnessed a teacher call three students “dumb, dumber, and dumbest” (para. 2). Her assertion that “teachers did not handle things in the best way” was followed by an emotional

description of time spent one-on-one with a student with special needs and a commitment to further investigate and potentially improve laws related to inclusion.

Ironically, text segments coded at the critical reflection level were characteristically blunt, lacking the flowery, cliché language that Harland and Wondra (2011) claimed to be indicative of lower levels of reflective thought. For example, Jake ended his paper with a well written, yet ultimately cliché and uninformative text segment that received a DoR score of understanding: This [self confidence] is what will carry them through life. This is what will help them not just hope for a better future, but step, walk, and even run for a better future (para. 3). Such a statement starkly contrasts Vincent's blunt confession that he initially did not believe ADHD was a real disorder, but rather "an excuse to give to misbehaving students" (para. 8), which was indicative of critical reflection.

The surplus of trite and cliché statements throughout the field experience reflection papers could be attributed to the fact that students often attempt to demonstrate knowledge and hide ignorance if they know their reflections are reviewed by tutors or other individuals in authority (Boud, 1999; Sumsion & Fleet, 1996). As previously discussed, critical reflection requires a fair amount of risk-taking and vulnerability, particularly when PSTs articulate potential misunderstandings that they have discovered concerning specific populations (Ford, Harris, Tyson, & Trotman, 2002; Kendall, 1996; King, 1997). It is thus likely that some PSTs found comfort in cliché statements such as "the experience changed me forever", choosing to resist the discomfort and risk that accompanies critically investigating potential misunderstandings and assumptions.

Implications

The overarching purpose of this study was to explicitly investigate the relationship between reflection and creativity and to examine commonalities across reflective writing samples coded at the highest levels of reflection. These investigations were dependent on the successful training of judges to reliably score reflective writing samples using the Framework of Reflection for Teacher Education (Harland & Wondra, 2011). Results indicated that judges could be trained to reliably score reflective essays without meeting to discuss the scoring of individual text segments in detail. Comparison of scores on a test of creative potential across levels of reflection revealed a positive trend between reflection and creative potential. Analysis of text segments coded at the highest levels of reflection revealed common contextual themes, and additional investigations indicated that PSTs who demonstrated advanced reflection predominately reported on field experiences that required them to frequently work outside of their comfort zones.

This study has several implications for the field of teacher preparation. The creation of succinct training materials that have been shown to produce reliable judges for the Framework of Reflection for Teacher Education paves the way for additional, less time-consuming studies to be conducted in the future. Evidence supporting the relationship between reflection and creativity informs the creation of instructional strategies to support the development of reflective thinking. Although direct instruction for reflective thinking is rare (Choy & Oo, 2012; James, 2007; Rodgers, 2002), several instructional techniques have been empirically proven to help individuals fulfill their creative potential (Runco & Sumners, 2015), and it is likely that creative teaching strategies could be used to successfully encourage the development of reflective thinking

skills. Indeed, this study revealed little evidence of critical reflection among PSTs, illustrating the demand for instructional strategies that help demystify the reflective process and equip future educators to meaningfully reflect on their experiences.

Results also demonstrated the importance of carefully crafting field experiences for future educators. Given that the majority of PSTs who produced reflective writing samples coded at the highest levels of reflection reported that they worked in educational environments that contrasted their personal educational experiences, teacher educators should resist taking a “one-size-fits-all” approach when helping students select field experience placements. Future educators are often required to design their own field experiences in introductory education classes, which was the case for participants in the current study. Some participants chose to work in familiar environments (e.g. assisting their favorite past teachers), but others selected placements that exposed them to new, less comfortable settings (e.g. working with students who spoke a different native language). Although working outside of one’s comfort zone requires risk taking, teacher educators should support future teachers in the careful selection of field experience placements that will challenge them and stimulate meaningful reflection. Furthermore, teacher educators should encourage PSTs to visit field placements frequently and guide them to analyze experiences through perspectives rooted in research-based theories of teaching and learning, rather than personal interpretations.

Finally, it is important to note that text segments coded at the highest levels of reflection required a general sense of vulnerability and honesty from PSTs. Teacher educators should keep this in mind as they discuss reflection with their students, emphasizing the importance of the reflective process over the final product, and

establishing a safe environment for future educators to critically examine challenging experiences.

Limitations and Future Directions

One of the main limitations of this study was the uneven sample sizes across Highest Incidence Depth of Reflection scores, which limited comparison analyses between HI-DoR scores and scores on the TTCT-Figural. A fair amount of variability was lost when field experience papers were categorized into four levels (e.g. a paper with two instances of reflection received the same HI-DoR score as a paper with just one instance of reflection), and collapsing the four levels into two further contributed to this lack of variance. Despite this issue, the literature clearly states that reflective writing should be assessed at the whole-paper, rather than the text-segment level (see Harland & Wondra, 2011; Kember et al., 2008; Marton et al. 1993). Attempts were made to transform Highest Incidence Depth of Reflection into a continuous, rather than categorical variable, but this introduced additional issues. For example, an Overall Depth of Reflection score could be tabulated by awarding one point for each instance of understanding, two for reflection, and three for critical reflection, and finally summing these points to determine an overall score. Unfortunately, this technique would operate under the assumption of equal variances between levels of reflection, which is not supported by the literature. Indeed, a transition from Nonreflection to Understanding is unlikely to be equal to the transition from Reflection to Critical Reflection. Furthermore, essays consist of various pieces that fit together to create a whole, and it is difficult to score individual text segments without considering how they fit together holistically (Kember et al., 2008).

Although assessment of reflective essays and journals is common in teacher education programs, this method only addresses final written reflections and does not necessarily capture the ability to reflect in action (Lee, 2005; Schon, 1983). Research has shown that individuals prefer to reflect in multiple modalities (e. g., online platforms, art portfolios, collaborative discussions), and thus sorting reflective writing samples into Harland and Wondra's (2011) framework may not capture true reflective ability (Spalding & Wilson, 2002). Further research should investigate how to capture reflective ability in a more holistic manner (potentially by analyzing multiple indicators of reflection) in order to gain a more accurate measure of reflective thinking that could be compared to creative potential. As previously mentioned, additional measures of creative potential, such as the TTCT-Verbal, should also be used.

An additional limitation was the lack of diversity in the study participants. The majority of the participants were white (81%) and female (78%), thus conforming to the majority of teacher and teacher candidates across the nation who predominantly identify as European American, middle-class and English-speaking (U.S. Department of Education, 2016). Thus, participants who reported working in field experiences that contrasted their personal educational environments predominantly reflected on the transition to interacting with more diverse student populations (e.g., several participants indicated that they attended private schools with predominantly white students and reflected on their field experiences working with populations such as English Language Learners or students in a Title One school). It would be particularly interesting to examine the reflective practice of future educators from minority populations, since their experiences in the field are likely to strongly contrast those from majority populations.

For example, how would a male PST who grew up attending Title One schools interpret his experiences in a private school composed mainly of upper class students? Additional research should investigate the reflective practice of more diverse populations of future educators in order to address such questions, which would greatly inform teacher preparation.

References

- Allen, J., & Wright, S. (2014). Integrating theory and practice in the pre-service teacher education practicum. *Teachers and Teaching*, 20(2), 136-151.
- Ash, S. L., & Clayton, P. H. (2009). *Learning through critical reflection: A tutorial for service-learning students*. Raleigh, NC: PHC Ventures.
- Atkins, S., & K. Murphy (1993). Reflection: A review of the literature. *Journal of Advanced Nursing*, 18, 1188–1192.
- Badiali, B. J. & Hammond, D.J. (2002, March). *The power and necessity for using inquiry in a PDS*. Paper presented at the Professional Development Schools National Conference, Orlando, FL.
- Boody, R. M. (2008). Teacher reflection as teacher change, and teacher change as moral response. *Education*, 128(3), 498-506.
- Borg, M. (2004). The apprenticeship of observation. *English Language Teaching Journal*, 58(3), 274-276.
- Boud, D. (1999). Situating academic development in professional work: Using peer learning. *International Journal for Academic Development*, 4(1), 3-10.
- Boud, D., & Walker, D. (1998). Promoting reflection in professional courses: The challenge of context. *Studies in Higher Education*, 23(2), 191-206.
- Boud, D., Keogh, M., & Walker, D. (1985). *Reflection: Turning experience into learning*. London: Kogan Page.
- Boyatzis, R. E. (1998). *Transforming qualitative information: Thematic analysis and code development*. Thousand Oaks, CA: Sage.

- Braun, V. & Clarke, V. (2006) Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77-101.
- Brookfield, S. (1987). *Developing critical thinkers: Challenging adults to explore alternative ways of thinking and acting*. San Francisco: Jossey-Bass.
- Brookfield, S. D. (1988). *Training educators of adults: The theory and practice of graduate adult education*. New York: Routledge.
- Chase, C. I. (1985). Review of the Torrance Tests of Creative Thinking. In J. V. Mitchell Jr. (Ed.), *The ninth mental measurements yearbook* (pp. 1631–1632). Lincoln: University of Nebraska, Buros Institute of Mental Measurements.
- Choy, S.C., & Oo, P.S. (2012). Reflective thinking and teaching practices: A precursor for incorporating critical thinking into the classroom? *International Journal of Instruction*, 5(1), 167-182.
- Cohen, J. (1960). A coefficient of agreement for nominal scales. *Educational Psychology Measures*, 20, 37–46.
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, NJ: Lawrence Erlbaum.
- Cochran-Smith, M., & Lytle, S.L. (1999). Relationships of knowledge and practice: teacher learning in communities. *Review of Research in Education*, 24, 249-305.
- Colley, B. M., Bilics, A. R., & Lerch, C. M. (2012). Reflection: A key component to thinking critically. *Canadian Journal for the Scholarship of Teaching and Learning*, 3(1), 213-224.
- Cropley, A. J. (2000). Defining and measuring creativity: Are creativity tests worth using? *Roeper Review*, 23(2), 72-29.

- Csikszentmihalyi, M. (1996). *Creativity: Flow and the psychology of discovery and invention*. New York: HarperCollins.
- Darling-Hammond, L. (2006). Constructing 21st century teacher education. *Journal of Teacher Education*, 57(3), 300-314.
- Davis, G. A. (1997). Identifying creative students and measuring creativity. In N. Colangelo & G. A. Davis (Eds.), *Handbook of gifted education* (pp. 269 –281). Needham Heights, MA: Viacom.
- Dewey, J. (1933) *How we think: A restatement of the relation of reflective thinking to the educative process*. Boston: DC Heath and Company.
- Farr, F., & Riordan, E. (2015). Tracing the reflective practices of student teachers in online modes. *ReCALL: Journal of Eurocall*, 27(1), 104-123.
- Ford, D. Y., Harris III, J. J., Tyson, C. A., & Trotman, M. F. (2002). Beyond deficit thinking. *Roeper Review*, 24(2), 52.
- Furlong, C. (2013). The teacher I wish to be: Exploring the influence of life histories on student teacher idealized identities. *European Journal of Teacher Education*, 36(1), 68-83.
- Garmon, M. A. (2005). Six key factors for changing preservice teachers' attitudes/beliefs about diversity. *Educational Studies: Journal of the American Educational Studies Association*, 38(3), 275-286.
- Getzels, J.W., & Jackson, P.W. (1962). *Creativity and intelligence: Explorations with gifted students*. New York: Wiley.
- Gibbs, G. (1988). *Learning by Doing: A guide to teaching and learning methods*. Oxford Brookes University, Oxford: Further Education Unit.

- Grossman, R. (2008). Structures for facilitating student reflection. *College Teaching*, 57, 15-22.
- Guest, Greg (2012). *Applied thematic analysis*. Thousand Oaks, California: Sage.
- Guillaumier, C. (2016). Reflection as creative process: Perspectives, challenges and practice. *Arts and Humanities in Higher Education*, 15(3-4), 353-363.
- Gulwadi, B. B. (2009). Using reflective journals in a sustainable design studio. *International Journal of Sustainability in Higher Education*, 10(1), 43–54.
- Hao, N., Ku, Y., Liu, M., Hu, Y., Bodner, M., Grabner, RH., & Fink, A. (2016). Reflection enhances creativity: Beneficial effects of idea evaluation on idea generation. *Brain Cognition*, 103, 30-37
- Harland, D. J., & Wondra, J. S. (2011). Teacher candidates' reflections on clinical experiences: A comparison of blog and final paper assignments. *Journal of Digital Learning in Teacher Education*, 27(4), 128–133.
- Hatton, N., & Smith, D. (1995). Reflection in teacher education: Towards definition and implementation. *Teaching and Teacher Education*, 11(1), 33-49.
- Irwin, B. & Boulton, H. (2010). Analysing the development of professional identity in blogging discourse. In C. Rust (Ed.), *Improving student learning: For the twenty-first century learner. Proceedings of the 17th Improving Student Learning Symposium* (pp. 22-32). Oxford: Oxford Centre for Staff and Learning Development.
- James, A. (2007). Reflection revisited: Perceptions of reflective practice in fashion learning and teaching. *Art, Design, and Communication in Higher Education*, 5(3), 179-196.

- James, A. & Brookfield, S. D. (2014). *Engaging imagination: Helping students become creative and reflective thinkers*. San Francisco, CA: Jossey-Bass.
- Jay, J. K. & Johnson, K. L. (2002). Capturing complexity: A typology of reflective practice for teacher education. *Teaching and Teacher Education*, 18, 73–85.
- Kember, D., McKay, J., Sinclair, K., & Yuet Wong, F. K. (2008). A four-category scheme for coding and assessing the level of reflection in written work. *Assessment and Evaluation in Higher Education*, 33(4), 369-379.
- Kendall, F. E. (1996). *Diversity in the classroom: New approaches to the education of young children*. New York, NY: Teachers College Press.
- Killeavy, Maureen & Anne Moloney (2010). Reflection in a social space: Can blogging support reflective practice for beginning teachers? *Teaching and Teacher Education*, 26, 1070-1076.
- Killion, J., & Todnem, G. (1991). A process for personal theory building. *Educational Leadership*, 48(6), 14-16.
- Kim, K. H. (2006). Can we trust creativity tests? A review of the Torrance Tests of Creative Thinking (TTCT). *Creativity Research Journal*, 18, 3-14.
- Kim, K. H. (2008). Meta-analyses of the relationship of creative achievement to both IQ and divergent thinking test scores. *Journal of Creative Behavior*, 42, 106-130.
- Kim, K. H. (2011). The creativity crisis: The decrease in creative thinking scores on the Torrance Tests of Creative Thinking. *Creativity Research Journal*, 23(4), 285-295.
- King, J. (1997). "Thank you for opening our minds": On praxis, transmutation, and black studies in teacher development. In J. King, E. Hollins & W. Hayman (Eds.),

- Preparing teachers for cultural diversity* (pp. 156-169). New York: Teachers College Press.
- Kolb, D. (1984). *Experiential learning: Experience as the source of learning and development*. Upper Saddle River, NJ: Prentice Hall.
- Landis, J. R., & Koch, G. G. (1977). The measurement of observer agreement for categorical data. *Biometrics*, 33, 159-174.
- Lee, H.-J. (2005). Reflection and teaching: A taxonomy. *Teaching and Teacher Education*, 21, 699-715.
- Light, R. J. (1971). Measures of response agreement for qualitative data: Some generalizations and alternatives. *Psychological Bulletin*, 76(5), 365-377.
- Lortie, D. (1975). *Schoolteacher: A sociological study*. Chicago: University of Chicago Press.
- Lucas, P. (1991). Reflection, new practices and the need for flexibility in supervising student-teachers. *Journal of Further and Higher Education*, 15(2), 84-93.
- Makel, M.C., & Plucker, J.A. (2010). Assessment of creativity. In J.C. Kaufman & R.J. Sternberg (Eds.), *The Cambridge handbook of creativity* (pp. 48-73). New York, NY: Cambridge University Press.
- Markos, A. M. (2012). Mandated to learn, guided to reflect: Pre-Service teachers' evolving understanding of English Language Learners. *Issues in Teacher Education*, 21(1), 39-57.
- Marton, F., G. Dall'Alba, & E. Beaty (1993). Conceptions of learning. *International Journal of Educational Research*, 19(3), 277-300.

- Mezirow, J. (1981). A critical theory of adult learning and education. *Adult Education Quarterly*, 32(3), 3-24.
- Mezirow, J. (1991). *Transformative dimensions of adult learning*. San Francisco: Jossey-Bass.
- Mezirow, J. (1992). Transformation theory: Critique and confusion. *Adult Education Quarterly*, 42,(4), 185-198.
- Mezirow, J. (1998). On critical reflection. *Adult Learning Quarterly*, 48, 185-198.
- National Commission on Teaching and America's Future. (1996). *What matters most: Teaching for America's future*. Retrieved from <http://www.namodemello.com.br/pdf/tendencias/whatmattersmost.pdf>
- National Council for Accreditation of Teacher Education. (2007). *Professional standards for the accreditation of teacher preparation institutions*. Retrieved from <http://www.ncate.org/Standards/ProgramStandardsandReportForms/tabid/676/Default.aspx>
- Nielsen, M. F. (2014). Sizing up 'the box' in order to fit in. *Codesign*, 10(2), 112-134.
- Ostorga, A. N. (2006). Developing teachers who are reflective practitioners: A complex process. *Issues in Teacher Education*, 15(2), 5-20.
- Riddell, T. (2007). Critical assumptions: Thinking critically about critical thinking. *Journal of Nursing Education*, 46(3), 121-126.
- Robinson, K. R. (2011). *Out of our minds: Learning to be creative*. Chichester, West Sussex: Capstone Publishing Ltd.
- Rodgers, C. (2002). Defining reflection: Another look at John Dewey and reflective teaching. *Teachers College Record*, 104(4), 842-866.

- Rolfe, G., Freshwater, D. & Jasper, M. (2001). *Critical reflection for nursing and helping professions: A user's guide*. Basingstoke: Palgrave MacMillan.
- Rosaen, C. L. (2003). Preparing teachers for diverse classrooms: Creating public and private spaces to explore culture through poetry writing. *Teachers College Record*, 105, 1437–1485.
- Roulston, K. (2001). Data analysis and ‘theorizing as ideology’. *Qualitative Research*, 1, 279-302.
- Runco, M.A. & Sumners, S.E. (2016). Creativity training. In J. D. Wright (Ed.), *International Encyclopedia of the Social & Behavioral Sciences* (2nd ed., Vol 5, pp. 113-116). Oxford: Elsevier.
- Sellers, M. (2014). *Reflective practice for teachers*. London: SAGE.
- Tuckett, A. G. (2005). Applying thematic analysis theory to practice: A researcher's experience. *Contemporary Nurse*, 19(1-2), 75-87.
- Runco, M. A., & Jaeger, G. J. (2012). The standard definition of creativity. *Creativity Research Journal*, 24(1), 92-96.
- Schon, D. A. (1983). *The reflective practitioner: How professionals think in action*. New York: Basic Books.
- Spalding, E. & Wilson, A. (2002). Demystifying reflection: A study of pedagogical strategies that encourage reflective writing. *Teachers College Record*, 104(7), 1393-1421.
- Sparks-Langer, G. M., Simmons, J. M., Pasch, M., Colton, A., & Starko, A. (1990). Reflective pedagogical thinking: How can we promote it and measure it? *Journal of Teacher Education*, 41(4), 23-32.

