

The Field Experience Journal

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From the Editor

Dear Readers of *The Field Experience Journal*:

The articles submitted for this edition of *The Field Experience Journal* address wide-spread experiences in clinical settings for teacher candidates. While this is not unique from other editions of this journal, it is of particular note for this edition. To the authors sharing their research and experiences, a sincere thank you as we seek to constantly make more meaningful and memorable these critical preparatory experiences for teacher candidates.

As the most recent semesters have ended, certainly all of us are appreciating those who serve as mentor/cooperating teachers for our teacher candidates. These semesters have provided clear evidence of the adaptability of educators to not only cope with the restrictions of a pandemic, but to guide teacher candidates in providing instruction that served young learners in a delivery that many were not previously prepared to utilize as fully as become necessary.

Truly, there were times of frustration (technical difficulties) that were felt by all parties engaged in the triad (mentor, teacher candidate, and university supervisor) as delivery varied from the norm, but supervision was also altered. In correspondence with many colleagues across our country, I am led to conclude that those of us serving as supervisors learned a great deal about what educational delivery may look like in the future. Certainly, instruction may never fully return to previous methods. After discussing for several years in pedagogy classes the need for flexibility, even I was required to demonstrate this quality for the benefit of my students.

Finally, my thanks to those who have contributed their manuscripts for our consideration and to our reviewers for their time and expertise.

Kim L. Creasy

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**An Arts-Integrated Creative Problem-Solving Activity:
A Different Way to Formatively Assess Student Learning**

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Abstract

Effective formative assessment is a vital part of instruction as it helps discover areas for improvement. Teacher candidates have some unique needs that require special attention to formative assessment strategies that they learn in college. To meet these needs and to be effective, formative assessment tactics included in teacher preparation programs need to be accurate, flexible, creative, applicable in various settings, differentiated, and have the capacity for consistent use over long periods. This article describes a formative assessment tool that meets these requirements as well as several Council for Accreditation of Educator Preparation (CAEP) standards and has other benefits. This tool is grounded in arts integration, the Dual Coding Theory of Information Storage of Allan Paivio, and E. Paul Torrance's creativity traits.

Keywords: Formative assessment, arts integration, preservice teachers, Torrance's creativity traits, non-linguistic representation of learning

Formative assessment is an important part of instruction. Yet, teachers and students forget about this relationship due to an excess of summative assessment at schools (Hargreaves, 2004; Lazarin, 2014) that leaves little room for formative assessment. This can lead to less-informed feedback and instructional decisions. Formative assessment supports learning only if used consistently (Volante & Beckett, 2011). To ease the task of consistent formative assessment, teachers need strategies that are not too time-consuming, applicable for daily use, and versatile (i.e., appropriate for a variety of subjects, projects, and types of knowledge: declarative, conceptual, and procedural). Many teachers feel restricted in applying creative formative assessment practices despite their strong potential to realize the main purpose of schooling, which is to help students become life-long learners. (Clark, 2012). To address these issues, teacher preparation programs need to include quality formative assessment tactics. The current article introduces an arts-integrated formative assessment tool based on Torrance Tests of Creative Thinking® and the Dual Coding Theory of Information Storage of Allan Paivio (1971). This tool could be used in different subject areas and at various grade levels. The figural transformations tactic, if included in teacher education practices, can help address several Council for Accreditation of Educator Preparation (CAEP) standards for teacher candidates (See Appendix A for the list of the standards).

Formative Assessment during Field Experiences and Internships

Once preservice teachers begin their field experiences or internships, the expectations are the same as for practicing teachers, i.e., to create and conduct a quality formative assessment that is appropriate for diverse students, motivates them, informs future instruction, and does not induce fear in learners (CAEP standards 1.a, 1.b, 3.a, 3.d, 3 f, 4.a, 4.d.). See Appendix A for the text of the standards. Formative assessment is an area that needs to receive more consideration in

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teacher preparation. A study by Volante et al. (2010) reported that teachers believe that the lack of attention to creative and innovative formative assessment techniques in teacher preparation programs prevents them from subsequently using these techniques in their teaching practices. Preservice teachers are put in a disadvantaged position because they can only rely on the knowledge they have gained in methods courses. It is safe to assume that during field experiences, the switch from learning to teaching makes assessment considerably harder. This, in turn, can lead to a non-systematic use of formative assessment by teacher candidates after graduation (Clark, 2012; Quyen & Khairani, 2017).