- Stemler, S. E. (2004). A comparison of consensus, consistency, and measurement approaches to estimating interrater reliability. *Practical Assessment, Research, and Evaluation*, 9(4), 1-11.
- Sumsion, J. & Fleet, J. (1996). Reflection: Can we assess it? Should we assess it? *Assessment and Evaluation, Higher Education*, 21, 121–30.
- Taylor, E. W. (1998). *The theory and practice of transformative learning: A critical review*. Columbus, OH: ERIC Clearinghouse on Adult, Career, and Vocational Education.
- Torrance, E. P. (1962). *Guiding creative talent*. Englewood Cliffs, NJ: Prentice-Hall.
- Torrance, E. P. (1963). *Education and the creative potential*. Minneapolis: University of Minnesota Press.
- Torrance, E. P. (1966). *The Torrance Tests of Creative Thinking-norms: Technical manual research edition-verbal tests, forms A and B-figural tests, forms A and B*. Princeton, NJ: Personnel Press.
- Torrance, E.P. (1974). *Torrance Test of Creative Thinking: Norms-Technical Manual*. Bensenville, IL: Scholastic Testing Service.
- Torrance, E. P. (1998). *The Torrance tests of creative thinking norms—technical manual figural (streamlined) forms A & B*. Bensenville, IL: Scholastic Testing Service, Inc.
- Torrance, E. P. (1990). *The Torrance Tests of Creative Thinking directions manual, figural forms A and B*. Bensenville, IL: Scholastic Testing Service, Inc.
- Torrance, E. P., & Ball, O. E. (1984). *The Torrance Tests of Creative Thinking Streamlined (revised) manual, Figural A and B*. Bensenville, IL: Scholastic

- Testing Service, Inc.
- Treffinger, D. J. (1985). Review of the Torrance Tests of Creative Thinking. In J. V. Mitchell, Jr. (Ed.), *The ninth mental measurements yearbook* (pp. 1632–1634). Lincoln, NE: Buros Institute of Mental Measurements, University of Nebraska.
- Valli, L. (1990). Moral approaches to reflective practice. In R. Clift, W. R. Houston & M. Pugach (Eds.). *Encouraging Reflective Practice in Education* (pp. 39-56). New York: Teacher College Press.
- Van Manen, M. (1977). Linking ways of knowing with ways of being practical. *Curriculum Inquiry*, 6, 205-228.
- Wong, F. K. Y., Kember, D., Chung, L. Y. F., & Yan, L. (1995). Assessing the level of student reflection from reflective journals. *Journal of Advanced Nursing*, 22, 48-57.
- Yang, S. H. (2009). Using blogs to enhance critical reflection and community of practice. *Educational Technology & Society*, 12(2), 11–21.

CHAPTER FOUR

THE APPLIED STUDY

Both seasoned and novice educators are quick to agree that no amount of teacher preparation classes can fully prepare future educators for the ever-changing challenges and opportunities in the teaching profession. Since every student is unique, educators must constantly adapt to unfamiliar, often challenging experiences. The fluctuating demands of teaching in the real world must be met with an open mind; instead of applying prescriptive teaching methods, successful educators adapt and respond to the unique needs of all students.

Well-designed teacher preparation programs cultivate the professional dispositions and skills that characterize such successful and adaptable educators. One of the most common skills required of future educators is reflective thinking, as clearly articulated in learning objectives proposed by various teacher accreditation institutions (Grossman, 2008; NCTAF, 1996; 2007; Ostorga, 2006). Reflective practitioners critically examine their experiences, addressing multi-faceted problems and meeting the needs of all students (Schon, 1987). This reflective process is rooted in creative problem solving, as educators are continually challenged by unfamiliar experiences that are often characterized by ill-defined problems (King & Kitchener, 1994). Thus, reflective and creative thinking work cohesively to equip educators to approach the classroom from an inquiry stance, critically examining experiences with an open mind and considering innovative methods to adapt practices to meet the needs of students, rather than forcing

students to adhere to expectations (Badiali & Hammond, 2002; Cochran-Smith & Lytle, 2001).

Despite the overwhelming assertion to engage in reflective practice, future educators are seldom instructed how to reflect (Choy & Oo, 2012; James, 2007; Rodgers, 2002). Furthermore, although the literature on reflection often refers to the importance of creative thinking, little research has investigated strategies to intertwine the two processes (Brookfield 1988; Gibbs, 1988; Killeavy, Maureen & Moloney, 2010; Lucas, 1991; Hatton & Smith, 1995). As a result, future educators often view reflection as the simple re-telling of their experiences, rather than a creative mechanism to critically examine circumstances and unearth opportunities for new and transformative practices (Rodgers, 2002; Yang, 2009). Absent explicit instruction for the development of reflective thinking, PSTs fail to engage in meaningful reflection and cling to safe responses which they have accumulated throughout their personal educational experiences (Correia & Bleicher, 2008).

In response to the clash between the demand for reflective practice and the lack of instructional strategies to develop reflective thinking skills, this study investigated the impact of an experimental teacher preparation course designed to enhance reflective thinking through creative teaching strategies. In addition to investigating the course's impact on the reflective ability of future educators, specific emphasis was placed on exploring conceptions of the reflective process itself. The simultaneous development of reflective and creative thinking aimed to equip future educators to adapt to the fluctuating demands of the teaching profession, and thus analysis of the impact of the course informs

teacher preparation programs how to better prepare students to become successful practitioners.

Review of Key Literature

The Importance of Reflection and Creativity in Teacher Preparation

Since it is not possible to fully prepare future educators for the plethora of unique challenges and opportunities they will face in the teaching profession, it is imperative to cultivate the skills that equip them to adapt to and capitalize on the ever-changing needs and interests of their students (NCATE, 2008). Both reflective and creative thinking are essential to such adaptation; successful educators critically examine their experiences, consider multiple explanations for their actions, and take the risk to implement new strategies that have a positive impact on both students and colleagues.

Future educators, also referred to as pre-service teachers (PSTs), are often instructed to engage in reflective practice (Allen & Wright, 2014; Killeavy & Moloney, 2010; Rodgers, 2002). The cultivation of reflective thinking skills is a key objective of several teacher preparation programs (Grossman, 2008; NCATE, 2008; NCTAF, 1996; Ostorga, 2006), since reflection is seen as the mechanism through which PSTs critically examine experiences and demonstrate a commitment to change (Rodgers, 2002). The literature on reflection finds its roots in the work of John Dewey, who claimed that reflection blossoms from real-world problems that disquiet the thinker and motivate her to resolve the issue by persistent and reasoned thinking (Dewey, 1910; 1933; Sellars, 2014). Thus, reflection is a meaning-making process that “requires attitudes that value the personal and intellectual growth of oneself and of others” (Rodgers, 2002, p. 845).

Many researchers have investigated the reflective process, explaining the steps through which individuals typically cycle in order to engage in meaningful reflection (e.g., Boud, Keogh, & Walker, 1985; Gibbs, 1988; Kolb, 1984; Rolf, Freshwater, & Jasper, 2001). Gibbs's (1988) reflective cycle, for example, proposes the following six stages: description, feelings, evaluation, analysis, conclusion, and the creation of an action plan. Perhaps the most well-known model for the reflective process is Rolfe, Freshwater, and Jaspers' (2001) 'What? So what? Now what?' framework, which suggests the reflective process requires individuals to describe their experiences in detail, construct new understandings as they consider theory and reality, and finally interpret these new understandings to inform future action.

Reflection and creativity are deeply intertwined; as individuals make meaning of their experiences, they must harness creative thinking skills to generate multiple explanations of circumstances and develop innovative ideas for improvement (Razdorskaya, 2015). Creative thinking is particularly important when PSTs encounter unfamiliar teaching experiences in which they are tempted to resort to ready-made recipes for action that produce familiar and safe results, rather than taking the risk to critically analyze their experiences and change existing practices (Buchmann, 1987). This is the crux of Torrance's survival definition of creativity (cited in Millar, 1995), "whenever one is faced with a problem for which he has no practiced or learned solution, some degree of creativity is required" (p. 39).

Although definitions of creativity are as diverse as those of reflection, the standard definition asserts that creative ideas must be both original and appropriate (Runco & Jaeger, 2012). These two criteria illustrate the social impact of creativity,

emphasizing that creative ideas are not only unique, but also have a degree of usefulness. The marriage of reflective and creative thinking in the field of education embodies this standard definition, resulting in the production of new (original) understandings that pave the way for transformative (useful and appropriate) practices.

Given that social and cultural gaps between teachers and students continue to widen (Darling-Hammond, 2006), it is imperative that future educators resist the temptation to simply teach the way they were taught (Lortie, 1975). When teaching becomes imitative, it often favors majority populations and fails to appropriately serve all students (Valentiin, 2006; Darling-Hammond, 2006). The cultivation of reflection and creativity not only challenges PSTs to critically examine their teaching practices, but also equips them to collaborate with others to investigate experiences from multiple perspectives and innovatively adapt to diverse student needs.

Development of Reflective Thinking: The Need for Direct Instruction

Although PSTs are often instructed to engage in ongoing reflection, they seldom receive direct instruction on how to do so (Choy & Oo, 2012; James, 2007; Rodgers, 2002). As a result, while many PSTs believe they are reflecting, it is likely they are simply reorganizing their misunderstandings. Reflection becomes a tedious and superfluous activity that is sprinkled onto the end of lessons, rather than a meaning-making experience that shapes learning (Garmon, 2005; Hartman, 2001 Spalding & Wilson, 2002).

Evidence of reflection (e.g., papers, interview transcripts, or blogs) is often sorted into categories or levels for assessment purposes (Harland & Wondra, 2011; Kember, McKay, Sinclair, & Wong, 2008; Lee, 2005; Sparks-Langer, Simmons, Pasch, Colton &

Starko 1990; Wong, Kember, Chuny, & Yan, 1995). Although assessment schemes vary in their nuances, lower levels of reflection are typically characterized by a lack of analysis and overemphasis on verbatim description of experiences, and higher levels of reflection are characterized by the realization and transformation of misunderstandings or assumptions. Unfortunately, empirical analyses have repeatedly shown little evidence of advanced reflection in various populations of PSTs, illustrating the need for instructional strategies to enhance reflective thinking skills (Farr & Riordan, 2015; King, 1997; Hatton & Smith, 1995; Sellars, 2014; Yang, 2009).

Meaningful reflection does not occur by chance, and it is essential that teacher educators provide exercises, strategies, and practical tools to support the development of reflective thinking in PSTs (Harrison, Short, & Roberts, 2003). Explicit instruction concerning reflection nurtures a safe psychological space for reflective thought and promotes feelings of control over learning (Hartman, 2001). As PSTs identify potential assumptions and misunderstandings through reflective thinking, they must be met with appropriate guidance and support as they consider the ways in which new understandings “shape their starting points for practice” (Banks et al., 2005, p. 242). Thus, without instruction and guidance throughout the reflective process, PSTs are likely to remain stuck in lower-levels of reflection (Correia & Bleicher, 2008).

Application of Creative Thinking Strategies to the Reflective Process

The literature on reflection often indirectly references creativity, suggesting that creative thinking strategies can potentially be used to encourage reflective thought (Brookfield 1988; Gibbs, 1988; Killeavy, Maureen & Moloney, 2010; Lucas, 1991; Hatton & Smith, 1995). Unfortunately, many of these references to creativity are

colloquial in nature and, thus, lack a strong foundation in creativity research. For example, James and Brookfield (2014) advocated for a creatively reflective classroom in which “challenging questions are raised and multiple sensory domains are engaged” (p. 65). Drawing on Robinson’s (2011, p. 158) assertion that creativity can “breach the boundaries between different frames of reference”, they proposed various methods to enhance reflective practice through the combination of creativity, imagination, and play. Although qualitative analyses indicated a general positive impact of such strategies, the authors provided little explanation concerning how these strategies related to creative thinking and reported no evidence of direct instruction that emphasized the interaction between reflective and creative thinking.

Razdorskaya (2015) pointed to the symbiotic relationship between reflection and creativity, claiming “reflection is viewed as the basis of creativity and the mechanism allowing the subject of education to make a creative product, to evaluate its novelty and to define the prospects of the further development” (p. 434). Analysis of the interplay between reflection and creativity informed the creation of the Reflective and Creative Approach (RCA) for teaching, which emphasizes the overlap of reflective and creative thinking skill skills. Reflective thinking is the mechanism through which students effectively define the existing world, and creative thinking functions to “change the rules of the game”, equipping individuals to successfully adapt and adjust to fluctuating, real-world challenges (Razdorskaya, 2015, p. 434).

Several techniques have been shown to encourage the fulfillment of creative potential, and research has revealed the successful application of creative thinking techniques and strategies to diverse settings (Runco & Sumners, 2015). As illustrated in

Table 4.1, several of these creative thinking strategies can be used to simultaneously encourage the development of reflective thinking.

Table 4.1. *The Application of Creative Thinking Strategies to the Reflective Process.*

Creative Thinking Strategy	Application to the Reflective Process
Elaboration	In order for PSTs to describe their educational experiences in as much detail as possible, they must remain open-minded and aware of the multitude of factors that can impact student learning. Several process models of reflection have emphasized the importance of providing elaborative descriptions of experiences, claiming that individuals are less likely to rely on their perceptions when they take time to precisely describe what happened (Atkins & Murphy, 1993; Boud, Keogh, & Walker, 1985; Gibbs, 1988; Rolfe, Freshwater, & Jasper, 2011).
Brainstorming	When PSTs face difficult teaching experiences, they often revert to default strategies that they have repeatedly used or witnessed in a classroom setting (Buchmann, 1987; Tomlinson, 1999). In order to resist such fixedness, PSTs must consider multiple explanations and potential outcomes of their experiences. Brainstorming techniques are especially useful in this phase of reflective thinking; PSTs list as many solutions as possible and resist the temptation to conclude that ideas are “too crazy” or “impractical”.
Multiple perspectives	Considering a problem from multiple perspectives enhances reflective thinking, encouraging PSTs to examine their experiences from several unique lenses. This shift in perspective prevents PSTs from relying on their perceptions, helping them uncover assumptions that could be hindering their understandings (Kember et. al, 2008). Van Manen (1977) referred to this thinking strategy as co-orientational grasping, which he defined as the “situation in which one person partakes in the orientation of another” (p. 213).
Visualization	Visualization techniques can help PSTs replay their experiences, encouraging reflection in, on, and for practice (Killion & Totdnem, 1991). Visualization can also encourage feelings of safety; PSTs imagine themselves in various environments and can confidently and thoughtfully consider how they would react (James & Brookfield, 2014).
Metaphorical and analogical reasoning	Analogical reasoning can encourage playfulness, breaking PSTs free from the pressure to “get the right answer” and encouraging them to take the risks associated with critical reflection (Brookfield, 2012). Since PSTs are likely to say they “don’t have the words to express their feelings”, analogical reasoning techniques would be quite effective in helping students understand and express their emotions.
	Role-playing allows PSTs to relive their experiences through multiple vantage points, encouraging them to reflect on how students and

Role-playing	teachers are likely to perceive their experiences differently. Role-playing also provides a safe place for PSTs to practice ongoing reflection. Free from the pressure to perform in front of a real audience of students, PSTs can challenge themselves to rectify common classroom issues in an original manner.
--------------	--

The Incubation Model of Teaching and Its Application to Reflective Thinking

Although it is clear that supporting the development of creative and reflective thinking skills prepares PSTs to make a positive impact in their future classrooms, the assertion to cultivate such skills is met with significant challenges. Pre-service teachers juggle immense responsibilities, often fulfilling the roles of both student and teacher (Allen & Wright, 2014). Furthermore, teacher preparation programs are tasked with developing both content and pedagogical knowledge in future educators, ensuring that PSTs have a strong grasp on the material they will teach as well as a firm understanding of how to successfully communicate this content to students. With such immense demands, it is tempting to conclude that there is simply not enough time to explicitly support the development of reflection and creativity.

Unfortunately, as PSTs begin their fieldwork in various educational environments, they often report that experiences in the real world contradict the material presented in teacher preparation courses (Garmon, 2005; Lucas, 1991). This contradiction widens the gap between theory and practice, and, if not appropriately investigated, could lead PSTs to assume that content presented in education courses cannot be realistically applied to the classroom (Tomlinson, 1999). Torrance, often referred to as the “father of modern creativity”, expressed the importance of addressing this gap and motivating educators to connect theory and practice: “For a long time I had been bothered that courses in psychology and education had such little impact upon what happened in

classrooms. I knew that something had to be done to arouse and motivate teachers and keep them thinking about their insights” (Torrance & Safter, 1990, p. v).

With the demands of every-day teaching in mind, Torrance developed the Incubation Model of Teaching (IMT) as a practical method to deliver academic content while simultaneously supporting the development of creative problem-solving skills (Torrance, 1979; Torrance & Safter, 1990). The IMT guides students through the creative thinking process, encouraging them to keep the learning going beyond the classroom. The model is designed to encourage learners to resist the temptation to draw quick conclusions, allowing time for new ideas to sink in through a process known as incubation (Torrance, 1979; Segal, 2004). The three stages, Heightening Anticipation, Deepening Expectations, and Keeping it Going, are structured to guide students to explore academic content through creative problem solving. Thus, creativity becomes the mechanism for learning, rather than an additional component of the lesson.

The stages of the IMT also parallel the reflective thinking process, as demonstrated by its’ overlap with Rolfe, Freshwater, and Jaspers’ (2001) ‘What? So what? Now what?’ model for reflection and Gibbs (1988) reflective cycle. Rolfe, Freshwater, and Jaspers’ (2001) model guides individuals through the reflective thinking process, first requiring a clear explanation of the experience (‘What’), then a thorough analysis of the situation and its impact on various individuals (‘So what’), and finally the application of these analyses to inform future action (‘Now what’). Gibbs’s (1988) reflective cycle mirrors this model, and is also used in teacher education programs. Learners progress through five stages (description, feelings, evaluation, analysis, and conclusion) in order to reach the climax of the reflective practice, which is the formation

of an action plan. This action plan embodies Torrance and Safter's (1990) assertion to keep the learning going, since PSTs consult learning outcomes of the reflective experience to inform future practices.

Figure 4.1 depicts the spiraling nature of the IMT and illustrates its overlap with these models of reflection. During the Heightening Anticipation stage, learners draw connections between what they are learning and something personally meaningful, encouraging the connection between theory and practice. In Deepening Expectations, learners interact with new material through various information-processing strategies, exploring academic content from multiple perspectives. Finally, rather than providing a clear conclusion to the lesson, the Keeping it Going stage encourages students to bring learning outside of the classroom and transform thought into action (Torrance, 1979; Torrance & Safter, 1990). Although these stages progress linearly, the model works in a continuous cycle that eventually spirals outward; thus, Heightening Anticipation, Deepening Expectations, and Keeping it Going continually feed into one-another (Murdock, 1993; Nitkowski, 2004).

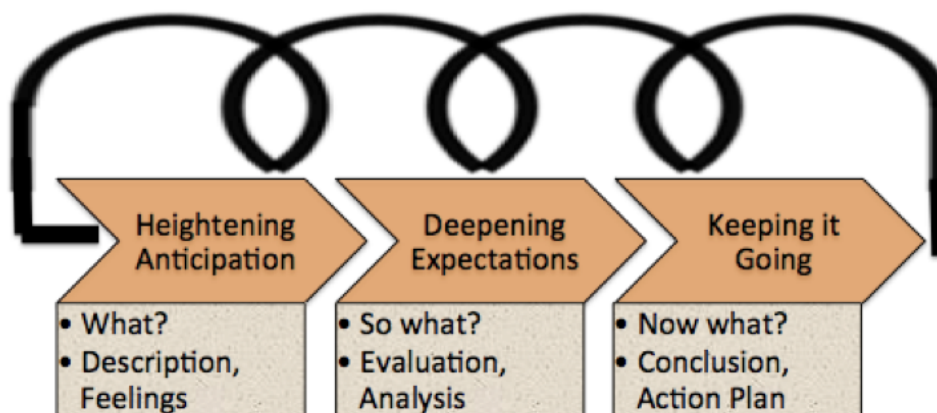


Figure 4.1. The spiraling nature of the IMT and its overlap with Rolf et al.'s (2001) and Gibb's (1988) description of the reflective process.

Given the theoretical connections between reflection and creativity, it is hypothesized that coupling lessons based on the Incubation Model of Teaching with direct instruction for reflection and creativity will enhance both reflective and creative thinking skills in PSTs.

Research Methods

The purpose of this study was to investigate the impact of an experimental educational psychology course designed to enhance reflective thinking through creative teaching strategies. Pre-service teachers enrolled in the experimental course were compared to those enrolled in other course sections that were not instructed via the experimental methods. Both sections covered the same academic content and required students to complete a final reflection paper, but the experimental class was specifically designed to support the development of reflective thinking throughout the semester.

Comparison of the experimental and control groups emphasized potential differences in reflective ability and conceptions of the reflective practice. The study was thus guided by three major questions:

1. How do PSTs who have completed the experimental version of the educational psychology course differ from those who have completed other course sections, in terms of:
 - (a) Highest incidence of depth of reflection, as assessed by final reflection papers scored using the Framework of Reflection for Teacher Education (Harland & Wondra, 2011)
 - (b) Scores on each subscale of the Reflection Questionnaire (Kember et al., 2000)?

2. Do PSTs who have completed the experimental educational psychology course display a different attitude toward reflective thinking than those who completed existing course sections? More specifically, are PSTs who completed the experimental class more likely than those who completed other course sections to agree that:
 - (a) The reflective practice is important to the teaching profession
 - (b) They have developed a greater understanding of reflection throughout the course
 - (c) Their views of reflection have changed as a result of the course?
3. How does the conception of reflection for PSTs who completed the experimental course differ from that of PSTs who completed existing course sections?

Statement of Subjectivity

Before further explaining the study, it is important to articulate my personal interest in the investigation of the reflective and creative thinking processes. What follows is a summary of my personal interest in the study, which illustrates my commitment to the systematic “monitoring of the self” that helps me remain aware of how my subjectivity may potentially influence the study and its findings (Peshkin, 1988; p. 20).

As a child, my favorite activity was playing school. I assumed the role of my favorite teachers, mimicking their teaching strategies and pretending that all of my students were engaged in the lesson and happily learning. As I grew older, I began to seriously consider making my favorite pretend game a reality. During my first year of college, I enrolled in multiple education courses. I wrote papers about how the whole

world was a classroom, read a plethora of education case studies, and engaged in critical conversations about educational theory. I couldn't wait to be a real teacher and finally stand on the other side of the desk and inspire all of my students to learn.

I arrived early to my first field experience placement, enthusiastically shook my cooperating teacher's hand, and followed him to the classroom. This was the moment I had dreamt of; I spent hours preparing my lesson, and my first day of teaching outfit was a perfect mix of professional and trendy. However, as I reflect on that day it is clear that my outfit was the only thing that lived up to my expectations. I walked nervously into the classroom and quickly realized that my students didn't resemble the attentive pretend classes that I taught as a child. The class was quite diverse; students were white, African American, Hispanic, and Asian. Some were perched in their chairs, watching me curiously. Others sat with their heads on the table, mindlessly doodling or writing notes to friends. I can replay this moment in my head like a movie, watching every detail unfold and feeling my nerves wind up like a ball of string. I often come back to this moment, the moment when I realized that teaching in the real world hardly resembles textbook case studies or pretend play. For several years, I tried to fix the "problems" I saw in the classroom, doing everything in my power to make my teaching experiences live up to my expectations. It was only when I began to study educational psychology and reflect on my teaching and learning experiences that I realized I was part of the problem.

Throughout my K-12 educational experiences, I was heavily involved in creative problem solving programs that taught me to look for new and innovative ways to solve problems. My passion to creatively express myself eventually became an area of

academic interest as I embarked on my doctoral studies in gifted and creative education. Throughout my studies, I had multiple opportunities to teach students from diverse backgrounds in a variety of settings. During my second year, I was member of a seminar in which I met with a small group of doctoral students and faculty members to reflect on our work in a local Title 1 school. As I listened to other doctoral students explain their perceptions of our work during our seminar meetings, I quickly realized that my view of teaching and learning was narrow at best. The combination of reflective and creative thinking challenged me to unpack my assumptions and misunderstandings; as a group, we constantly explored our experiences from multiple perspectives and collaborated to design innovative strategies to meet the needs of our students. Throughout this seminar, I discovered that I had my own view of successful teaching, which was largely based on my educational experiences as a white, upper-class student in the Southeastern United States. I assumed what inspired me would inspire my students, and aimed to emulate my favorite teachers, replicating practices that I had equated with success.

Since it took me several years to recognize that I was operating under a narrow view of teaching, I have always wanted to closely investigate future educators as they encounter real-world teaching experiences for the first time. During my first year teaching introductory educational psychology, I was alarmed by how few connections my students made between the course content and their field experiences. I attempted to implement reflective journaling assignments, but their entries were littered with cliché statements and course reviews revealed an alarming negative attitude toward this strategy. This inspired me to investigate the literature on reflection through the lens of

creativity, which culminated in my design of the experimental course that promotes reflective thinking through creative teaching strategies.

Studying reflection is a messy process, and I had to be careful not to unintentionally pressure my students to have the same epiphanies that characterize my personal reflective practice. Although I provided feedback throughout the semester, I emphasized group reflection activities in order to ensure that students received feedback from various individuals. Furthermore, I was careful not to assume that my students preferred to reflect in the same manners that I do, and thus designed the course to encourage creative reflection through multiple modalities. Most importantly, I practiced what I preached and completed all of the reflection activities along with my students. This encouraged ongoing monitoring of the self and helped me stay aware of potential biases throughout the study. When appropriate, I shared my reflective practice with the students, demonstrating vulnerability and honesty to cultivate a safe environment for them to engage in meaningful practice.

Analyses comparing the reflective practice of PSTs in my experimental class to those in the control group were primarily quantitative in nature. This ensured that I did not unintentionally manipulate qualitative data to conform to my biases. Instead, qualitative data served an elaborative role in the study, bringing depth to differences between PSTs in the experimental and control groups that were discovered through quantitative analyses. Thus, my personal interests helped me place myself in the participants' shoes, but the careful design of the study reduced the impact of potential biases I brought to the investigations.

Research Design

This study used an Embedded Design mixed-methods approach (Caracelli & Greene, 1997; Creswell, 2006). Data analyses were primarily quantitative, but the analysis of embedded qualitative data was used to augment the quantitative outcomes of the study and provide a more holistic interpretation of the findings (Palinkas et al., 2011). Qualitative analyses were interpretive in nature, and aimed to understand how PSTs saw reflective thinking as a tool to “interpret and make sense of their experiences and the world in which they live” (Holloway, 1997, p. 2).

Quantitative analyses were used to compare the reflective thinking of participants in the experimental and control group, as assessed by final reflection papers scored by the Framework of Reflection for Teacher Education (Harland & Wondra, 2011) and participant responses on the Reflection Questionnaire (Kember et al., 2000). Additional quantitative analyses investigated how participants in the two groups differed in terms of conception of reflection, as assessed by the Conception of Reflection survey. Thematic analysis (see Boyatzis, 1998; Braun & Clarke, 2006; Roulston, 2001) techniques were used to investigate participant’s elaborations on their responses to items on this survey in order to gain a more holistic understanding of PSTs’ conception of the reflective practice.

As depicted in Figure 4.2, triangulation of qualitative data was embedded within the context of quantitative results, thus strengthening reliability and validity of findings (Patton, 2002). There were three sources of qualitative data: (a) field experience reflection papers, (b) elaborations on questions one through three of the Conception of Reflection Survey, which addressed attitudes toward reflective practice, and (c) descriptions of what is required for meaningful reflection, which were submitted in

response to the final question of the Conception of Reflection Survey. Thematic analyses of each qualitative data source were conducted in reference to all other data sources in order to ensure a holistic understanding of the findings.

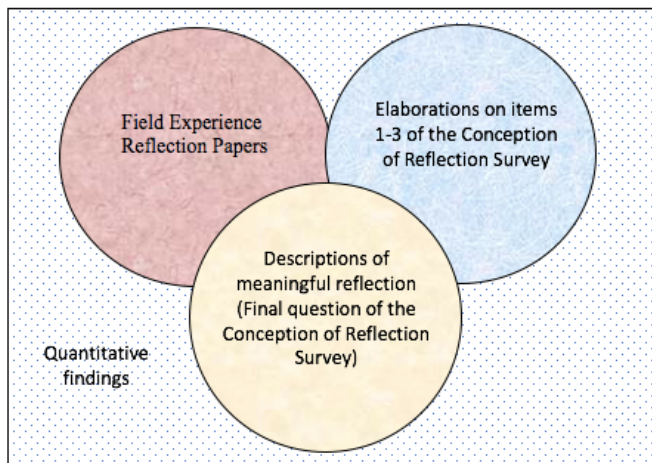


Figure 4.2. Embedded design of the applied study.

Participants

All participants were undergraduate students enrolled in an introductory educational psychology course at a large university in the Southeastern United States during the Fall Semester of 2016. This course is mandatory for all education majors and is foundational to the teacher preparation program. Students in other related majors, such as counseling or psychology, are also likely to complete the course. Students enrolled in the course are required to complete ten field experience hours in which they are actively engaged in an educational environment. Due to this requirement, as well as the fact that the course is foundational to the teacher preparation program, participants in the study were considered to be PSTs.

Participants in the experimental group were enrolled in my experimental section of the educational psychology course. This class covered the same content as other course sections, but it was specifically designed to enhance reflective thinking through creative

teaching techniques. I did not have any contact with participants in the experimental group prior to their enrollment in the class. Participants in the control group were PSTs enrolled in other sections of the educational psychology course.

Participants in the experimental group received two research credits in exchange for participating in the study. Pre-service teachers enrolled in the experimental course were not required to participate in the study and I clearly explained that they could elect to fulfill the research requirement via an alternative assignment. Participants in the control group received one research credit in exchange for their participation and could also fulfill the research requirement via an alternative assignment.

All students enrolled in the experimental course elected to participate in the study, resulting in a final sample of 22 participants in the experimental group. The control group was comprised of 25 participants, resulting in roughly equal sample sizes for the two groups. Table 4.2 summarizes the demographic information of the participants.

Table 4.2. *Demographic Description of Participants in the Applied Study*

	Control Frequency (%)	Experimental Frequency (%)
Indicated Gender		
Female	24(96)	17(77)
Male	1(4)	5(23)
Indicated Ethnicity		
White	21(84)	20(91)
Hispanic	3(12)	0(0)
Asian Pacific	1(4)	2(9)
Age Category		
18-20	20(80)	14(64)
21-23	3(12)	8(36)
24-26	0 (0)	0(0)
27-29	1(4)	0(0)
Major		
Education-Content Specific	6(24)	7(32)
Education-Age Specific	8(32)	10(45)
Special Education	4(16)	0(0)
Psychology	0(0)	1(5)
Com. Sci. & Dis.	5(20)	4(18)
Music Therapy	1(4)	0(0)
Human Dev. & Family Sci.	1(4)	1(5)
Dance	1(4)	0(0)

Notes. Control Group N = 25. Experimental Group N = 22. Education Content Specific majors include majors in art, English, mathematics, science, music, family and consumer science, physical, and social studies education. Education Age Specific majors include majors in early childhood education, middle grades education, and high school education. Com. Sciences & Disorders = Communication Sciences and Disorders. Percentages are rounded to the nearest whole number.

The Experimental Course

Sample materials from the experimental educational psychology course can be found in Appendix D. Although the course was designed to enhance reflective practice, it is important to note that PSTs were never exposed to the measures used to assess reflective ability for comparison analyses at the end of the semester (the Framework of Reflection for Teacher Education and the Reflection Questionnaire). Thus, the course was designed to encourage the development of reflective thinking and did not explicitly

instruct PSTs how to perform in a manner that would secure higher scores of reflective ability than those in the control group.

The experimental course differed from the control in the following ways:

- (1) All lessons were designed based on the Incubation Model of Teaching (Torrance, 1979; Torrance & Safter, 1990).
- (2) Direct instruction concerning the nature and development of reflection and creativity was intertwined throughout the course, with specific emphasis on the relationship between the two constructs.
- (3) Ongoing reflection was encouraged through the following techniques:
 - a. Creative thinking strategies such as those described in Table 4.1
 - b. Online reflection discussion posts
 - c. Structured verbal reflection assignments utilizing Flipgrid (<http://flipgrid.com/info/>), an online collaborative video tool
 - d. Creative critical reflection activities (see Appendix D for an example) that encouraged reflection through multiple modalities (Lee, 2005; Spalding & Wilson 2002).

Materials

Demographic questionnaire. The demographic questionnaire was designed specifically for this study and was composed of four simple questions. The first three questions were multiple choice and asked participants to indicate their age range, gender, and ethnic origin (participants had the option to choose “Would rather not say” for each question). The fourth question asked participants to indicate their major(s)/area(s) of study.

Field experience reflection paper. All participants completed the field experience reflection paper before data collection, since it was a mandatory assignment for students enrolled in the educational psychology course. Pre-service teachers completed ten hours of field experience in an educational environment of their choice and reflected on this experience in the final paper, which was due for course credit three days before data collection began.

Reflection papers were required to be about three pages in length, and PSTs were instructed to address the following general topics in their writing: (a) describe the learning environment where they volunteered/worked; (b) relate their experience to class content, and (c) reflect on how the experience expanded their view of learning and teaching. Pre-service teachers in all sections of the educational psychology course received the same directions and grading rubric for this assignment, which can be found in Appendix B.

Framework of Reflection for Teacher Education. Harland and Wondra (2011) created the Framework of Four Levels of Reflection for Teacher Education (see Appendix A) to capture the transformative nature of reflection within the specific population of PSTs. Based on an extensive review of the literature on reflection (Kember et al., 2008; Wong et al., 1995; Hatton & Smith 1995; Gulwadi, 2009; Spalding & Wilson 2002), the authors modified the four level structures for assessment of reflection from Kember et al. (2008) and Hattan and Smith (1995) to fit the unique construct of future educator reflections on field experiences.

The framework assesses depth of reflection (DoR) on four levels: Nonreflection, Understanding, Reflection, and Critical Reflection. Nonreflection is characterized by

simple descriptions of experiences that make no effort to connect educational theory with practice. Pre-service teachers at the Understanding level describe their educational experiences in light of the content discussed in teacher preparation courses. However, in order for writing to be categorized as Reflective, PSTs must demonstrate how their interpretations of these experiences aid in the construction of personal philosophies of education and inform future practices. Finally, Critical Reflection involves the transformation of basic assumptions and conceptual frameworks.

Reflective writing samples are scored for instances of each level of reflection (by paragraph), and a Highest Incidence DoR (HI-DoR) score is assigned based on the highest level of reflection identified at any point in the writing sample. Thus, writing samples are coded at the whole paper, rather than text segment level. This facilitates inter-rater reliability, since coders are unlikely to agree on DoR scores for each paragraph, but typically reach 100% consensus on the HI-DoR score (see Harland & Wondra, 2011; Kember et al., 2008).

Harland and Wondra (2011) pilot tested the Framework by asking four trained judges to analyze five writing samples at a time. Judges independently scored each sample, marking instances of each level of reflection, and then met to discuss HI-DoR scores until 100% consensus was reached. Based upon the discussions during the piloting process, the framework was revised to contain descriptions of subcategories of reflection specific to issues that PSTs are likely to face. After the piloting process, trained judges scored 67 reflective blogs and essays based on the revised protocol, and 100% scoring consensus was reached after judges met to discuss any discrepancies.

Reflection Questionnaire. The Reflection Questionnaire (Kember et al., 2000) can be found in Appendix A. The scale contains four scales, each measured by four items on a 5-point response scale (1 = definitely disagree; 5 = definitely agree). The scales are: (a) habitual action, which is characterized by activity performed automatically; (b) understanding, which makes use of existing knowledge but makes no attempt to change perspectives; (c) reflection, which involves the recognition and critique of assumptions; and (d) critical reflection, which is characterized by a shift or transformation of assumptions. Confirmatory factor analysis has indicated good fit to the four-factor model based on each scale described above, and Cronbach's alpha values indicate acceptable reliability for each scale ($\alpha = .621, .757, .631, \text{ and } .675$, respectively).

Conception of Reflection Survey. The Conception of Reflection Survey (see Appendix A) was created specifically for this study for the purpose of examining participants' general conceptions of reflection and the degree to which participants reported that these conceptions changed as a result of the educational psychology course. The survey contained three questions scored on a 5-point (1 = definitely disagree; 5 = definitely agree) Likert scale: (1) Reflection is a key component to success in my future career; (2) As a result of this course, I have developed a greater understanding of reflection; and (3) As a result of this course, my view of reflection has changed. Participants were asked to elaborate on their responses to each Likert scale question. Finally, the last question asked participants to describe their general conception of the reflective process by creating a list of key components that are necessary to engage in meaningful reflective thinking.

Procedures

Data collection spanned the Fall 2016 academic semester (August 11th to December 5th). Evidence of the reflective practice of PSTs enrolled in the experimental course was collected on an ongoing basis, and data for the comparison of PSTs enrolled in the experimental course to those enrolled in other sections was collected online during the final two weeks of the semester.

I reviewed the consent documents with PSTs enrolled in the experimental course on the first day of class. Pre-service teachers were told they could earn two research credits in exchange for participating in the study, which required them to complete an online survey at the end of the semester and provide permission for class assignments and activities to be used in data analyses. I assured all PSTs that they were not required to participate and that there would be no differential treatment of research participants. I also explained an alternative assignment that could fulfill the course's research requirement. Pre-service teachers in the experimental course were given one week to complete consent documents in order to ensure they did not feel pressured to make a decision about participation on their first day of class.

Data for the comparison of PSTs in the experimental class to those in other course sections were collected online during the final two weeks of the semester (November 21st to December 5th). Pre-service teachers in the control group earned one research credit in exchange for participation and those in the experimental group earned a total of two credits for their semester-long commitment to the study. Two weeks before the semester ended, I reminded PSTs in the experimental group that they were required to complete an online survey as part of their consent to participate in the study. All PSTs in the

experimental group were then sent a protected link to the survey, which was created via Qualtrics (Qualtrics, <https://www.qualtrics.com/>). Pre-service teachers enrolled in other course sections used an online management system to sign up to participate in the study. After PSTs completed the consent form, the online management system sent them a protected link to the survey.

All PSTs in the experimental and control groups completed the entire survey, which consisted of the demographic questionnaire, the Reflection Questionnaire (Kember et al., 2000), and the Conception of Reflection Survey. After completing all survey items, PSTs uploaded a confidential copy of their field experience reflection paper.