Practicing teachers can make many instructional decisions based on their experience; that is why these decisions do not require as much focus and mental energy as they would from preservice teachers. Seasoned professionals, thanks to experience, have a wider repertoire of formative assessment tactics, are typically more attuned to different forms of assessments and to the needs of students, hence, they can adjust assessment strategies efficiently. An expected lack of experience of teacher candidates makes choosing and using appropriate or sophisticated assessment tools harder. This creates a strong need for careful selection of assessment tactics that preservice teachers are introduced to in teacher preparation programs.

Teacher candidates and beginning teachers form a unique subgroup of teachers that differs from practicing teachers. This suggests the need for teacher preparation programs to include a set of assessment tactics that effectively meet the needs of K-12 students and the needs of this population of teachers.

Challenges of Commonly Used Assessment Practices and Characteristics of Quality

Assessment

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The necessity of differentiated instruction has been recognized a long time ago and is addressed in teacher preparation programs. The lack of differentiated assessment that is creative and supportive of student learning, unfortunately, has not received much attention in teacher preparation yet (Montenegro & Jankowski, 2017). Diverse students require differentiated assessment. For example, such frequently-used strategies as tests and quizzes are unlikely to reveal linguistically diverse students' true knowledge and potential. According to Card and Giuliano, (2015), English Language Learners' (ELLs') test results are typically not representative of their knowledge, understanding, or IQ.

Many commonly used formative assessment tactics fail to address the needs of culturally diverse students. For example, a study by Trumbull et al. (2015) demonstrated that questioning/classroom discussion is ineffective when used with American Indian and Alaska Native students because this approach is not widespread in their cultural communities. Diverse student populations will always need alternative assessment (Kneale & Collings, 2018). An inflexible assessment strategy cannot effectively reveal student progress, which is always impacted by culture, disabilities, low socioeconomic background, being a non-native speaker, and other factors.

One way to diversify assessment is by using the Dual Coding Theory of Information Storage of Allan Paivio (1971). The main premise of his theory is that the human brain stores information in two forms: linguistic and non-linguistic. The latter involves mental images or any other visual or sensual representation of knowledge (Pitler et al, 2012). In a metaanalysis of over 100 studies, Robert Marzano, a known expert in non-linguistic representation (NLR) of knowledge found that NLRs, in addition to enhancing learners' ability to process, systematize, and recall information (Marzano et al., 2001), produce significant gains in student overall

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knowledge and assessment scores (Haystead & Marzano, 2009). Creating and using NLRs have been shown to support visual learners (Marzano et al., 2001), ELLs (Hill & Bjork, 2008), and to help all students internalize knowledge better (Marzano et al., 2001).

Time constraints of a school year and the pressure of high-stakes tests increase the difficulty of development and systematic use of assessment strategies that foster higher-order thinking skills. Tests and quizzes, routinely used for formative assessment essentially show a snapshot of mostly declarative knowledge at some point in time and do not produce a good representation of students' abilities and understanding (Saxon & Morante, 2014). Based on an extensive review of research, William (2011) conceptualized two major characteristics of quality formative assessment that address this issue. 1) Assessment should detect that a lack of knowledge or understanding exists, reveal its cause and the actions on the part of the teacher that can help remedy the situation. 2) Assessment should motivate the active participation of the learners in addressing any gaps in knowledge or understanding they may have.

A common side-effect of many widely used assessment techniques is student anxiety. Test anxiety negatively affects students at all levels of education (Hamzah et al., 2018). It is harder to stay focused under stress, which can interfere with the diagnostic function of assessment and make consecutive instructional decisions less effective. Stress caused by being assessed lowers students' overall desire to learn (Hargreaves, 2004). This creates a barrier to fulfilling one of the main purposes of schools: creating life-long learners (Clark, 2012).