Data Analysis

Research question one: How do PSTs who have completed the experimental version of the educational psychology course differ from those who have completed other course sections, in terms of:

- (a) Highest incidence of depth of reflection, as assessed by final reflection papers scored using the Framework of Reflection for Teacher Education (Harland & Wondra, 2011)**
- (b) Scores on each subscale of the Reflection Questionnaire (Kember et al., 2000)?**

Scoring of field experience reflection papers using the Framework of Reflection for Teacher Education. I independently scored field experience reflection papers according to Harland and Wondra's (2011) Framework of Four Levels of Reflection for Teacher Education. The following scores were reported for each paper: (a) number of paragraphs, (b) Depth of Reflection (DoR) score for each paragraph, and (c) tally of DoR

scores for the entire paper (number of paragraphs scored as Nonreflection, Understanding, Reflection, and Critical Reflection). Reflection papers were then assigned a Highest Incidence Depth of Reflection (HI-DoR) score based on the highest incidence of reflection demonstrated throughout the entire paper. For example, a paper with four paragraphs coded at the Understanding, Reflection, Understanding, and Reflection levels received a HI-DoR score of Reflection (see Harland & Wondra, 2011; Kember et al., 2008).

Reliability for Depth of Reflection scores. Two additional judges scored a sample of the field experience reflection papers in order to assess inter-rater reliability. These judges were previously trained to score reflection papers using the Framework¹. I hosted a refresher training session to review the scoring protocol and discuss indicators for each depth of reflection in the Framework (all training materials can be found in Appendix C). As part of this session, judges assigned DoR scores to twenty-four practice text segments and discussed the scoring of each segment until 100% consensus was reached.

After the training session, judges independently scored 25 percent (12 of the 47) field experience reflection papers. Inter-rater reliability was determined by calculating percent majority adjacent agreement and average kappa for DoR scores assigned to each paragraph of the 12 papers scored by all judges. Percent majority adjacent agreement was calculated by tallying the number of paragraphs for which the majority of judges assigned the same score (with the remaining judge assigning an adjacent score) and dividing this number by the total number of paragraphs in the sample. Average kappa was determined

¹ In a previous study, the three judges worked with one additional judge to score 66 text segments with the Framework of Reflection for Teacher Education. Analysis of inter-rater reliability revealed 88% percent majority agreement between all four judges and average $\kappa = .57$.

by calculating Cohen's kappa for each pair of judges and finding the arithmetic mean of these values (Light, 1971).

Comparison of Highest Incident Depth of Reflection scores in the control and experimental groups. As previously mentioned, HI-DoR scores were determined based on the highest incidence of reflection demonstrated throughout the entire reflection paper. A chi-square test of independence, followed by post hoc analyses, was conducted to investigate the potential association between treatment group (experimental or control) and HI-DoR scores.

Comparison of scores on each subscale of the Reflection Questionnaire.

Each subscale of the Reflection Questionnaire was composed of four questions scored on a one (definitely disagree) to five (definitely agree) Likert scale. Total scores for each subscale were determined by summing the responses for each of these items; therefore, the minimum score on each subscale was 4 and the maximum score was 20. Since it is likely that there is a relationship between subscales on the Questionnaire (individuals who receive high scores on the reflection subscale are also likely to receive high scores on the critical reflection subscale), a MANOVA was conducted to compare mean scores on each subscale of the Questionnaire for the control and experimental groups. Since a MANOVA examines dependent variables simultaneously, it takes into account the correlations between the dependent variables (Huberty & Morris, 1989). Thus, a MANOVA was conducted to determine if the control and experimental groups differed in scores on the Reflection Questionnaire, and then separate univariate ANOVAs examined differences in mean scores for each subscale.

Research question two: Are PSTs who completed the experimental class more likely than those who completed other course sections to agree that:

- (a) The reflective practice is important to the teaching profession**
- (b) They have developed a greater understanding of reflection throughout the course**
- (c) Their views of reflection have changed as a result of the course?**

The first three questions on the Conception of Reflection survey were designed to address PSTs' attitude toward the reflective process. These questions were scored on a one (definitely disagree) to five (definitely agree) Likert scale. Independent *t*-tests compared mean responses of PSTs in the control and experimental groups for each of the three questions, and thematic analyses of elaborations for these responses further explored potential differences.

Research question three: How does the conception of reflection for PSTs who completed the experimental course differ from that of PSTs who completed existing course sections?

The general conception of reflection was assessed by the final question of the Conception of Reflection survey: *In your opinion, what is required to engage in meaningful, reflective thinking? Please list ONE-WORD answers only. For example if the question asked you what was required to have fun, you could write "friends" or "money". Write as MANY ideas as possible. What is required for you to think reflectively?* Two word clouds were created to capture the experimental and control group's responses to this open-ended question. A word cloud, also known as a semantic cloud, is a unique representation of text that is often used to create a visual depiction of

qualitative data (Cidell, 2010). Words that are used more frequently in a text sample appear larger and thus have a greater prominence in the representation (McNaught & Lam, 2010). Word-cloud analyses of written responses provide a visually rich representation of qualitative data that enables researchers to easily investigate common themes across participant responses. Thus, comparison of word clouds generated by textual responses from different groups can quickly reveal thematic differences in group responses (McNaught & Lam, 2010).

Responses from participants in the experimental and control group were compiled into two large lists (one list of words that participants in the experimental group reported were important to engage in reflective thought and one list of words that participants in the control group indicated were important to engage in reflective thought). All words were transformed to their noun forms (e.g., “adaptable” was transformed to “adaptability”) and synonyms were collapsed into one another (e.g., “errors” was transformed to “mistakes”). Lists of participant responses were then uploaded to Wordle (<http://www.wordle.net/create>), a free online tool that quickly creates word clouds to visually represent qualitative data. Two word clouds were created (one for the control and one for the experimental group) to succinctly illustrate the general conception of reflection for PSTs in each group. Comparison analyses investigated differences in common themes that arose from the visual depiction of the data.

Results

Reliability of Judges’ Depth of Reflection Scores for Field Experience Papers

After judges reached 100% consensus in scoring of practice text segments, each judge independently scored 12 of the 46 field experience papers so that inter-rater

reliability could be assessed. The 12 papers scored by all judges ranged between three to seven paragraphs in length ($M = 5$ paragraphs, $SD = 1.21$), resulting in a total of 60 paragraphs. Two out of three judges awarded the same DoR score to 59 out of the 60 paragraphs. In each of these cases, the judge that disagreed with the majority assigned an adjacent DoR score. Thus, there was 98% majority adjacent agreement between judges for DoR scores (See Table 4.3).

Table 4.3. *Depth of Reflection (DoR) Scores for the 60 Paragraphs Scored by All Judges*

	J1	J2	J3
DoR Score	Frequency (%)	Frequency (%)	Frequency (%)
Non Reflection	14 (23)	20 (33)	21 (35)
Understanding	28 (47)	22 (37)	19 (32)
Reflection	14 (23)	13 (22)	13 (22)
Critical	4 (7)	5 (8)	7 (12)
Reflection			

Note. Percentages are rounded to the nearest whole number. J1= Judge one; J2 = Judge two; J3 = Judge three.

Cohen's kappa was computed for each pair of judges, and all values were statistically significant ($p < .001$): κ (Judge one and two) = .59 (95% CI, .43 to .75); κ (Judge one and three) = .46 (95% CI, .30 to .63); and κ (Judge two and three) = .625 (95% CI, .47 to .78). These values were averaged to provide a single index of IRR (Light, 1971), and the resulting kappa indicated moderate agreement, $\kappa = .56$ (Landis & Koch, 1977).

Comparison of Highest Incidence Depth of Reflection scores in the Experimental and Control Groups

As previously explained, HI-DoR scores were assigned based on the highest incidence of reflection demonstrated throughout the paper. Table 4.4. displays the frequencies of HI-DoR scores for participants in the control and experimental groups.

Table 4.4. HI-DoR Scores for Control and Experimental Group

	Control Frequency (%)	Experimental Frequency (%)
Nonreflection	0	0
Understanding	13 (52)	1 (5)
Reflection	12 (48)	13 (59)
Critical Reflection	0	8 (36)

Notes. DoR = Depth of Reflection. Percentages are rounded to the nearest whole number.

There was a significant association between group (control vs. experimental) and HI-DoR score, $\chi^2(2) = 18.21, p \leq .001, \phi_c = .622$. Examination of standardized residuals revealed that differences in the frequencies of understanding and critical reflection were the strongest contributors to this significant association. Of all papers with HI-DoR scores of understanding, 93% were produced by participants in the control group and 7% were produced by participants in the experimental group. All papers with HI-DoR scores of critical reflection were produced by participants in the experimental group.

Comparison of Scores on the Reflection Questionnaire in the Experimental and Control Groups

Table 4.5. reports means and standard deviations for each subscale of the Reflection Questionnaire (Kember et al., 2000) for the control and experimental groups.

Table 4.5. *Scores on each Subscale of the Reflection Questionnaire in the Control and Experimental Groups*

	Control Mean (SD)	Experimental Mean (SD)
Habitual Action	11.60 (2.22)	10.91 (3.33)
Understanding	16.64 (1.69)	18.41 (1.53)
Reflection	15.48 (1.78)	17.45 (1.84)
Critical Reflection	11.40 (3.34)	16.50 (2.48)

Notes. SD = Standard deviation.

A MANOVA was conducted to compare mean scores of each subscale on the Reflection Questionnaire for the control and experimental groups. There were no outliers.

Homogeneity of variance-covariance matrices was assessed by *Box's M* test and normality was assessed using Shapiro-Wilk's normality test for each cell of the design.

There was homogeneity of variance-covariance matrices ($p = .41$), and all residuals were normally distributed ($p > .05$) except for those of the Understanding subscale. Since a MANOVA has been shown to be robust to violations of normality if sample size is greater than 20 and groups are of nearly equal sample size, analyses were carried out despite this violation (Leech, Barrett, & Morgan, 2005).

The multivariate result was significant for group, $F(4, 42) = 10.33, p \leq .001, \eta^2 = .50$, which indicates that there was a difference in scores on the Reflection Questionnaire for participants in the control and experimental groups. Univariate F tests showed there was a significant difference between scores on the Understanding subscale, $F(1, 45) = 14.08, p \leq .001, \eta^2 = .24$; the Reflection subscale, $F(1, 45) = 13.91, p \leq .001, \eta^2 = .24$, and the Critical Reflection subscale, $F(1, 45) = 34.46, p \leq .001, \eta^2 = .43$. The difference between scores on the Habitual Action subscale was not significant.

Impact of the Course on Participant Conception of Reflection

In addition to the Reflection Questionnaire (Kember et al., 2000), participants responded to three simple Likert scale questions (one = strongly disagree; five = strongly agree) on the Conception of Reflection survey that addressed their general attitudes toward reflection and how these attitudes changed throughout the semester. It is important to note that examining potential differences in participant responses to these three questions was an exploratory investigation. Additional research should investigate

potential differences in attitudes toward reflections using more sophisticated measures before results are generalized. Independent-samples *t*-tests were conducted to compare the mean scores on each of these questions for the control and experimental groups, as shown in Table 4.6.

Table 4.6. *Mean Responses on Conception of Reflection Questions for Control and Experimental Groups*

	Control Mean (SD)	Experimental Mean (SD)	<i>t</i> -test
Q1: Reflective thinking is key to success in my future career.	4.36 (.49)	4.86 (.35)	4.08*
Q2: As a result of this class, I have developed a greater understanding of how to engage in meaningful reflection.	3.44 (1.12)	4.73 (.46)	5.27*
Q3: As a result of this class, my view of reflection has changed.	2.80(.96)	4.41(.91)	5.89*

* $p \leq .01$

Notes. SD = Standard deviation. All items were scored on a one (Definitely Disagree) to five (Definitely Agree) Likert scale.

On average, participants in the experimental group agreed more strongly ($M = 4.86$, $SD = .35$) than those in the control group ($M = 4.36$, $SD = .49$) that reflection is a key component to success in their future careers; $t(45) = 4.08$, $p \leq .01$, $r = .52$.

Participants in the experimental group also agreed more strongly ($M = 4.73$, $SD = .46$) than those in the control group ($M = 3.44$, $SD = 1.12$) that they had developed a greater understanding of how to engage in reflection throughout the class; $t(45) = 5.27$, $p \leq .01$, $r = .62$.

The largest difference in mean response to the conception of reflection questions pertained to the degree to which participants reported that their view of reflection changed as a result of the educational psychology course. On average, participants in the

experimental group agreed more strongly ($M = 4.73$, $SD = .46$) than those in the control group ($M = 3.44$, $SD = 1.12$) that their view of reflection had changed as a result of taking the class; $t(45) = 5.89$, $p \leq .01$, $r = .66$. As summarized in Table 4.7, thematic analysis of participants' elaborations on these questions revealed four over-arching themes that characterize the experimental group's shifts in perspective concerning reflective practice.

Table 4.7. *Overarching Themes from the Experimental Group's Elaboration on How Their Views of Reflection Changed as a Result of the Course*

Theme	Example Description from Participant
Reflection is a mechanism to uncover new ideas and opportunities for growth	I have recognized reflection as very important to not only look at what you've learned but to help you become better (in anything) by realizing what you could change or what you are doing right. (Kathleen)
	I never really thought that reflection was super important, but this class taught me that you can't know what needs improving if you don't look back on what you've done. (Sandra)
Meaningful reflection resists the cliché	It [the course] taught me to steer away from cliché statements and really think about the experiences that I went through. (Clarence)
	Reflection is not just about remembering information, but rather it's applying them into concepts that will enable me to see if I truly understand the learned concepts. (Roy)
Reflection is not just a retroactive process	I've learned that reflection doesn't just end with "I did this wrong", but ends with "I did this wrong, and in the future, I'll do this to prevent the same mistake. (Andrea)
	Reflection extends beyond a flashback. It's not just thinking back on how you acted in a given situation; it's about thinking critically and asking "why" and "how" to change things in future circumstances. (Elle)
There are multiple ways to reflect	Good reflection comes from deep thinking and creative thinking that can take time to really form. ("Clarence")
	This class has allowed me to reflect in a variety of other ways I had not considered. (Sean)

Notes. Themes were determined by combining all responses produced by participants in the experimental group into a single document, generating an initial list of themes based on a holistic review of the responses, and comparing these initial themes to specific student responses to determine final over-arching themes to succinctly describe the data. Pseudonyms are used in order to ensure participant confidentiality.

Comparison of the Conception of Reflection for PSTs in the Control and Experimental Groups

Pre-service teacher's responses to the final question of the Conception of Reflection survey were analyzed in order to gain a general understanding of the conception of reflection for PSTs in the experimental and control groups. This open-ended question asked PSTs to list one-word answers to describe what is needed to engage in meaningful reflective thought. Pre-service teachers in the control group reported a total of 108 words in response to this question, which are displayed as a word cloud in Figure 4.3.



Figure 4.3. Word cloud illustrating general conception of reflection for PSTs in the control group.

Pre-service teachers in the experimental group reported a total of 129 words in response to the open-ended question inquiring what is needed to engage in reflective thought, which are displayed as a word cloud in Figure 4.4.

Discussion

Since the majority of reflection papers produced by PSTs in the control group received Hi-DoR scores of Understanding, they focused on drawing connections between experiences and class content. For example, Virginia described an example of extrinsic motivation: “Another type of extrinsic motivation that I noticed working within a student

was that she was motivated by me signing off of a section in her book, a type of performance goal” (para. 3). Jay wrote extensively about Piaget’s Theory of Cognitive Development and described how his student, Manny, was “outside the relative norms” of the sensorimotor stage of cognitive development (para. 3). Although such explanations of course content demonstrate an understanding of educational theory, the majority of PSTs in the experimental group progressed beyond making connections and used their analysis of experiences to inform future actions. For example, Roy reflected on the positive impact of setting high expectations for his ESL student and expressed a commitment to setting similar goals for his future students: “Similar to how my student was able to improve his English comprehension skills, I want to produce that same Pygmalion effect as a result of me setting high expectations and goals for each of my future students to achieve” (para. 8). Andrea discussed an experience in which she struggled with a misbehaving student, but demonstrated openness when she described the circumstance from the student’s perspective: “I began to think how he would see me as his teacher, and he probably saw me as an always angry teacher who calls on him too much” (para. 4). This realization was followed by a commitment to switch from an authoritarian to an authoritative teacher, and a description of the “special relationship” she built with the student as she investigated underlying reasons for his behavior through the lens of Maslow’s hierarchy of needs (para. 5).

Although several PSTs in the control group produced papers that received HI-DoR scores of Reflection, further analyses of Depth of Reflection scores for each paragraph of these papers revealed that only a small portion of the papers were scored as Reflective. Only one out of the twelve papers with HI-DoR scores of reflection in the

control group contained more than one paragraph scored at the reflective level.

Interestingly, of the thirteen papers with HI-DoR scores of reflection produced by the experimental group, ten contained more than one paragraph scored as reflective. Thus, it is likely that the papers with HI-DoR scores of reflection produced by PSTs in the experimental group were more well developed than those produced by the PSTs in the control group.

On average, PSTs in the experimental group scored higher than those in the control group on the Understanding, Reflection, and Critical Reflection subscales of the Reflection Questionnaire (Kember et al., 2000). These findings further support the positive impact of the experimental course on the reflective practice of PSTs. Although differences in HI-DoR scores for reflection papers provided convincing evidence of this positive impact, one could argue that these differences were in part due to variability in verbal expression. Research has demonstrated that PSTs prefer to reflect via multiple modalities, and thus some PSTs in the sample may have demonstrated more advanced reflective practice if given the opportunity to reflect in a manner that was less verbal in nature (Farr & Riordan, 2015). Since the Reflection Questionnaire was designed to assess reflective ability absent the qualitative analysis of reflective writing samples, differences in scores on this measure provide evidence of the impact of the course that is not potentially biased by verbal ability.

The most significant differences in scores on the Reflection Questionnaire were for the Reflection and Critical Reflection subscales. On average, PSTs in the control group earned a lower score ($M = 15.48$) on the Reflection subscale than those in the experimental group ($M = 17.45$). According to Kember and colleagues (2000), this

subscale was designed to capture the degree to which individuals examine their experiences in order to improve future action, as demonstrated in Boud, Keogh, and Walker's (1985) description of reflection as the "generic term for those intellectual and affective activities in which individuals engage to explore their experiences in order to lead to new understandings and appreciations" (p. 19). Thus, differences in scores on this subscale could indicate a commitment to self-improvement that is rooted in the open-minded examination of the status quo. Sandra, a PST enrolled in the experimental course, expressed this commitment in her elaboration on one of the questions in the Conception of Reflection survey: "I never really thought that reflection was super important, but this class taught me that you can't know what needs improving if you don't look back on what you've done" (question 3).

On average, PSTs in the control group also earned a lower score ($M = 11.40$) on the Critical Reflection subscale than those in the experimental group ($M = 16.50$). Differences in these scores provide the most convincing evidence of the impact of the experimental course, since Kember and colleagues (2000) asserted that "conventional wisdom and ingrained assumptions are hard to change, in part because they become so deeply embedded that we become unaware that they are assumptions or even that they exist" (p. 385). Examination of responses to item 16 ("During this course I discovered faults in what I had previously believed to be right") of the questionnaire provides rich evidence of the impact of the experimental course. Although ten of the twenty-five (40%) PSTs in the control group reported that they agreed or strongly agreed with this statement, all PSTs enrolled in the experimental class agreed that they had discovered faults throughout their enrollment in the course. Further investigations revealed that

twelve (55%) of the PSTs in the experimental group strongly agreed with this statement, but only one (4%) of the PSTs in the control group strongly agreed that she had uncovered faults and misunderstandings throughout the course.

This realization of misunderstandings and assumptions was a common theme among reflection papers produced by PSTs in the experimental group that received HI-DoR scores of Critical Reflection. For example, Sandra described her previous neglect to consider the individual needs of her students: “Until I took this class, I thought I had everything figured out for my future as an educator. In taking this class, I realized that a huge piece of the picture was missing. I had planned for my classroom, but I had not planned for my students and their individual struggles” (para. 5). Audrey openly explored her changed perspective on how to meet the needs of all students, reporting that her previous understanding of student needs was restricted to primarily visible difficulties: “When we learned this [Maslow’s Hierarchy of Needs] in class, I immediately thought of abused children or poverty stricken families. However, this was a wrong assumption because everyone I’ve encountered needed this atmosphere to be able to interact and learn” (para. 2). Perhaps the most honest illustration of critical reflection was Adelaide’s commitment to investigate potential stereotypes to ensure she successfully meets the needs of all students:

I have a fear that I will stereotype my students before getting to know them, and then I will be blind to the other talents and abilities they have that I just assumed they would not. We talked about prejudice, stereotypes, and discrimination in class and I tell myself I would hate it if a teacher did any of that to me and I will

not do it when I become a teacher, but I feel like it is easier than I think and I may not even notice it (para. 6).

Findings also indicated that PSTs in the experimental group held different conceptions of the reflective practice than those in the control group, as illustrated by participant responses on the Conception of Reflection Survey. This is particularly important, since the development of reflective thinking skills first requires PSTs to combat assumptions they may hold about reflection itself (Spalding & Wilson, 2002). On average, PSTs in the experimental group agreed more strongly ($M = 4.86$) than those in the control group ($M = 4.36$) that reflective thinking is key to their future success. Pre-service teachers in the experimental group demonstrated a commitment to the reflective practice beyond their responses to this question, discussing the importance of reflection in class activities and assignments, and even articulating plans to encourage reflection in their own classrooms. Roy, for example, highlighted the importance of critical reflection in his final field experience reflection paper:

Thus, with higher expectations I will emphasize critical reflection, so my future students will have a deeper understanding of everything they learn. Encouraging reflection will derive a great deal of original and appropriate creativity.

Essentially, high expectations, critical thinking, and creativity will be the components I want to define as my role in the teaching and learning process (para. 8).

Pre-service teachers in the experimental group agreed more strongly ($M = 4.73$) than those in the control group ($M = 3.44$) that the class helped them develop a greater understanding of how to engage in meaningful reflection, and also agreed more strongly

($M = 4.41$) than those in the control group ($M = 2.80$) that their view of reflection had changed throughout the semester.

Thematic analysis of the elaborations on these responses revealed a significant shift in perspective concerning the nature and purpose of reflection among PSTs in the experimental group. Rather than seeing reflection as a purely retroactive process, PSTs in the experimental group suggested that reflection “doesn’t end with I did this wrong” (Andrea) but extends to “thinking critically and asking why and how to change things in future circumstances” (Elle). Pre-service teachers also suggested that meaningful reflection requires individuals to “steer away from cliché statements and really think about experiences” (Clarence) in order to “follow new ideas that previously went undiscovered” (Edna). Although some PSTs in the experimental group admitted they previously viewed reflection as a “waste of time” (Vanessa) several PSTs reported that they had “never really thought about purposefully reflecting” (Dawn) and previously “did not even know what reflection was” (Cindy).

All PSTs in the experimental group agreed that the course helped them develop a deeper understanding of how to engage in meaningful reflection, reporting that the course introduced them to “creative thinking and why it is important” (Clarence), equipped them with “various ways to consider multiple view points” (Gigi), and helped them realize that it is “necessary to dig deeper and assess what you have learned and explain how it changed you” (Kathleen).

Although some PSTs in the control group indicated that their view of reflection had changed throughout the semester, analysis of their elaborations on these responses provided little evidence of the shift in perspective that was characteristic of PSTs in the

experimental group. For example, Sam reported that “I agree that this class has opened my eyes to more understanding of how to engage in meaningful reflection, but I still feel that I have not fully grasped the best understanding” and Finn suggested that “I have an understanding of how to engage in meaningful reflection, but I believe that I had that understanding before starting this course”. Some PSTs in the control group provided vague statements about how their view of reflection had changed throughout the semester, such as Jay’s assertion that the “class taught me things I never knew”. However, such positive statements were contradicted by less convincing elaborations on the impact of the course, such as Kendall’s suggestion that “the course only validated some of the ideas of reflection she already had” and Charlotte’s suggestion that “I believe that I am already a successful reflector, so this course didn't really help in regards to that”.

The final question of the Conception of Reflection survey required PSTs to submit one-word answers to describe what they thought to be necessary to engage in meaningful reflective practice. Comparison analyses of the word clouds depicting PST’s responses to this question further explained how PSTs in the experimental and control group hold different conceptions about reflection. The most frequent response in the control group was “time”, which was reported by 10 of the PSTs in this group. Surprisingly, only two PSTs in the experimental group listed “time” as an important factor for reflective thought. The most frequent responses in the experimental group were “creativity” (reported eight times) and “open-mindedness” (reported seven times). Since the experimental class was designed to encourage ongoing reflection, it is possible that PSTs who completed this course saw reflection as an ongoing process that was

intertwined with action, but those who completed other course sections perceived reflection as tangential to action and thus assumed additional time for reflection was necessary.

Since the experimental class was designed to enhance reflective practice through creative thinking techniques, it is encouraging that the most frequent response from PSTs in the experimental group was “creativity”. At the beginning of the semester, PSTs in the experimental class were instructed to compile a list of factors that were important to reflective thought as a pre-assessment activity. Only two PSTs listed “creativity” and four listed “open-mindedness” at this point, suggesting that the frequency of these words in the final assessment was in a large part due to the experimental design of the course. Interestingly, PSTs in the control group also listed “creativity” (reported three times) and “open-mindedness” (reported three times), suggesting an initial understanding of the importance of creative thinking in the reflective practice. It is likely that these PSTs would benefit from the instructional strategies used in the experimental course that would encourage them to harness creative thinking to enhance reflective skills.

Another common response for PSTs in the control group was “quiet” (reported four times). Although this response may seem synonymous to the experimental group’s indication of the importance of “peace” (reported five times), it is important to recognize the potential nuances between these responses. It is likely that PSTs in the experimental group consider “peace” beyond the simple idea of a quiet environment in which to reflect. The general conception of reflection among PSTs in the experimental group seems to highlight the importance of vulnerability, as indicated by responses such as “mistakes” (reported three times), “criticism” (reported three times), and “change”

(reported three times). Such vulnerability requires a peaceful psychological environment in which individuals feel safe to critically investigate the reasons behind their actions. Pre-service teachers in the control group only reported “failure” and “criticism” once, and neglected to report the importance of “change”. It is likely that their assertion for the importance of “quiet” does not refer to a psychologically peaceful environment, but rather a quiet environment that allows for “attentiveness” (reported three times) and “patience” (reported four times).

Implications

The overarching purpose of this study was to investigate the impact of a teacher preparation course designed to enhance reflective thinking through creative teaching strategies. In addition to comparing pre-service teachers in the experimental and control groups in terms of reflective ability, the study investigated the potential differences in PSTs’ conception of reflection itself. Results indicated that PSTs in the experimental group exhibited more advanced reflective ability than those in the control group, as demonstrated by reflection papers scored by the Framework of Reflection for Teacher Education (Harland & Wondra, 2011) and scores on the Reflection Questionnaire (Kember et al., 2000). These differences support Correia and Bleicher’s (2008) warning that PSTs are likely to get stuck in lower-levels of reflection if they do not receive instruction and guidance throughout the reflective process. Teacher educators should take care to provide explicit instruction for the reflective practice, as general assertions to reflect on experiences can leave PSTs feeling both confused and frustrated. Indeed, although all PSTs in the sample completed the field experience reflection paper, many PSTs in the control group reported that they “didn’t discuss how to reflect on teaching in

the course” (Omar, Conception of Reflection Survey question 2), and that “any reflective thinking [they] did would have to be initiated by [themselves]” (Anna, Conception of Reflection Survey question 2).

The experimental design of the course was conceptually rooted in the intersection between reflective and creative thinking, as described in the literature review. The Incubation Model of Teaching (IMT) provided a framework for all lessons, ensuring that creative thinking was supported from the start to finish of class. Given the overlay of the IMT and the reflective thinking process, all lessons encouraged PSTs to engage in meaningful reflective practice through a variety of creative thinking techniques. The application of the Incubation Model of Teaching to higher education settings is a particularly important implication of this study, as it provides teacher educators with a framework through which they can simultaneously cover academic material and encourage creative and reflective thinking. Thus, although the sample lesson plan and strategies provided in Appendix D can be easily replicated, this study provides a mechanism for teaching for reflection that can be easily adapted to a variety of settings. Teacher educators who are committed to providing PSTs with appropriate scaffolding throughout the reflective process should further examine the literature on the IMT and other techniques that have been shown to develop creative thinking skills, as the development of creativity and reflection go hand-in-hand.

The implementation of creative teaching techniques was particularly effective in encouraging PSTs to progress beyond cliché reflection, since these strategies required them to communicate their learning in an innovative and unfamiliar manner that often precluded the use of “safe” responses. Teacher educators should harness creative

teaching strategies to encourage reflection via multiple modalities, providing diverse opportunities for PSTs to investigate their experiences from multiple viewpoints. As the instructor, I spent a significant amount of time creating a safe learning environment in which PSTs felt comfortable expressing themselves honestly. Although some of the PSTs in the experimental class seemed to cling to more safe forms of reflection at the beginning of the semester, their responses on the Conception of Reflection survey demonstrated a commitment to resist the cliché and critically examine their actions. This commitment was evident in the final reflection papers produced by PSTs in the experimental group, since all but one of these papers were scored at the Reflective or Critically Reflective level.

Although the progression beyond safe and trite reflection is the goal of teacher preparation classes, it is important to note the psychological risk that is associated with the honest communication of one's learning processes. Many of the PSTs in the experimental group asserted that peace was essential to engage in meaningful reflection, and responses on the Conception of Reflection survey revealed that the class provided a safe and collaborative environment for them to "vocalize and discuss reflective thinking" (Shirly, Conception of Reflection survey question 2). Thus, when providing instruction and guidance for the development of reflective thinking, it is essential that teacher educators meet the affective needs of PSTs, ensuring they feel safe to investigate potentially challenging experiences. Instruction for reflection should not be unaccompanied by the cultivation of safe and challenging learning environments, lest future educators cling to "ready-made recipes for action" that promise "familiar, safe results" (Buchmann, p. 161).

It is also important to emphasize that PSTs in the experimental and control groups seemed to have different conceptions of the reflective process. Those enrolled in the experimental course agreed more strongly that reflection was a key factor to success in their future careers than those in the control group, and qualitative investigations of responses to the Conception of Reflection survey revealed significant differences in the factors that are essential to reflective practice. Several PSTs in the control group indicated that “time” was important to engage in reflection, suggesting the belief that reflection is an action that requires an additional time commitment and is thus separated from action. Only two PSTs in the experimental group indicated that time was important for reflection, and the most frequent responses from this group were “creativity” and “open-mindedness”. Such differences in the general conception of the reflective process suggest that in order to promote the development of reflective thinking in PSTs, teacher educators should first guide their students to combat assumptions they hold about reflection itself.

It is fruitless to provide PSTs with strategies to enhance reflective thinking without first ensuring that they have a firm understanding of reflection and its practical importance in the teaching profession. In retrospect, I remember several judgmental, even annoyed faces on my students when I explained that the course would emphasize reflection at the beginning of the semester. Although I aimed to equip my students with diverse reflection strategies, I also provided explicit instruction concerning the nature of both reflective and creative thinking, emphasizing empirical evidence for the importance of reflective thinking in the teaching profession. Thus, it is imperative that teacher educators do not assume their students will buy in to the importance of reflective

thinking, and teacher preparation courses should be designed in a manner that encourages PSTs to investigate potential misunderstandings they have about the reflective practice.

Limitations and Future Directions

Although findings indicated impressive differences in reflective ability for PSTs in the experimental and control groups, it is important not to generalize these findings and assume that all PSTs would benefit from the experimental course in a similar manner. There was general lack of diversity among PSTs in the experimental group, 77% of which were female and 91% were white. Future studies should investigate the impact of similar teacher preparation courses for more diverse populations of PSTs, since greater diversity is likely to bring about richer, more challenging conversations that investigate experiences through multiple viewpoints.

Although it is encouraging that PSTs in my experimental class demonstrated more advanced reflective ability than those in the control group, perhaps the most natural next step in the research agenda is to train other teacher educators to implement the instructional strategies used throughout the experimental course. Since I have such an intense personal interest in and passion for reflection and creativity, it is likely that some of the positive impact of the course is more strongly related to my teaching style, rather than the instructional design. Thus, future studies should investigate the impact of similar teacher preparation courses that are taught by other teacher educators. Given both my practical and research experience with the Incubation Model of Teaching, it is also important to design appropriate training materials that will familiarize other teacher educators with the model and prepare them to apply it to their own classrooms.

Since reflection is an ongoing process, assessing products such as the field experience reflection paper for reflective ability only produces a snapshot of an individual's reflective practice. Thus, it is important not to equate reflective ability of PSTs to the HI-DoR score they received on the reflection paper, or even their scores on the Reflection Questionnaire (Kember et al., 2000). Future longitudinal studies should investigate the reflective process as it naturally unfolds in order to gain a more holistic understanding of the impact of instructional strategies to enhance reflective thinking. Such longitudinal studies would be particularly effective in tracing the development of reflective practice of PSTs throughout the entire teacher preparation experience. Furthermore, additional studies should explore the long-term effects of teacher preparation courses designed to encourage reflective thinking, following PSTs as they enter the teaching profession and exploring how their reflective practice and conceptions of reflection change as they serve as fulltime teachers in the real world.

References

- Allen, J., & Wright, S. (2014). Integrating theory and practice in the pre-service teacher education practicum. *Teachers & Teaching, 20*(2), 136-151.
- Badiali, B. J. & Hammond, D.J. (2002, March). *The power and necessity for using inquiry in a PDS*. Paper presented at the Professional Development Schools National Conference, Orlando, FL.
- Boud, D., Keogh, M., & Walker, D. (1985). *Reflection: Turning experience into learning*. London: Kogan Page.
- Boyatzis, R. E. (1998). *Transforming qualitative information: Thematic analysis and code development*. Thousand Oaks, CA: Sage.
- Braun, V. & Clarke, V. (2006) Using thematic analysis in psychology. *Qualitative Research in Psychology, 3* (2), 77-101.
- Brookfield, S. D. (1988). *Training educators of adults: The theory and practice of graduate adult education*. New York: Routledge.
- Brookfield, S. D. (2012). *Teaching for critical thinking*. San Francisco, CA: Jossey-Bass.
- Buchmann, M. (1987). Teaching knowledge: The lights that teachers live by. *Oxford Review of Education, 13*(2), 151–64.
- Caracelli, V.J., & Greene, J. C. (1997). Crafting mixed-method evaluations designs. *New Directions for Evaluation, 74*, 19-32.

- Choy, S.C., & Oo, P.S. (2012). Reflective thinking and teaching practices: A precursor for incorporating critical thinking into the classroom? *International Journal of Instruction*, 5(1), 167-182.
- Cidell, J. (2010). Content clouds as exploratory qualitative data analysis. *AREA*, 42(4), 514-523.
- Cochran-Smith, M. & Lytle (2001). Beyond certainty: Taking an inquiry stance on practice. In A. Lieberman & L. Miller (Eds.), *Teachers caught in action* (pp. 45-58). New York, NY: Teacher College Press.
- Correia, M. G., & Bleicher, R. E. (2008). Making connections to teach reflection. *Michigan Journal of Community Service Learning*, 14, 41-49.
- Creswell, J. W. (2011). Choosing a mixed methods design. In J. W. Creswell & V. L. Plano Clark (Eds.), *Designing and Conducting Mixed Methods Design* (p. 53-107). Thousand Oaks, CA: SAGE.
- Darling-Hammond, L. (2006). Why teacher education is important—and difficult. In L. Darling-Hammond (Ed.), *Powerful teacher education* (pp. 19-42). San Francisco: Jossey-Bass.
- Dewey, J. (1910). *How we think*. Boston, D.C.: Heath and Co., Publishers.
- Dewey, J. (1933). *How we think: A restatement of the relation of reflective thinking to the educative process*. Boston: DC Heath and Company.
- Farr, F., & Riordan, E. (2015). Tracing the reflective practices of student teachers in online modes. *ReCALL: Journal of Eurocall*, 27(1), 104-123.

- Furlong, C. (2013). The teacher I wish to be: Exploring the influence of life histories on student teacher idealized identities. *European Journal of Teacher Education*, 36(1), 68-83.
- Garmon, M. A. (2005). Six key factors for changing preservice teachers' attitudes/beliefs about diversity. *Educational Studies: Journal of the American Educational Studies Association*, 38(3), 275-286.
- Gibbs, G. (1988). *Learning by Doing: A guide to teaching and learning methods*. Oxford Brookes University, Oxford: Further Education Unit.
- Grossman, R. (2008). Structures for facilitating student reflection. *College Teaching*, 57, 15-22.
- Harland, D. J., & Wondra, J. S. (2011). Teacher candidates' reflections on clinical experiences: A comparison of blog and final paper assignments. *Journal of Digital Learning in Teacher Education*, 27(4), 128-133.
- Hatton, N., & Smith, D. (1995). Reflection in teacher education: Towards definition and implementation. *Teaching and Teacher Education*, 11(1), 33-49.
- Holloway, I. (1997). *Basic concepts for qualitative research*. Oxford: Blackwell Science.
- Huberty, C. J., & Morris, J. D. (1989). Multivariate analysis versus multiple univariate analysis. *Psychological Bulletin*, 105(2), 302-308.
- James, A. (2007). Reflection revisited: Perceptions of reflective practice in fashion learning and teaching. *Art, Design, and Communication in Higher Education*, 5(3), 179-196.

- Kember, D., Leung, D. Y. P., Jones, A., Loke, A. Y., McKay, J., Sinclair, K., & Yeung, E. (2000). Development of a questionnaire to measures the level of reflective thinking. *Assessment & Evaluation in Higher Education*, 25(4), 381-395.
- Killeavy, Maureen & Anne Moloney (2010). Reflection in a social space: Can blogging support reflective practice for beginning teachers? *Teaching and Teacher Education*, 26, 1070-1076.
- King, P.M. & Kitchener, K.S. (1994). *Developing reflective judgment: Understanding and promoting intellectual growth and critical thinking in adolescents and adults*. San Francisco: Jossey-Bass.
- Kolb, D. (1984). *Experiential learning: Experience as the source of learning and development*. Upper Saddle River, NJ: Prentice Hall.
- Leech, N. L., Barrett, K. C., & Morgan, G. A. (2005). *SPSS for intermediate statistics: Use and interpretation* (2nd ed.). Mahwah, NJ: Lawrence Erlbaum Associates.
- Lortie, D. (1975). *Schoolteacher: A sociological study*. Chicago: University of Chicago Press.
- Lucas, P. (1991). Reflection, new practices and the need for flexibility in supervising student-teachers. *Journal of Further and higher Education*, 15(2), 84-93.
- McNaught, C., & Lam, P. (2010). Using Wordle as a supplementary research tool. *The Qualitative Report*, 15(3), 630-643.
- Millar, G. W. (1995). *E. Paul Torrance: "The creativity man."* Norwood, NJ: Ablex.
- Murdock, M. C. (1993). *Lessons from practice: Some intriguing characteristics of the Torrance Incubation Model*. Personal Collection of M.C. Murdock, International Center for Studies in Creativity, Buffalo State College, Buffalo, NY.