Clark (2012) calls teaching an art form. This title implies such attributes as creativity, innovation, and uniqueness. He stresses that teaching needs to be an act of artistic creation, as that is the best way to support the construction of meaning by each student in a diverse classroom. Inflexible assessment tactics that do not allow teachers and students to be creative are

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less likely to demonstrate diverse students' knowledge and are less likely to be seen as learning opportunities by them. The following section explains how arts-integrated assessment, and the figural transformations assessment tool, in particular, meet the criteria of effective formative assessment and why this tactic is advantageous for teacher candidates.

Benefits of Figural Transformations, an Arts-integrated Assessment Strategy

Arts-integrated Formative Assessment

Arts-integrated instruction and assessment are culturally responsive because the arts constitute an attribute of every culture (Langer, 1966). Further, the famous saying “A picture is worth a thousand words” summarizes another benefit of arts-integrated assessment: i.e., an alternative way for students to demonstrate their knowledge. For example, a struggling writer may not be able to explain connections between the components of a water cycle in writing; yet, he/she may better show his/her learning through drawing or drama. According to Fazylova and Rusol (2016), because the arts do not solely rely on the expression of knowledge or feelings through language, they become an alternative and effective way for ELLs to express themselves and their knowledge. This makes, arts-integrated assessment essentially an NLR of student learning. Arts integration gives teachers an opportunity to be creative and adjust their teaching and assessment strategies to the needs of their diverse students (Cornett, 2015).

Thanks to the pleasure of artistic self-expression, arts-integrated formative assessment can help school students feel less anxious, more focused, and even enjoy the assessment process. Arts integration stimulates content retention (Hardiman et al., 2014) attention to detail, pattern-recognition, critical thinking, and problem-solving skills (Root-Bernstein & Root-Bernstein, 1999; Watts, 2018). These qualities make arts-integrated tactics conducive to the development of higher-order thinking skills, creativity, and other 21st Century skills (Crawford, 2004; The

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College Board for National Coalition for Core Arts Standards, 2017). Adding an artistic component to formative assessment can help improve student content retention, performance on standardized summative assessment (Hardiman et al., 2014; Fazylova & Rusol, 2016), and reduce the need for remediation.

Arts integration increases students' intrinsic motivation to learn (Cornett, 2015); therefore, they are more likely to view formative assessment as a beneficial part of learning and be more open to feedback, along with participation in remediation activities. This helps put assessment back in its rightful place of an integral part of instruction (Lazarin, 2014) and makes consistent use of formative assessment easier. Arts-integrated projects are multifaceted and grounded in real-life application (Cornett, 2015). Yet, they are not necessarily complicated or difficult to implement. This quality is important for preservice teachers because their lack of teaching experience makes many tasks harder.

Integrating the arts disciplines with assessment can help students demonstrate not only their knowledge of facts but their understanding of connections and potential for growth, which gives this assessment an advantage over such common tools as pop-up quizzes. Integration of the arts supports student learning as well as improves instruction (Burnaford et al., 2013). Instructional decisions based on arts-integrated assessment will likely be more informed due to the quality of data they provide, which in turn, will likely ease the task of remediation and further instruction for teacher candidates. Better instructional decisions are likely to result, in addition to increased self-efficiency, reduced feelings of stress, and greater positive evaluations from mentor-teachers and supervisors. Teacher candidates will likely have more time and energy for self-reflection and discovering what *kind* of teachers they are or want to become. Instead of

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addressing one issue after another, they will have a chance to “shine”, be creative, enjoy teaching, and begin seeing teaching as an art form and themselves as artists.

The Benefits of Figural Transformations Tool as Arts-integrated Assessment

This assessment tactic is based on the Dual Coding Theory of Information Storage of Allan Paivio (1971) and works of E. Paul Torrance and the Torrance Tests of Creative Thinking ®. These tests include the two most widely-used and reliable tests of creativity (Gifted Education TTCT, 2018). The figural transformations tool was created in collaboration with several colleagues and used in several published research studies (see study 1 authors; study 2 authors; study 3 authors). These articles focused on the instructional and enrichment value of this tool for creativity and originality development, motivation, and teaching science content. The current article focuses on the use and benefits of this tool as an assessment in various subjects. The template of the tool is included in Appendix B.

Figural transformations are easy to adjust to the context of any subject at almost any grade level (CAEP standards 1.a and 4.a). All a teacher candidate needs to do is give each student a printed copy, announce the topic, and a challenge if needed. Then, students are asked to modify the figures provided and make them look like something related to the given topic. For example, a social studies teacher can assign to change one or more sections of the tool into representations of the most important economic, social, and other consequences of the Battle of Gettysburg and demonstrate the impact of these outcomes on the results of the Civil War. A science teacher can challenge students to demonstrate their understanding of the water cycle. At the end of a reading or language arts lesson, students can show the conflict in *To Kill a Mockingbird* (Lee, 1960) or, at a lower grade, the cause-and-effect connections in *If You Give a Moose a Muffin* (Joffe Numeroff, 1991). The next step could be peer-teaching and peer-

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feedback, self-evaluation, or a class discussion of the transformations. A teacher candidate could request a verbal or written explanation of each transformation. After the exercise is complete, a teacher can provide students with feedback based on their transformations (CAEP standard 4.d). Such features of formative assessment as feedback without the evaluative purpose, peer- and self-assessment, along with questioning, have been shown to improve student learning (Volante & Beckett, 2011). All of these can be included in the final step of using the figural transformations tool.

Preservice teachers need to demonstrate an ability to consistently acquire quality assessment-based data on student progress that is not limited to declarative knowledge (CAEP standard 3.a). This tactic allows schoolchildren to communicate procedural, declarative, and conceptual knowledge. Transformations 1-7 in Appendix C includes examples of figural transformations completed by a second grader and a third grader that demonstrate the three types of knowledge as well as an analysis of each transformation. Similarly, the revision of Bloom's taxonomy in 2001 concluded that creation is the most complex level of cognitive processes that an individual may engage in (Anderson & Krathwohl, 2001). Therefore, given the product that the Transformations 1-7 in Appendix C call for, students would be able to create a representation of their knowledge.

Before using figural transformations, students can develop assessment criteria for complete transformations, which can be used for teacher-feedback, self-assessment, and peer feedback (CAEP standard 4.d). This aligns with one of the main purposes of formative assessment according to Torrance (2012): using feedback to help students improve and understand the content at a deeper level.

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Arts-integration helps this strategy meet the first requirement of quality assessment identified by William (2011): the ability to reveal not only the gaps in understanding or knowledge but their origins. For example, figural transformations will likely show if the problem lies in the lack of knowledge of the components of the water cycle, specific connections between them, or processes such as evaporation. This data gives a better foundation for feedback and instructional decisions regarding remediation. Arts integration also helps this assessment tactic meet the second characteristic of effective formative assessment identified by William (2011): a potential to elicit active participation of students in addressing gaps in their knowledge and understanding. This tool is not as intimidating as answering content-related questions verbally or on paper. Learners are less likely to think about being assessed because they are focused on creatively expressing knowledge and experience, which promotes greater openness to feedback. The joy of artistic self-expression fosters a positive attitude and improves students' sense of self-efficacy (Lee, 2020). Consequently, they are likely to gain a more constructive view of assessment in general and a stronger desire to improve (CAEP standard 3.f).

This tactic is aligned with the Dual Coding Theory of Information Storage of Allan Paivio (1971) due to its artistic component. Many areas of the arts involve communication without using language. Because this assessment technique capitalizes on the benefits of non-linguistic representation of learning, figural transformations can be applied within any cultural setting, with diverse populations of students including ELLs, struggling learners, and visual learners. Incorporating the benefits of NLRs and arts integration make figural transformations a differentiated assessment (CAEP standards 1.a, 1.b, 3.d, 4.a).