- National Commission on Teaching and America's Future. (1996). *What matters most: Teaching for America's future*. Retrieved from <http://www.namodemello.com.br/pdf/tendencias/whatmattersmost.pdf>
- National Council for Accreditation of Teacher Education. (2008). *Professional standards for the accreditation of teacher preparation institutions*. Retrieved from <http://www.ncate.org/Portals/0/documents/Standards/NCATE%20Standards%202008.pdf>
- Nitkowski, K. (2004). *Documenting teacher's experience with the use of the Torrance Incubation Model of Learning and Teaching* (Unpublished master's project). International Center for Studies in Creativity, Buffalo State College, Buffalo, NY.
- Ostorga, A. N. (2006). Developing teachers who are reflective practitioners: A complex process. *Issues in Teacher Education*, 15, 5–20.
- Palinkas, L. A., Aarons, G. A., Horwitz, S., Chamberlain, P., Hurlburt, M., & Landsverk, J. (2011). Mixed methods designs in implementation research. *Administration and Policy in Mental Health*, 38(1), 44-53.
- Patton, M. Q. (2002). *Qualitative evaluation and research methods* (3rd ed.). Thousand Oaks, CA: Sage Publications, Inc.
- Peshkin, A. (1988). In search of subjectivity-one's own. *Educational researcher*, 17(7), 17-21.
- Ramsden, A., & Bate, A. (2008). *Using word clouds in teaching and learning*. University of Bath. Retrieved from <http://opus.bath.ac.uk/474/1/using%2520word%2520clouds%2520in%2520teaching%2520and%2520learning.pdf>

- Razdorskaya, O. (2015). Reflection and creativity: The need for symbiosis. *Education, Reflection, Development*, 209, 433-438.
- Rodgers, C. (2002). Defining reflection: Another look at John Dewey and reflective teaching. *Teachers College Record*, 104(4), 842-866.
- Rolfe, G., Freshwater, D. & Jasper, M. (2001). *Critical reflection for nursing and helping professions: A user's guide*. Basingstoke: Palgrave MacMillan.
- Roulston, K. (2001). Data analysis and 'theorizing as ideology'. *Qualitative Research*, 1, 279-302.
- Runco, M. A., & Jaeger, G., J. (2012). The standard definition of creativity. *Creativity Research Journal*, 24(1), 92-96.
- Schon, D.A. (1987). *Educating the reflective practitioner*. San Francisco: Jossey-Bass.
- Segal, E. (2004). Incubation in insight problem-solving. *Creativity Research Journal*, 16(1), 141-148.
- Sellars, M. (2014). *Reflective practice for teachers*. Los Angeles: SAGE.
- Spalding, E. & Wilson, A. (2002). Demystifying reflection: A study of pedagogical strategies that encourage reflective writing. *Teachers College Record*, 104(7), 1393-1421.
- Torrance, E. P & Safer, T. (1990). *The Incubation Model of Teaching: Getting beyond the aha*. Buffalo, NY: Bearly Limited.
- Torrance, E.P. (1979) An instructional model for enhancing incubation. *Journal of Creative Behavior*, 13(1), 23-25.
- Valentiin, S. (2006). Addressing diversity in teacher education programs. *Education*, 127(2), 196-202.

Van Manen, M. (1977). Linking ways of knowing with ways of being practical.

Curriculum Inquiry, 6, 205-228.

CHAPTER 5

A DISCUSSION OF THE FINDINGS

Teaching is an ever-changing profession that continually presents new challenges and opportunities for growth. Although the majority of individuals spend a significant portion of their lives as students, transitioning to view the classroom through the lens of the teacher requires a substantial amount of training and practice. Since teacher preparation programs cannot equip future educators with all the answers to the diverse challenges and opportunities they will face, successful programs emphasize the development of the tools that equip PSTs to be effective problem-solvers in the classroom (Cochran-Smith & Lytle, 2001; Badiali, Nolan, Zembal-Saul, & Manno, 2011; Grossman, 2008; NCTAF, 1996; 2007; Ostorga, 2006). Such teacher preparation programs encourage PSTs to approach teaching with an inquiry stance, reflecting upon experiences to make “diagnostic and strategic judgements to address the needs of those whom they serve” (Bransford, Darling-Hammond, et al., 2005, p. 9).

The inquiry stance relies on both reflective and creative thinking, since educators must critically examine experiences to recognize opportunities for growth and creatively adapt their practices to meet diverse student needs and interests. As Dewey (1933) asserted, “What does having an experience amount to unless, as it ceases to exist, it leaves behind an increment of meaning, a better understanding of something, a clearer future plan and purpose of action: in short, an idea?” (p. 154). The cultivation of such an idea, however small, is the central goal of successful teacher preparation programs. It is from these ideas that innovative practices blossom

and future teachers progress beyond the rote application of past teaching methods to meet the needs of today's increasingly diverse student population.

Unfortunately, despite overwhelming assertions for the importance of reflective practice in the teaching profession (Grossman, 2008; NCTAF, 1996; 2007; Ostorga, 2006), PSTs generally demonstrate little evidence of advanced reflective thinking and seldom receive explicit instruction for how to engage in meaningful reflective practice (Choy & Oo, 2012; James, 2007; Rodgers, 2002). Thus, although reflection is a common requirement for future educators, it is typically seen as enigmatic and superfluous, and often fails to bridge the gap between theory and practice to cultivate a "future plan and purpose of action" (Dewey, 1933, p. 154).

Although the literature on reflection often references the importance of creative thinking, little research has explicitly investigated the relationship between the two constructs, nor the potential to cultivate reflective thinking through creativity training techniques. The purpose of the current studies, therefore, was to bring clarity to potential factors that impact reflection by exploring the relationship between reflection and creativity and the impact of a course designed to enhance reflective thinking skills.

The Investigatory Study

The investigatory study examined the reflective practice of a sample of forty-two pre-service teachers enrolled in an educational psychology course with a field experience component. In addition to completing a demographic questionnaire and describing their field experience placement, participants uploaded a copy of their final field experience reflection paper and completed the Torrance Test of Creative Thinking-Figural (Torrance, 1966). Quantitative analyses compared creative potential with reflection, as assessed by field experience essays scored by the Framework of Reflection for Teacher Education (Harland & Wondra,

2011). Further analyses examined how participants who demonstrated advanced reflection described their field experiences, and qualitative investigations revealed common themes across advanced reflective writing samples.

Findings

Field experience essays were sorted into four categories (Nonreflection, Understanding, Reflection, and Critical Reflection) based on the Highest Incidence of Depth of Reflection (HI-DoR) demonstrated throughout the paper. Although 22 (52%) received HI-DoR scores of Reflection, only five (12%) were sorted into the Critical Reflection category, which confirms findings from previous studies that revealed little evidence of critical reflection among PSTs (Farr and Riordan, 2015; Harland & Wondra, 2011; Hatton & Smith, 1995; King, 1997; Sellars, 2014; Yang, 2009).

Eighty percent of the participants who wrote reflection papers with HI-DoR scores of Critical Reflection reported that their field experiences were different from their personal K-12 educational experiences, and all of these participants reported that they visited the field placement multiple times throughout the semester, rather than in one or two large chunks of time. A similar pattern was observed among participants who wrote reflection papers with HI-DoR scores of Reflection: 55% described their field experience as different than their personal educational experiences and 82% visited the placement multiple times throughout the semester.

Thematic analysis of writing samples coded at the Reflective level revealed a commitment to improve future teaching practices, emphasizing the importance of building strong relationships to serve the whole child and recognizing that all students learn differently. Although these essays were characterized by a thorough, open-minded analysis of field experiences, those with HI-DoR scores of Critical Reflection clearly articulated a fundamental

shift in understanding or a dissatisfaction with the status quo. Interestingly, most of these essays lacked the flowery language that was pervasive in papers sorted into the Understanding level, and thus were characterized by honest, often blunt articulations of new understandings. Thus, although general statements such as “the experience changed me forever” (Jake, para. 2) may initially sound impressive, text segments indicative of the highest level of reflection broke free of such clichés to honestly express new, at times difficult, realizations and understandings.

Field essays were then collapsed into two categories (HI-DoR scores of Non Reflection or Understanding = Low Reflectors; HI-DoR scores of Reflection or Critical Reflection = High Reflectors) in order to allow for comparison analyses between reflection and scores on the TTCT-Figural. There was a positive trend between reflection and creativity scores, and the average score for Abstractness of Titles was significantly greater for the High Reflectors ($M = 129.78$) than the Low Reflectors ($M = 119.47$).

The Applied Study

The applied study examined the impact of an experimental educational psychology course designed to enhance reflective thinking through creative teaching techniques. Pre-service teachers enrolled in the experimental class ($N = 22$) were compared to a control group of PSTs enrolled in other course sections ($N = 25$). At the end of the semester, all PSTs submitted their final field experience reflection paper and completed the Reflection Questionnaire (Kember et al., 2000) and Conception of Reflection survey. Quantitative analyses compared the reflective ability of the two groups, as assessed by field experience essays scored by the Framework of Reflection for Teacher Education (Harland & Wondra, 2011) and scores on each subscale of the Reflection Questionnaire (Kember et al., 2000). The Conception of Reflection survey assessed general attitudes toward the reflective practice, as well as conception of what is needed to engage

in meaningful reflection. Both quantitative and qualitative analyses were used to examine how PSTs in the experimental and control groups responded differently to this survey.

Findings

Trained judges used the Framework of Reflection for Teacher Education (Harland & Wondra, 2011) to sort field experience essays into four categories (Nonreflection, Understanding, Reflection, and Critical Reflection), based on the highest incident of reflection demonstrated throughout the entire paper. The majority (52%) of PSTs enrolled in the control group produced field experience essays with HI-DoR scores of Understanding, but the majority (59%) of those in the experimental group received scores of Reflection. Furthermore, although none of the PSTs in the control group produced essays scored as Critical Reflection, 36% of those in the experimental group were sorted into this category.

Pre-service teachers enrolled in the experimental course also scored significantly higher than those in the control group on the Understanding ($M_{\text{control}} = 16.64$; $M_{\text{experimental}} = 18.41$), Reflection ($M_{\text{control}} = 15.48$; $M_{\text{experimental}} = 17.45$), and Critical Reflection ($M_{\text{control}} = 11.40$; $M_{\text{experimental}} = 16.50$) subscales of the Reflection Questionnaire (Kember et al., 2000). Analyses of the Conception of Reflection survey revealed that PSTs in the experimental group were more likely than those in the control group to agree that reflective thinking is key to success in their future careers, and to report that the course changed their view of reflection and helped them develop a greater understanding of how to engage in meaningful reflective practice.

Qualitative analyses of participant responses on the Conception of Reflection survey suggested that PSTs in the control and experimental groups perceived reflection differently. Pre-service teachers in the control group seemed to view reflection as an activity that takes additional time and requires a quiet and secluded environment, but those in the experimental group

expressed the importance of creativity and open-mindedness in the reflective practice. Although PSTs in the control group reported that the class did not challenge, but rather confirmed, their conceptions of reflection, those in the experimental group agreed strongly that their view of reflection had changed and expressed that the course taught them “you can’t know what needs improving if you don’t look back on what you’ve done” (Sandra).

Discussion

Results from both studies supported the relationship between reflection and creativity. Although the investigatory study only revealed one significant difference in scores (for Abstractness of Titles) on the TTCT-Figural for High and Low Reflectors, these findings were likely confounded by the nature of the assessments, since the reflection essay is clearly a verbal measure and the figural form of the TTCT was used. The ability to encourage reflection through creative techniques was more convincing, since the applied study clearly illustrated that PSTs in the experimental group demonstrated more advanced reflection than those in the control group, as well as a more positive attitude toward the reflective practice itself. It is likely that the creative strategies encouraged PSTs to combat assumptions about reflection and precluded them from relying on safe reflective statements that can be easily communicated in traditional reflective writing assignments (Buchmann, 1987). Spalding and Wilson (2002) proposed the importance of encouraging reflection via multiple modalities in order to ensure that PSTs are not limited to verbally biased forms of expression. Since PSTs in the experimental course were constantly challenged to reflect in new, often unfamiliar manners, they could not rely on past “formulas” for reflection and had to critically examine their experiences in order to express their understanding via diverse platforms. Although all PSTs wrote a final reflection paper, those in the experimental group were encouraged to consult past creative reflection assignments when

writing this paper, and thus examined their learning from multiple perspectives. The constant analysis of experiences encouraged PSTs to approach learning from an inquiry stance, as clearly articulated in Clarence's elaboration on the Conception of Reflection survey: "This class has taught me different ways to reflect, and why it is important for teachers to reflect on their classroom. It introduced me to creative thinking and why it is important. Also, it showed me that reflection is not just a summary, but is much more meaningful" (question 2).

The lack of critical reflection demonstrated by PSTs in the investigatory study and those in the control group of the applied study further supports the importance of instructional techniques to enhance reflective practice. What is most alarming were the statements from PSTs in the control group of the applied study that suggested the course simply "validated ideas they already had" about reflection (Kendal, Conception of Reflection survey question 3) or did not help them "fully grasp the best understanding" of reflective practice (Sam, Conception of Reflection survey question 3). Such assertions support Huntley's (2008) concern that absent explicit instruction for reflection, PSTs are likely to hold a misconstrued conception of reflective thought which "serves only to rationalize current practices" (p. 21). If PSTs view reflection as a retelling of their experiences, it is indeed a waste of time; future educators must understand that meaningful reflection should lead to the reframing of understandings and inspire a change in instructional practices (Loughran, 2002).

One of the main difficulties in studying reflection is the contextualized nature of the reflective practice; since PSTs interpret fieldwork through the unique lens of their personal educational experiences, comparing the reflective practice of PSTs in diverse field experiences is particularly challenging and often results in inconsistent findings (Clift & Brady, 2006). The field experience component of teacher education has a reputation of being both disorganized and

haphazardly planned (Darling-Hammond, 2010), and researchers have warned teacher educators not to assume that more exposures to fieldwork will automatically result in beneficial outcomes for future educators (Allsopp, DeMarie, Alvarez-McHatton, & Doone, 2006). The majority of PSTs categorized as High Reflectors in the investigatory study reported they worked in field placements that did not resemble their personal educational experiences, and visited these placements multiple times throughout the semester. Such descriptions reflect assertions to cultivate “critical incidents” that encourage PSTs to confront assumptions through critical reflection when expectations do not match reality (Brookfield, 1987; 1988; James & Brookfield, 2014).

Results from the applied study suggested that in order to truly benefit from such critical incidents, PSTs must have a safe and supportive learning environment that guides them throughout the reflective practice. When asked to describe what was necessary to engage in meaningful reflection, PSTs in the experimental group demonstrated a commitment to change by listing words such as “criticism”, “honesty”, and “mistakes”, but also reported that “peace” was essential to take the emotional risk associated with such transformative thinking. This supports Giovannelli’s (2003) assertion that learning and experiences must be continually integrated, and reflects Runco and Sumner’s (2015) suggestion that tolerance is one of the most critical attitudes to cultivate when aiming to enhance creative thinking. Further support for the importance of such tolerance was evident in the PSTs’ responses to the Conception of Reflection survey: Dawn admitted that “reflection means being vulnerable to being wrong about something” (question 2), and Gigi reported that the safety to “compare and contrast other’s experience with [her] own really helped” (question 3). Cultivating such a safe and motivational environment could address

the “extracognitive basis” (see Runco & Sumners, 2015) of creativity and reflection, promoting the motivational and attitudinal components that form the basis of reflective thought.

Implications

These studies have several implications for the field of teacher preparation. Despite demands for reflective practitioners and strides to expose future educators to diverse educational environments, it is clear that PSTs should not be expected to engage in meaningful reflection absent explicit instruction for the development of reflective thinking skills. However, such instruction must be carefully crafted, lest PSTs conclude that reflection is simply a requirement for teacher preparation courses and neglect to see its importance to the teaching profession. Successful efforts to develop reflective practitioners must first encourage PSTs to combat assumptions about reflection itself, thus addressing the why before the how. Such training avoids the over justification effect, in which intrinsic motivation is lost because training emphasizes the application of certain techniques and fails to address why such techniques should be employed (Runco & Sumners, 2015). The intersection between reflection and creativity training serves to demystify approaches to enhance reflective thinking. The literature on creativity is dense with techniques to maximize creative potential, and teacher educators should consult strategies such as the Incubation Model of Teaching to construct learning experiences that cultivate the essential skills for future educators to approach teaching with an inquiry stance.

Results also caution teacher educators not to take a one-size-fits-all approach to crafting field experiences, since PSTs are likely to benefit from frequent exposures to environments that contradict their personal educational experiences and cause them to critically examine the juxtaposition between expectation and reality. Reflection should not be taught in isolation from such experiences, and teacher educators must create safe learning environments that encourage

PSTs to address potentially challenging issues that arise from these critical incidents. Thus, efforts to enhance reflective practice should emphasize real-world applications of reflective thinking, and PSTs should be guided to work collaboratively to investigate experiences from multiple viewpoints and evaluate the effectiveness of new solutions (Loughran, 2002; Walkington, 2005). Such teacher development opportunities simultaneously address the why and how of reflective practice, and are in line with well-crafted creativity training techniques that emphasize real-world illustrations (Scott, Leriz, & Mumford, 2004).

Techniques to enhance reflective practice should encourage PSTs to reflect via multiple modalities, providing appropriate scaffolding and affective support to resist safe and cliché responses. Teacher educators should thus emphasize the importance of the reflective process, rather than product, and ensure PSTs that feelings of discomfort and confusion are actually indicative of meaningful reflective practice. The emphasis on process is particularly important to cultivating culturally responsive educators, since PSTs must recognize there is no formula for effective teaching, but rather appreciate that quality teaching gradually evolves to meet the diverse needs and interests of unique student populations. Thus, PSTs must critically examine beliefs about teaching as they engage in diverse field experiences, since such beliefs form the foundation and rationale for future instructional practices (Yost, Sentner, & Forlenza-Bailey, 2000).

In summary, based on findings from both the Investigatory and Applied Studies, the following guidelines are suggested for teacher educators who strive to support the development of reflective thinking skills in pre-service teachers:

- Provide a safe learning environment that supports the collaborative investigation of potentially difficult misunderstandings or assumptions.

- Encourage PSTs to uncover and combat assumptions about reflection itself.
- Design diverse field experiences that provide PSTs with opportunities to work in educational environments that contrast their personal educational experiences.
- Provide explicit instruction for the development of reflective thinking skills.
- Provide appropriate scaffolding and affective support to resist safe and cliché reflections.
- Encourage displaced practice of reflective thinking and emphasize that meaningful reflection is on-going, rather than recursive in nature.
- Encourage reflection via multiple modalities.
- Encourage PSTs to work collaboratively to investigate experiences from multiple viewpoints and evaluate the effectiveness of new solutions.
- Emphasize the importance of the reflective process, rather than product.
- Encourage reflective thinking through various creative strategies.

Limitations

Although the investigatory and applied studies had their own sets of limitations, there were several commonalities. First, participant populations for both studies were predominantly white and female, and thus caution should be taken when generalizing findings to more diverse populations of future teachers. Furthermore, although assessment of reflection allowed for interesting investigations, it is important to note that assessments such as the Framework of Reflection for Teacher Education (Harland & Wondra, 2011) and the Reflection Questionnaire (Kember et al., 2000) enforce an unnatural end to the ongoing reflective process. Thus, it is essential not to equate reflective ability with scores on such measures, since it is not possible to fully capture reflection with tools that just take a snapshot of the reflective practice. Furthermore,

research has demonstrated that PSTs may hold back from expressing difficult realizations when they know their reflections are not anonymous, and thus it is likely that study participants filtered their true interpretations of experiences since they completed the field experience essay for a grade. Finally, both studies examined reflective practice over a short time period (one semester), and it is likely that participants would demonstrate more advanced reflective thinking over a more extended period of time.