Teachers often feel that the overwhelming volume of summative assessment leaves very limited time for instruction, let alone for formative assessment (Hargreaves, 2004). This issue is

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even harder to combat for teacher candidates because of their lack of experience. Figural transformations are not time-consuming and are easy to use. Completing one of the four figural transformations will not require more than a few minutes. This feature is conducive to making the consistent implementation of formative assessment less challenging. When used regularly, figural transformations can assess knowledge and develop thinking skills (CAEP standard 3.a).

This tactic provides ample freedom for modification and adjustments. The degree of flexibility of figural transformations can support teachers' creativity, which can help the teaching profession regain its rightful status of an art form according to Clark (2012). There are numerous ways to modify this tool to fit the needs of students, the framework of a subject, the purpose of a lesson, and more (CAEP standard 4.a). Other advantages of figural transformations are provided by the following specific modifications/features.

Beneficial Features of Figural Transformations Assessment Tool

Feature #1 Adjustable Level of Challenge

To increase or decrease the level of difficulty, a teacher can adjust the time allotment for each transformation. Supportive materials, such as a list of important facts, can make completing the transformations easier. Giving students a choice of content to demonstrate can help foster student ownership of learning and create conditions for success for those who are struggling academically. Working with a peer is an opportunity to practice collaboratively designing assessment criteria and giving peer-feedback. Peer support or lack of thereof also makes this activity less or more challenging. A greater level of difficulty can be achieved by incorporating written explanations of the transformations. A requirement to demonstrate a meaningful connection with another school subject increases the complexity of the task and helps

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schoolchildren see that the knowledge and skills they acquired are applicable outside of a particular course setting.

Feature #2 Expansions and Use in Different Subject Areas

Figural transformations can be used by teachers collaboratively, which makes curricular connections easier. For example, if this tool was used as an exit ticket in a social studies lesson about Native American culture, the language arts teacher could ask students to write short stories based on their transformations and give each other critical feedback. Transformations 2, 4, and 6 in Appendix C are examples of students demonstrating subject integration. A mathematics teacher can request students to demonstrate what they have learned during a unit on fractions. Then, the teacher can group them based on the content demonstrated and conduct a learners-lead stations activity. Transformations completed at the end of a science unit could be used for a whole-class review before an exam. Students can use the transformations accumulated throughout the year to review the content of various lessons. An art teacher could compare the transformations that students created at the beginning and at the end of the school year to help them discover how much they improved their creativity skills or knowledge of various artistic techniques. Appendix C includes several examples of students' works demonstrating knowledge from various subjects: science, reading, mathematics, social studies, and art.

Feature # 3 Creativity

This assessment tactic capitalizes on using the artistic component combined with Torrance's model of creativity (Torrance et al., 1992) to develop creativity in students. See Appendix D for a list of creative traits identified by E. Paul Torrance. These traits can be taught in any setting and applied in any academic area or sphere of life (Fazylova & Rusol, 2016). This tool allows students to showcase and develop their creativity if it is used regularly. Teachers

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could require to include at least 1 of Torrance's creativity traits every time this tool is used to formatively assess student knowledge. Transformation 3 in Appendix C demonstrates the creative traits of emotional expressiveness and colorfulness of imagery; transformation 5 demonstrates storytelling articulateness and movement or action.

Feature # 4 Development of the 21st Century Skills

Creativity is one of the eleven skills considered essential for a successful life in the new century. This assessment tool can help demonstrate and develop 8 more of the 21st century skills, i.e., problem solving, critical thinking, collaboration, communication, social skills, flexibility, leadership, and productivity.

Each transformation is essentially a problem to solve. Students need to incorporate the given shapes and patterns with the purpose of demonstrating their content knowledge clearly enough for a peer or a teacher to understand. Transformations offer a context that is not strongly connected to any specific subject. Applying new learning in a different context is challenging. Another feature that is conducive to the development of problem-solving and critical thinking skills is the resemblance between some shapes and ordinary objects. For example, one of the shapes looks like a silhouette of a person (See Appendix B). Children will be fostered to critically assess their ideas to demonstrate their knowledge of the skull bones without using a silhouette as a skull. Critical thinking is further developed through self- and peer-assessment, selection of the most significant information to include, reflection, and justification of choices. Students can collaboratively develop assessment criteria for transformations that include creativity, number of subject connections, and others.

Collaboration and communication are developed when learners work on one or more transformations together and through discussions with peers. The skill of communication

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requires an ability to clearly articulate ideas while considering different thinking and learning styles of the audience. Figural transformations are conducive to the development of student abilities to articulate and express information in diverse ways. Learners, while transforming the given shapes, systematize, and communicate the new learning in a non-linguistic form with an option of a verbal or written explanation. Peer-teaching with figural transformations facilitates the development of the skill of communication.

Development of flexibility or adaptability is embedded in this assessment tactic because the act of transforming necessitates learners to operate within a set of unconventional requirements. In order to demonstrate their knowledge, students need to be flexible, generate multiple ideas and avoid the most obvious path. They also need to adapt to the added challenges or subject contexts, in which this tool is used. During collaboration, discussions, and peer-teaching with figural transformations, students learn to see others' perspectives and adopt ideas that are better than their own.

The goal of a small-group activity involving figural transformations could be to develop leadership and accountability. Small groups of students need to demonstrate new learning in the most creative and best-articulated way. The team-competition component and student-developed assessment criteria will help learners ensure that every group member has an equal opportunity to contribute and help ensure that the team choices are guided by the quality of ideas – not personal relationships. The subsequent peer- and teacher- assessment of each team's work using student-developed criteria can also help develop accountability.

Students see their artworks as expressions of themselves, which promotes ownership of the learning process, its products, and fosters an intrinsic motivation to learn (Harrington & Chin-Newman, 2017). This, in turn, helps the figural transformations strategy develop

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accountability in learners. Finally, this tactic develops productivity by helping students build “the idea muscle”. Consistent use of figural transformations for formative assessment will help schoolchildren learn to generate multiple ideas, critically assess them, and select the best ones. This assessment tactic is advantageous not only for students. The following section discusses how the features and modifications of this assessment technique can benefit preservice teachers.

Advantages of this Tool for Preservice Teachers

Figural transformations can be used with almost any subject or age-group of students. Hence, this tactic can be helpful in different field placements as most universities want teacher candidates to gain experience working with various grades and subject areas. Adjusting the tactic to meet the needs of a particular subject, unit, or diverse group of students is simple: one needs to select an appropriate topic, modify the directions, and use one or more of the features described in this paper. A formative assessment tactic that can be relied on and adjusted to various situations in teacher candidates’ repertoires will likely help them feel more self-efficient, confident, and more creative with all aspects of teaching, which is aligned with Clark’s (2012) recommendation for teacher preparation programs to focus on creative and innovative formative assessment. The creative nature of figural transformations, in comparison to other tactics, makes them more engaging and less stressful for learners. Preservice teachers will likely feel more at ease working with K-12 students who are not scared of being assessed.

Preservice and beginning teachers have needs that will likely lessen with time. Due to the lack of experience, teacher candidates have to consciously and simultaneously focus on multiple aspects of teaching, even the most minute ones that later become second nature. Therefore, teacher preparation programs need to equip candidates with effective tactics that are not too hard to use. Figural transformations strategy fits this need of preservice teachers because it requires

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only a few minutes to prepare and implement and can be used consistently without learners growing tired of it, which can help teacher candidates focus more on informative feedback, remediation, or other components of teaching. Because of these benefits, this tool can potentially have a positive effect on the consistency of implementation of formative assessment by teacher candidates after graduation.

Conclusion

Formative assessment is a vital part of instruction that does not get enough attention in teacher preparation programs and at schools. Strategies and tools for formative assessment included in teacher education need to effectively meet the needs of diverse schoolchildren as well as the unique needs of teacher candidates during the field experiences and internships. The figural transformations arts-integrated tool provides a creative way to ease the task of effective differentiated formative assessment for preservice teachers and reduces the stress of assessment on teacher candidates and K-12 students. Figural Transformations can also be instrumental in helping teacher candidates to meet some of the current CAEP standards.