Future Research

Future studies should employ action research techniques to investigate the reflective practice as it naturally unfolds, thus capturing reflection-in-action. These studies illustrated multiple difficulties associated with the assessment of reflective thinking, and additional measures that emphasize the reflective process, rather than product, must be developed. Although the studies provided evidence of the relationship between reflection and creativity, additional research should use more diverse assessments to further investigate the intersection between the two constructs.

It would be particularly interesting to conduct longitudinal studies that follow PSTs into their first years of teaching, in order to investigate how instructional strategies to enhance reflective thinking carry over to the real world. Future studies could also investigate the interaction between reflection and other factors, such as teacher retention or civic engagement. Although the applied study revealed convincing evidence for the ability of creative strategies to enhance reflective thinking, further research should replicate such instructional techniques with additional instructors and examine potential student factors (goal orientations, educational experiences, etc.) that could affect the impact of such strategies.

Conclusions

Future educators may be fueled by life-long dreams to have a classroom of their own, but it is essential that teacher preparation programs equip PSTs to adapt such aspirations to meet the needs of their students and resist temptations to fit real-world experiences into the mold of personal expectations. No two students are the same, and prescribed teaching methods often neglect to meet and capitalize on the diverse needs and interests of today's student populations. Effective teacher preparation programs must progress beyond empty assertions to cultivate reflective practitioners who approach the classroom through an inquiry stance, and provide future educators with well-crafted instruction and field experiences that prepare them to "take the creative leap beyond" and meet the needs of all students (Torrance & Safter, 1999).

References

- Allsopp, D. H., DeMarie, D., Alvarez-McHatton, P., & Doone, E. (2006). Bridging the gap between theory and practice: Connecting courses with field experiences. *Teacher Education Quarterly, Winter, 33*(1), 19–35.
- Badiali, B., Nolan, J., Zembal-Saul, C., & Manno, J. (2011). Affirmation and change: Assessing the impact of the professional development school on mentor's classroom practice. In J. Nath, W. Irma, & J.R. Guadarrama (Eds.), *Investigating university-school partnerships* (pp. 321-346). Charlotte, NC: Information Age Publishing.
- Bransford, J., Derry, S., Berliner, D., Hammerness, K. & Beckett, K. (2005). Theories of learning and their roles in teaching. In L. Darling Hammond & J. Bransford (Eds.), *Preparing teachers for a changing world: What teachers should know and be able to do* (pp. 40-87). San Francisco: Jossey-Bass.
- Brookfield, S. (1987). *Developing critical thinkers: Challenging adults to explore alternative ways of thinking and acting*. San Francisco: Jossey-Bass.
- Brookfield, S. D. (1988). *Training educators of adults: The theory and practice of graduate adult education*. New York: Routledge.
- Buchmann, M. (1987). Teaching knowledge: The lights that teachers live by. *Oxford Review of Education, 13*(2), 151-164.
- Campoy, R., & Radcliffe, R. (2002). *Reflective decision-making and cognitive development: A descriptive study comparing the reflective levels of pre-service and in-service teachers*. Paper presented at the Annual Meeting of the American Educational Research

- Association, New Orleans, Louisiana. Retrieved from
<http://files.eric.ed.gov/fulltext/ED465753.pdf>
- Choy, S.C., & Oo, P.S. (2012). Reflective thinking and teaching practices: A precursor for incorporating critical thinking into the classroom? *International Journal of Instruction*, 5(1), 167-182.
- Clift, R. T., & Brady, P. (2006). Research on methods courses and field experiences. In M Cochran-Smith & K. Zeichner (Eds.), *Studying teacher education: The report of the AERA panel on research and teacher education* (pp. 309–424). Mahwah, NJ: Lawrence Erlbaum.
- Cochran-Smith, M. & Lytle (2001). Beyond certainty: Taking an inquiry stance on practice. In A. Lieberman & L. Miller (Eds.), *Teachers caught in action* (pp. 45-58). New York, NY: Teacher College Press.
- Darling-Hammond, L. (2010). Teacher education and the American future. *Journal of Teacher Education*, 61(1–2), 35–47.
- Dewey, J. (1933). *How we think*. Lexington, MA: D. C. Heath and Company.
- Fendler, L. (2003). Teacher reflection in a hall of mirrors: Historical influences and political reverberations. *Educational Researcher*, 32(3), 16–25.
- Giovannelli, M. (2003). Relationship between reflective disposition toward teaching and effective teaching. *Journal of Educational Research*, 96(5), 293–319.
- Grossman, R. (2008). Structures for facilitating student reflection. *College Teaching*, 57, 15-22.
- Harland, D. J., & Wondra, J. S. (2011). Teacher candidates' reflections on clinical experiences: A comparison of blog and final paper assignments. *Journal of Digital Learning in Teacher Education*, 27(4), 128–133.

- Hatton, N., & Smith, S. (1995). Reflection in teacher education: Towards definition and implementation. *Teacher and Teacher Education*, 11(1), 33–49.
- Hudson, P. (2004). Specific mentoring: A theory and model for developing primary science teaching practices. *European Journal of Teacher Education*, 27(2), 139–146.
- Huntley, C. (2008). Supporting critical reflection in pre-service teacher education. *Journal of the Scholarship of Teaching and Learning for Christians in Higher Education*, 3(1), 18-28.
- James, A. (2007). Reflection revisited: Perceptions of reflective practice in fashion learning and teaching. *Art, Design, and Communication in Higher Education*, 5(3), 179-196.
- James, A. & Brookfield, S. D. (2014). *Engaging imagination: Helping students become creative and reflective thinkers*. San Francisco, CA: Jossey-Bass.
- Kember, D., Leung, D. Y. P., Jones, A., Loke, A. Y., McKay, J., Sinclair, K., & Yeung, E. (2000). Development of a questionnaire to measures the level of reflective thinking. *Assessment & Evaluation in Higher Education*, 25(4), 381-395.
- Loughran, J. J. (2002). Effective reflective practice: In search of meaning in learning about teaching. *Journal of Teacher Education*, 53(1), 33–43.
- National Commission on Teaching and America's Future. (1996). *What matters most: Teaching for America's future*. Retrieved from <http://www.namodemello.com.br/pdf/tendencias/whatmattersmost.pdf>
- National Council for Accreditation of Teacher Education. (2007). *Professional standards for the accreditation of teacher preparation institutions*. Retrieved from <http://www.ncate.org/Standards/ProgramStandardsandReportForms/tabid/676/Default.aspx>
- Ostorga, A. N. (2006). Developing teachers who are reflective practitioners: A complex process.

- Issues in Teacher Education*, 15(2), 5-20.
- Rodgers, C. (2002). Defining reflection: Another look at John Dewey and reflective teaching. *Teachers College Record*, 104(4), 842-866.
- Runco, M.A., & Sumners, S.E. (2016). Creativity training. In J. D. Wright (Ed.), *International Encyclopedia of the Social & Behavioral Sciences* (2nd ed., Vol 5, pp. 113-116). Oxford: Elsevier.
- Scott, G., Leritz, L.E., & Mumford, M.D. (2004). The effectiveness of creativity training: a quantitative review. *Creativity Research Journal*, 16(4), 361–388.
- Spalding, E. & Wilson, A. (2002). Demystifying reflection: A study of pedagogical strategies that encourage reflective writing. *Teachers College Record*, 104(7), 1393-1421.
- Torrance, E. P. (1966). *The Torrance Tests of Creative Thinking-norms: Technical manual research edition-verbal tests, forms A and B-figural tests, forms A and B*. Princeton, NJ: Personnel Press.
- Torrance, E. P. & Safter, H. T. (1999). *Making the creative leap beyond*. Buffalo, NY: Creativity Foundation Press.
- Walkington, J. (2005). Becoming a teacher: Encouraging development of teacher identity through reflective practice. *Asia Pacific Journal of Teacher Education*, 33(1), 53–64.
- Williams, M., & Watson, A. (2004). Post-lesson debriefing: Delayed or immediate? An investigation of student teacher talk. *Journal of Education for Teaching*, 30(2), 85–96.
- Yost, D., Sentner, S., & Forlenza-Bailey, A. (2000). An examination of the construct of critical reflection: Implications for teacher education programming in the 21st century. *Journal of Teacher Education*, 51(1), 39–49.

Appendix A

Instruments for the Investigatory and Applied Studies

Demographic Questionnaire-Investigatory Study: This questionnaire was used to gather basic demographic information from participants in the investigatory study, as well as details about their field experience placements.

1. What is your age?
 - a. 18-20
 - b. 21-23
 - c. 24-26
 - d. 27-29
 - e. 30-32
 - f. 33-35
2. What is your gender?
 - a. Male
 - b. Female
 - c. Would rather not say
3. What is your ethnic origin (race)?
 - a. White
 - b. White, non-Hispanic
 - c. African American
 - d. Hispanic
 - e. Asian Pacific Islander
 - f. Native American
 - g. Would rather not say
4. What is your major/area of study (please list all if you have more than one)?
 - a. Describe the nature of your field experience for your Educational Psychology course.
 - b. I completed the field experience in short 1-2 hour segments throughout the semester
 - c. I completed the field experience in three or four longer (3-4 hours) segments throughout the semester
 - d. I completed the field experience in two segments (about 5 hours each)
 - e. I completed the field experience in one large segment
5. Where did you complete your field experience this semester?
6. Which of the following best describes your field experience this semester?

- a. I worked in an environment that was VERY similar to my K-12 (Kindergarten through high school) educational experiences.
- b. I worked in an environment that was somewhat similar to my K-12 (Kindergarten through high school) educational experiences.
- c. I worked in an environment that was somewhat different than my K-12 (Kindergarten through high school) educational experiences.
- d. I worked in an environment that was VERY different my K-12 (Kindergarten through high school) educational experiences.
- e. Not applicable.

Please elaborate on your answer to the previous question.

Demographic Questionnaire-Applied Study: This questionnaire was used to gather basic demographic information from participants in the applied study.

1. What is your age?
 - a. 18-20
 - b. 21-23
 - c. 24-26
 - d. 27-29
 - e. 30-32
 - f. 33-35
2. What is your gender?
 - a. Male
 - b. Female
 - c. Would rather not say
3. What is your ethnic origin (race)?
 - a. White
 - b. White, non-Hispanic
 - c. African American
 - d. Hispanic
 - e. Asian Pacific Islander
 - f. Native American
 - g. Would rather not say
4. What is your major/area of study? Please select more than one answer if you have multiple areas of study.
 - a. Art Education
 - b. Communication Sciences and Disorders
 - c. Early Childhood Education
 - d. English Education
 - e. FACS Education
 - f. Health and Physical Education
 - g. Linguistics
 - h. Mathematical Education
 - i. Middle Grades Education
 - j. Music Education
 - k. Music Therapy
 - l. Political Science
 - m. Psychology
 - n. Science Education
 - o. Social Studies Education
 - p. Other

Reflection Questionnaire (Kember et al., 2000): This questionnaire was one of the measures of reflective ability used in the applied study. Average participant responses on each subscale for the experimental and control group were compared in order to investigate potential differences in reflective ability.

Please fill in the appropriate circle to indicate your level of agreement with statements about your actions and thinking in this course.

- 1-definitely disagree
- 2-disagree with reservation
- 3-only to be used if a definite answer is not possible
- 4-agree with reservation
- 5-definitely agree

Habitual Action

- 1. When I am working on some activities, I can do them without thinking about what I am doing.
- 5. In this course we do things so many times that I started doing them without thinking about it.
- 9. As long as I can remember handout material for examinations, I do not have to think too much.
- 13. If I follow what the lecturer says, I do not have to think too much on this course.

Understanding

- 2. This course requires us to understand concepts taught by the lecturer.
- 6. To pass this course you need to understand the content.
- 10. I need to understand the material taught by the teacher in order to perform practical tasks.
- 14. In this course you have to continually think about the material you are being taught.

Reflection

- 3. I sometimes question the way others do something and try to think of a better way.
- 7. I like to think over what I have been doing and consider alternative ways of doing it.
- 11. I often reflect on my actions to see whether I could have improved on what I did.
- 15. I often re-appraise my experience so I can learn from it and improve for my next performance.

Critical Reflection

- 4. As a result of this course I have changed the way I look at myself.
- 8. This course has challenged some of my firmly held ideas.
- 12. As a result of this course I have changed my normal way of doing things.
- 16. During this course I discovered faults in what I had previously believed to be right.

Conception of Reflection Survey: This survey was used in the applied study to investigate whether participants in the control and experimental groups demonstrated different attitudes toward the reflective process. The final question was used to explore potential differences in participants' conceptions of the reflective practice. Responses to this open-ended question were used to create the word clouds depicting overall conceptions of reflection for participants in the control and experimental groups.

1. Reflective thinking is a key component to success in my future career.

1-definitely disagree
 2-disagree with reservation
 3-only to be used if a definite answer is not possible
 4-agree with reservation
 5-definitely agree

Please elaborate on your answer above.

2. As a result of this class, I have developed a greater understanding of how to engage in meaningful reflection.

1-definitely disagree
 2-disagree with reservation
 3-only to be used if a definite answer is not possible
 4-agree with reservation
 5-definitely agree

Please elaborate on your answer above.

3. As a result of this class, my view of the reflection has changed.

1-definitely disagree
 2-disagree with reservation
 3-only to be used if a definite answer is not possible
 4-agree with reservation
 5-definitely agree

Please elaborate on your answer above.

4. In your opinion, what is required to engage in meaningful, reflective thinking? Please list ONE-WORD answers only. For example, if the question asked you what was required to have fun, you could write "friends" or "money". Write as MANY ideas as possible. What is required for you to think reflectively?

Appendix B

Field Experience Paper Directions

This handout was distributed to all participants in both the investigatory and applied studies. The handout describes the field experience requirement, as well as instructions and a rubric for the final field experience reflection paper. This was an existing document that has been used in all course sections for several years.

Field Experience Requirement: The University System Board of Regents requires a 10-hour field experience in this course. This field experience is arranged by the individual student. This experience is broadly defined but involves relating the principles you are learning in the course to the children, adolescents, or other learners with whom you are working. Students should select a field experience site and provide documentation about the 10 hours of field work. For example, if you choose to tutor an elementary-aged student, please provide a log of your hours and ask the parent of the child you tutored to sign the log. If you are working with an after-school program or a community-based program, the person who oversees your work can sign your log. In addition to the hours log, students should compose a written response to the following questions: (1) Provide a brief description of the person(s) with whom you worked. Describe their general age, learning needs, and areas of learning in which you provided support; (2) Choose one experience from your ten-hours and relate it to a concept presented in the 2130 class. For example, you might describe how when working with an adolescent who was struggling in mathematics, you applied principles of Vygotsky's theory to assist the student; and (3) Describe how this experience broadens your views on your role in the teaching and learning process. Your written reflection should be no more than three double-spaced pages in length.

	Exceeds Expectations.	Meets Expectations.	Minimally meets expectations.	Does not meet all expectations.	Does not meet any expectations.
Logistics (Up to 10 points)	9-10 points Paper is turned in on time, and all components (including signed log demonstrating ten hours of field work) are included.	7-8 points <i>Failure to earn full points for logistics will vary.</i>	5-6 points <i>Failure to earn full points for logistics will vary.</i>	3-4 points <i>Failure to earn full points for logistics will vary.</i>	0-2 points <i>Failure to earn full points for logistics will vary.</i>
GUMPS-Grammar, usage, mechanics, punctuation (Up to 10 points)	9-10 points Paper includes little to no grammar issues.	7-8 points Paper includes a few grammar issues.	5-6 points Paper includes grammar issues that are distracting to the reader.	3-4 points Paper includes several grammar issues that are distracting to the reader.	0-2 points Paper is difficult to understand due to surplus of grammar issues.
Description of learner population. (Up to 20 points)	17-20 points A complete description is included, addressing general age, learning needs, and areas of learning in which support was provided.	13-16 points A complete description is included, but some components of the description could be further developed.	9-12 points Description of learner population is missing one of the following: -general age -learning needs -areas of learning in which support was provided	5-8 points Description of learner population is missing two of the following: -general age -learning needs -areas of learning in which support was provided	0-4 points No description of learner population is provided.
Analysis of experience and application of concepts covered in EPSY 2130. (Up to 40 points)	33-40 points Description of experience is well described. The student thoroughly analyzes the experience and applies concepts covered in EPSY 2130. Clear evidence of analysis is present.	26-32 points Description of experience is well described. Application of concepts covered in EPSY 2130 is sufficient, but could be further developed.	18-25 points Description of experience is described. Application of concepts covered in EPSY 2130 is present, but inadequately developed.	9-17 points Description of experience is not well described, and little to no application of concepts from EPSY 2130 is present.	0-8 points Experience is not described, and no application is present.
Reflection on experience/its effects on personal role in the teaching and learning process. (up to 20 points)	17-20 points Paper demonstrates thorough and thoughtful reflection and analysis of how the experience broadens view of teaching.	13-16 points Paper demonstrates reflection and analysis of how the experience broadens view of teaching, but ideas could be more developed.	9-12 points Paper demonstrates an incomplete reflection and analysis of how the experience broadens view of teaching.	5-8 points Paper demonstrates little to no reflection and analysis of how the experience broadens view of teaching.	0-4 points Paper does not address how the experience broadens view of teaching.

Appendix C

Framework of Four Levels of Reflection for Teacher Education

Framework of Reflection for Teacher Education Scoring and Training Overview: I created this document to concisely describe the following: (A) The scoring procedures for the Framework of Reflection for Teacher Education, (B) The general timeline/protocol for training the judges to assess field experience papers using the Framework, and (C) The inter-rater reliability of the judges in the Investigatory and Applied Studies. This would be a useful document to share with other researchers wishing to use the Framework.

Scoring Procedures

Each paragraph is assigned a Depth of Reflection (DoR) score and a contextual theme.

Nonreflection: Simple descriptions of experiences that make no effort to connect educational theory to practice

The students that I was working with were in various grades in high school and most of the time I tutored them in English. (Amy, para. 1)

Understanding: Descriptions of educational experiences in light of the content discussed in teacher preparation courses

At snack time, I broke his graham cracker in half and he got really excited because he had “two” graham crackers instead of one. This reminded me of the concept of conservation that we talked about in class. (Rob, para. 4)

Reflection: Interpretations of experiences that inform future practices and aid in the construction of personal philosophies of teaching

I realized how difficult it could be to help someone overcome a learning handicap that they place on themselves...In my future classroom, I will make a specific effort to address the underlying affective needs that impact student learning. (Clarence, para. 2)

Critical Reflection: Characterized by the transformation of basic assumptions and conceptual frameworks

I have a fear that I will stereotype my students before getting to know them, and then I will be blind to the other talents and abilities they have that I just assumed they would not (Adelaide, para. 3)

Each essay is then assigned a Highest Incident Depth of Reflection (HI-DoR) score, based on the highest DoR score assigned throughout the entire paper.

For example, if an essay had four paragraphs with DoR scores of Understanding, Reflection, Reflection, and Reflection, the HI-DoR score would be Reflection.

Training and IRR Analysis: Investigatory Study ($N = 4$ judges)

SESSION 1

- Review of the literature on reflection
- Detailed discussion of the Framework of Reflection for Teacher Education
- Discussion of the handout with the four levels of the Framework and corresponding tips for how to sort writing samples
- Practiced 18 text segments and discussed scoring until 100% reliability was reached

Independently scored 4 practice essays

SESSION 2

- Discussed scoring of the four practice essays until 100% reliability was reached
- Reviewed protocol and clarified any questions

Independently scored 4 additional practice essays

Confirmed no major discrepancies and addressed any final questions

All judges scored 12 of the 42 field experience papers ($N = 66$ paragraphs)

Percent Majority Adjacent Agreement	Average Kappa
<p>Definition: Three out of four judges assigned the same DoR score for the paragraph, with the remaining judge assigning an adjacent score.</p> <p><u>Agreement:</u> Reflection, Reflection, Reflection, Understanding</p> <p><u>Not an Instance of Agreement:</u> Reflection, Reflection, Reflection, Nonreflection</p>	<p>Cohen's kappa for each pair of judges was calculated, and the arithmetic mean of these estimates was determined in order to provide an overall agreement for scoring of all paragraphs for the twelve papers (Light, 1971).</p>
88 % Majority Adjacent Agreement	Average $\kappa = .57$

Training and IRR Analysis: Applied Study ($N = 3$ judges)

<p>REFRESHER TRAINING</p> <ul style="list-style-type: none"> Reviewed previous training materials Clarified any questions/concerns Practiced 24 text segments and discussed scoring until 100% reliability was reached

All judges scored 12 of the 47 field experience papers ($N = 60$ paragraphs)

Percent Majority Adjacent Agreement	Average Kappa
<p>Definition: Three out of four judges assigned the same DoR score for the paragraph, with the remaining judge assigning an adjacent score.</p> <p><u>Agreement:</u> Reflection, Reflection, Reflection, Understanding</p> <p><u>Not an Instance of Agreement:</u> Reflection, Reflection, Reflection, Nonreflection</p>	<p>Cohen's kappa for each pair of judges was calculated, and the arithmetic mean of these estimates was determined in order to provide an overall agreement for scoring of all paragraphs for the twelve papers (Light, 1971).</p>
98 % Majority Adjacent Agreement	Average $\kappa = .56$

Introduction to Reflection Handout: I created this handout to introduce the judges to the concept of reflection and summarize key literature. The discussion of this handout was the first component of the training session.

What is Reflection?

“The kind of thinking that consists of turning a subject over in the mind and giving it serious and consecutive consideration” (Dewey, 1933, p. 3).

Why is reflection important in teacher education?

- According to Harland and Wondra (2011), reflection allows pre-service teachers to:
 - Recount classroom clinical experiences (observations and/or teaching practices)
 - Compare observations to what they know about teaching and learning
 - Adjust teaching as necessary
 - Reflection functions to “increase abilities to improve and modify teaching” (p. 128).
- “The reflective process should challenge preservice teachers’ own thinking, misconceptions about teaching and learning, and the thinking of their classmates” (Harland & Wondra, 2011, p. 132).
- Reflection is important because it is necessary to make reflective judgments to deal with ill-defined problems. (King and Kitchener, 1994)
 - Expert practitioners in a profession are often distinguished from novices by their ability to reflect on their practice when dealing with unusual or particularly complex cases (Kember, McKay, Sinclair, & Wong, 2008, p. 369).

Is all reflection the same?

- Reflection operates on a number of levels. The highest level is typically referred to as critical reflection, and usually necessitates a change to deep-seated, and often unconscious beliefs, leading to the creation of new belief structures (Kember, 2001).

References and Further Reading

Dewey, J. (1933) *How we think: A restatement of the relation of reflective thinking to the educative process*. Boston: DC Heath and Company.

Harland, D. J., & Wondra, J. S. (2011). Teacher candidates’ reflections on clinical experiences: A comparison of blog and final paper assignments. *Journal of Digital Learning in Teacher Education*, 27(4), 128–133.

Kember, D. (2001). *Reflective teaching and learning in the health professions*. Oxford: Blackwell Science.

- Kember, D., McKay, J., Sinclair, K., and Wong, F. K. Y. (2008). A four-category scheme for coding and assessing the level of reflection in written work. *Assessment & Evaluation in Higher Education*, 33(4), 363-379.
- King, P. M., & Kitchener, K. S. (1994). *Developing reflective judgment: Understanding and promoting intellectual growth and critical thinking in adolescents and adults*. San Francisco: Jossey-Bass.

Framework of Four Levels of Reflection for Teacher Education and Tips for Scoring

Handout: This handout describes the four levels of the Framework, as well as tips to guide the scoring process. The descriptions of the levels were proposed by Harland and Wondra (2011), but I created the tips for scoring during the pilot version of the experimental class. I reviewed these levels in detail with the judges during the training sessions, and everyone was encouraged to keep this handout with them as they scored the field experience papers.

Nonreflection (Descriptive): Coursework content or clinical experiences are described without trying to understand it.

- a) Teacher (and/or student) roles are reported and described.
- b) May voice frustration or excitement but without forming a view and trying to understand experiences or connect it to course content.
- c) Responses are interpreted in light of personal worries and previous experience.
- d) Weak or no attempt to connect lesson effectiveness w/ teaching methods. (Weak = Less than 3 statements)

Tips for scoring:

- “Fly on the wall” perspective; tells exactly what happened
- Reproduces material without showing evidence of understanding it (terminology is just “sprinkled in” with no analysis; descriptions seem to be copied and pasted from textbook)
- Routine cases that almost feel automatic; no thought given to any type of alternatives
- Provides overview of the essay without giving any “meat”
- No attempt to provide reasons/justification for events

Understanding: Coursework content or clinical experiences are described in light of course content; correlations made between teaching methods and effectiveness.

- a) Teacher (and/or student) roles are analyzed, giving reasons for actions taken, but with limited justification.
- b) Experiences are used to support and/or explain course content. But reflection might be trite, cliché or generalized.
- c) Reflections are rationalized based on personal experiences/ observations
- d) Connects lesson effectiveness w/ teaching methods

Tips for scoring:

- Often full of trite and cliché language (*I can inspire students to accomplish their dreams, I am honored to work with children, since they are the future*)
- “A-ha moments” that reinforce course content; but no analysis of how that experience would translate into future educational practice.

- Attempt to reach an understanding of a concept/topic (expands on terminology, goes beyond just copying and pasting definitions)
- “In the moment” explanations; little relation to future practices

Reflection: Course content or clinical experiences frame content and help shape philosophy and determine future practice.

- a) Teacher (and/or student) roles are analyzed, exploring possible reasons and explanations for experiences.
- b) Experiences are used to evaluate content of the course, in attempt to determine application for future classroom.
- c) Reflection is personalized; addressing affect on teaching philosophy or specific future teaching practices.
- d) Strong connections made between lesson effectiveness and teaching methods while providing alternative methods for improvement

Tips for scoring:

- Several potential explanations of experiences are offered (demonstrates open-mindedness)
- Makes suggestions for future teaching practices (*When I am a teacher; In my classroom I will*)
- Theory is applied to practical situations; the student demonstrates an effort to put ideas into practice
- Connects to personal philosophy and teaching practice (*I am beginning to see that good teaching requires; In order to be an effective teacher one must*)
- Situations encountered in practice are considered and successfully discussed in relationship to what has been taught; personal insights go beyond textbook definitions
- Suggests modifications of strategies to different environments (*We could have done it this way, In the future I will try a different technique*)

Critical Reflection: Critically reviews assumptions, and a new conceptual framework is formed.

- a) Teacher (and/or student) roles are critically analyzed.
- b) Experiences are used as examples for a fundamental shift in thinking, committed to changing practice.
- c) Reflection is internalized, showing evidence of a change in perspective over a fundamental teaching belief.
- d) Connections between lesson effectiveness, and teaching methods may include dissatisfaction with existing frameworks, but must also explain new framework.

Tips for scoring:

- Characterized by uncovering a new understanding (*I never realized; I now see that*), or shifting a conceptual framework
- Thoughtful frustration about the status quo
- Often involves multiples tenses (*I didn't think, but now...*)
- Shows evidence of a change in perspective or behavior (the purpose of education, what it means to learn)

Scoring Procedures Handout: This handout describes the protocol for scoring the Field Experience Reflection Papers. I reviewed this protocol with the judges during the training sessions.

1. Quickly read the entire essay
2. Count the number of paragraphs in the essay
3. Assign a contextual theme (see examples below) to each paragraph
 - a. “Importance of making connections with students”
 - b. “Autonomous learning”
 - c. “Teaching is not common sense”
 - d. “What it means to be a good teacher”
 - e. “Observational learning”
4. Mark each paragraph as Non-Understanding (“N”), Understanding (“U”), Reflection (“R”), or Critical reflection (“CR”)
5. Tally the instances of Non-Reflection, Understanding, Reflection, and Critical Reflection, and write the totals on the top right hand corner of the essay.

Appendix D

The Experimental Course

Sample lesson outline and materials: This outline describes a sample lesson from the experimental course and illustrates how it is designed based on the three stages of the Incubation Model of Teaching. The PowerPoint slides for the lesson are also provided.

Academic Goals (Chapter 9: Complex Cognitive Processes)

- What is creativity and how is it related to problem solving? Why is creative thinking important for educators?
- How are reflection and creativity related?
- Why is it important to consider schema driven problem-solving in the classroom and how does this relate to diversity?

Heightening Anticipation: Arouse Curiosity

- Nine Dot Problem
- Two open-ended Poll Everywhere questions: What is creativity? What is reflection?

Deepening Expectation: Digging Deeper

After discussing definitions of creativity, students work in groups to analyze TTCT-Figural tests completed last class and provide examples of:

- | | |
|----------------------|---------------------------|
| • Divergent thinking | • Restructuring a problem |
| • Originality | • Functional fixedness |
| • Fluency | • Response set |
| • Flexibility | |

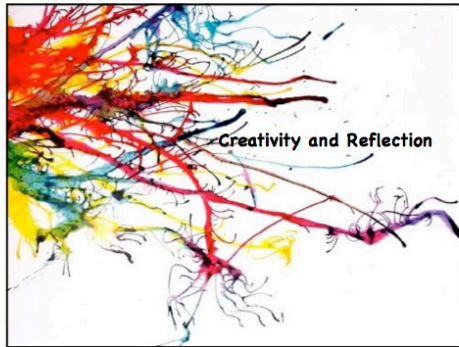
Students examine word clouds for their responses for “What is creativity?” and “What is reflection?” and discuss connections between the two processes. Students then discuss why creativity and reflection are important in the classroom, in order to combat Schema Driven Problem Solving.

Keeping it Going

Students examine their most recent picture reflection in response to the question, “What is learning?” and submit a video reflection via Flipgrid on the following prompt: *How are creative*

and reflective thinking related? What is one misunderstanding about learning/teaching that you think you are discovering throughout this class and your field experience?

3/7/17



What is creativity?

When poll is active, respond at [PollEv.com/sarahmarieca475](https://poll.ev.com/sarahmarieca475)
 Text SARAHMARIECA475 to 37607 once to join

The ability to produce work that is ORIGINAL and APPROPRIATE

TTCT Analysis

- Divergent thinking
- Originality
- Fluency
- Flexibility
- Restructuring a problem
- Functional fixedness
- Response set

Metacognition

"Knowledge or awareness of self as knower"

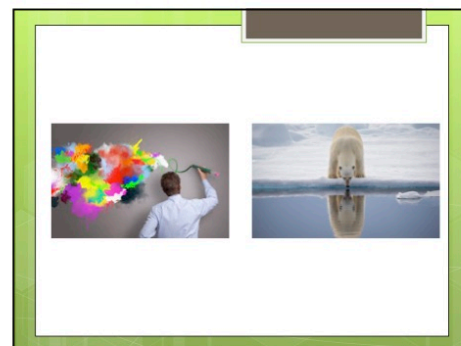
Procedural Knowledge

Declarative Knowledge

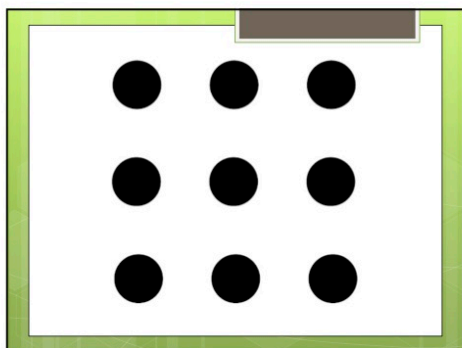
Self-Regulatory Knowledge

What is reflection??

When poll is active, respond at [PollEv.com/sarahmarieca475](https://poll.ev.com/sarahmarieca475)
 Text SARAHMARIECA475 to 37607 once to join



3/7/17



Critical Reflection:
When expectations don't match reality

Critical reflection is characterized by UNCOVERING and TRANSFORMING misunderstandings and assumptions.

The danger of "solving" a problem too quickly

Call
Pay
Line

Blue
Cake
Cottage

Incubation leads to moments of **insight**.

The Danger of "Solving" Problems too Quickly

I was so upset our supervisor wouldn't let us give the students a prize for their positive behavior. So many of these students live in poverty, and I wanted to give them a reward.

Be careful not to assume that all situations are the same...

Schema-driven problem solving: recognizing a problem as a "disguised" version of an old problem for which one already has a solution

- Fixedness
- Representative heuristics
- Availability heuristics
- Belief perseverance
- Confirmation bias

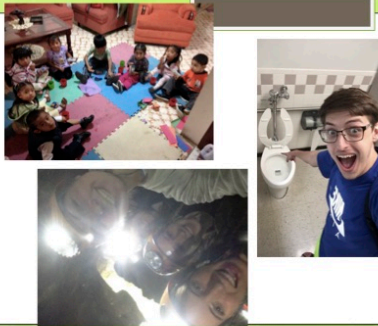
Avoid "safe" reflections

- This experience really changed my life.
- I am happy I have the opportunity to be a pillar of hope for these students.
- At first, classroom discipline was hard...but then I tried something new and now I understand what to do.

3/7/17

Maybe I don't actually know what these children need to feel appreciated. I may think that giving them prizes makes them feel loved, but really they just want me to hug them and spend time with them. Helping those in need doesn't mean solving their "problems" in the way I would want them to be solved. In fact, many of these students don't see their lack of material possessions as a problem at all.

Creativity and Reflection



How are creative and reflective thinking related?
What is one misunderstanding about learning/teaching that you think you are discovering throughout this class and your field experience?

Sample creative reflection activity-Problem Stacks: This is one of eight creative reflection activities that were specifically designed based on the information processing strategies in the Deepening Expectations phase of the Incubation Model of Teaching. The students in the experimental course completed this activity about halfway through the semester to investigate commonalities across any challenges they were facing in their field experiences.

Problem Stacks

Getting to the Essence of Problems and Identifying Underlying Assumptions

1. Each individual receives a stack of blank notecards.
2. For two minutes, participants brainstorm as many issues as possible related to a problem-area of their choice, recording each issue on a separate notecard.
 - a. For example, a teacher could choose to brainstorm issues concerning student behavior, listing examples such as *students talking out of turn* and *children unable to sit still during group time*.
3. After completing the brainstorming activity, participants exchange notecards with a partner. Partners draw 3-5 notecards from each other's stacks, and ask one-another to explain the issues written on each card.
4. After a short discussion about the issues, partners work together to identify common themes that unite each of the problems discussed. Participants create a list of these themes, and the process is repeated. Partners draw a new selection of notecards, and conversation continues.
5. Once partners have completed the activity multiple times, they work together to analyze their list of themes and succinctly summarize which themes unite all of the issues discussed.

In order to critically reflect upon experiences, it is essential that individuals focus attention to the underlying themes and issues that directly impact their circumstances. Critical reflection is characterized by the transformation of perspectives; individuals become aware of assumptions and restructure understandings (Dewey, 1933). Transformative thought and informed action requires individuals to remain open-minded and recognize assumptions that inform their current beliefs (Jay & Johnson, 2002; Mezirow, 2003). Getting to the essence of experiences guides individuals to recognize underlying problems, acknowledging assumptions and guiding future actions. Throughout this activity, partners must consider diverse viewpoints as they work together to succinctly define the underlying problem(s) that give rise to multiple issues (Brookfield, 1995; Riddell, 2007). Individuals “cut holes” through their experiences, identifying common themes that describe diverse problems and guiding them to implement solutions that address underlying issues.

This strategy is inspired by *Cutting Holes to See Through* in the Incubation Model of Teaching, which refers to directing or focusing attention to specific information's essence or theme in order to target problems and solutions (Torrance and Safter, 1990).

- Brookfield, S. (1995). *Becoming a critically reflective teacher*. San Francisco: Jossey-Bass.
- Dewey, J. (1933). *How we think: A restatement of the relation of reflective thinking to the educative process*. Boston: DC Heath and Company.
- Jay, J. K. and Johnson, K. L. (2002). Capturing complexity: A typology of reflective practice for teacher education. *Teaching and Teacher Education*, 18,73–85.
- Mezirow, J. (2003). Transformative learning as discourse. *Journal of Transformative Education*, 1(1), 58-63.
- Riddell, T. (2007). Critical assumptions: Thinking critically about critical thinking. *Journal of Nursing Education*, 46(3), 121-126.
- Torrance, E. P and Safter, T. (1990). *The incubation model of teaching: Getting beyond the aha*. Buffalo, NY: Bearly Limited.

Sample activities for encouraging reflection via multiple modalities: This table summarizes some of the strategies used in the experimental course that were designed to encourage reflection via multiple modalities.

Table A.1. *Encouraging Reflection via Multiple Modalities: Sample Activities from the Experimental Course*

Strategy	Description
Flipgrid (https://info.flipgrid.com/)	Five times throughout the semester, students uploaded short, 90-second video responses to reflection prompts. I submitted a video response to these reflections and students were also encouraged to listen and respond to their classmates' responses.
Progressive Photo Reflections	Four times throughout the semester, students worked individually or in small groups to take a photo to capture their response to the reflection prompt, <i>What is learning?</i> As a final assignment, students made a collage of these photos and reflected on how their understanding of reflection had changed throughout the semester.
This or That	This short activity was used multiple times throughout the semester. Various pairs of pictures (e.g., waterfall vs. lake; beach vs. mountain) were projected on the screen, and students were asked to first reflect individually, and then in groups, as to which picture best captured their feelings about a particular topic or experience. For example, after students visited their field placements the first time, they reflected as to whether their first exposure to the field placement was like a melting ice-cream cone or a thirteen-layer cake.
de Bono's (1985) Six Thinking Hats	Students worked in groups of six to discuss course content or field experiences from multiple perspectives. Each student wore a different colored hat, which dictated the perspective through which he or she was to discuss the content. Students switched hats multiple times throughout the discussion. Although the perspectives were often adjusted (For example, during one activity, students explored field experiences via the perspectives of different learning theorists), the original perspectives for each colored hat are as follows: <div style="margin-left: 40px;"> White hat: Seeks the facts and only the facts Yellow hat: Explores the positives of the situation Black hat: Plays the devil's advocate Red hat: Explores feelings, emotions, and intuition </div>

Green hat: Focuses on creativity and new possibilities
Blue hat: Manages the other perspectives; attempts to reach conclusions

Force Fit

Students worked in pairs to list specific incidents from their field experiences on yellow slips of paper and key course concepts on blue slips of paper. Students then drew one of each colored strip at random and reflected on how the two ideas related to one another. For example, one pair of students reflected on how the trouble student at snack time related to the concept of cognitive overload.

Role Play

Students worked in small groups to role play challenging incidents they encountered in their field experiences. After presenting to the class, each group of students reflected on how they could change their teaching practices to improve the situations depicted in their skits. Students then extended the role play to illustrate how their improved practice could create alternative endings to their experiences. Finally, the whole class discussed how such changes could positively impact various characters in the scene.