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Arts Standards.

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Appendix A

CAEP Standards That Can Be Addressed by Including the Figural Transformations Tool

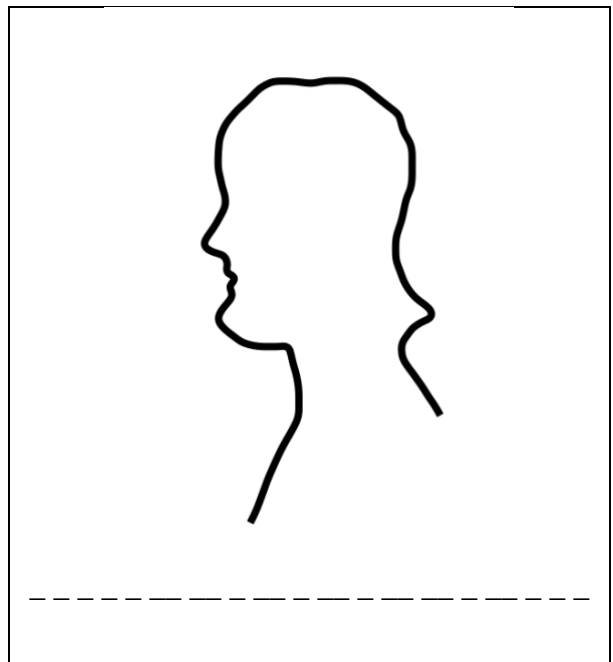
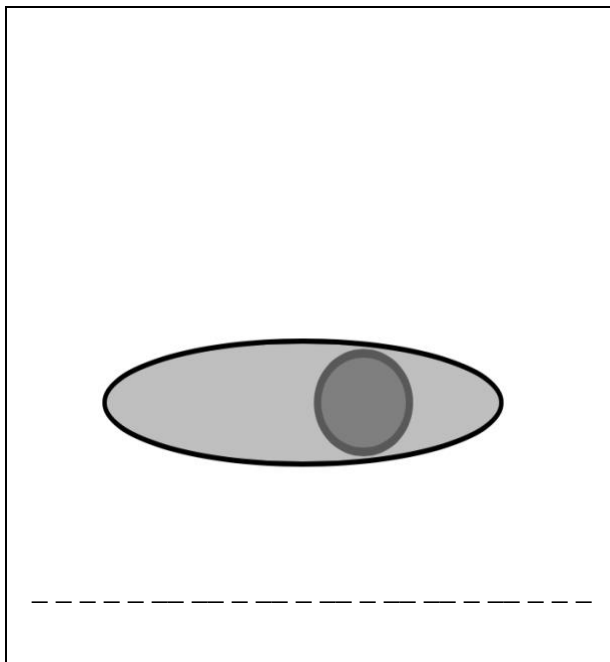
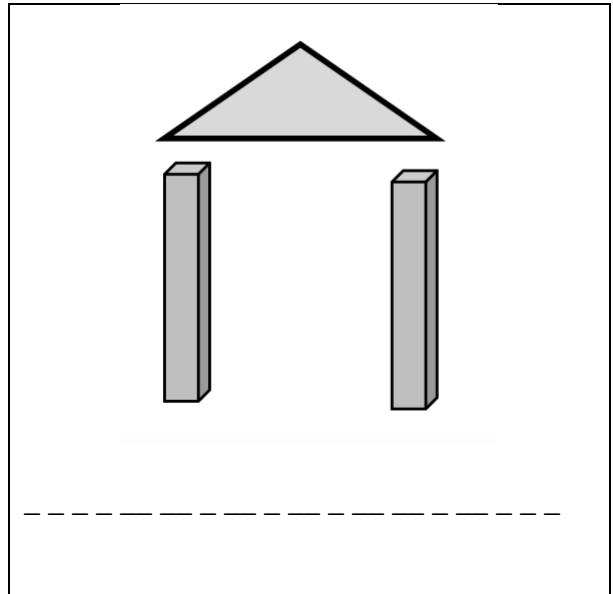
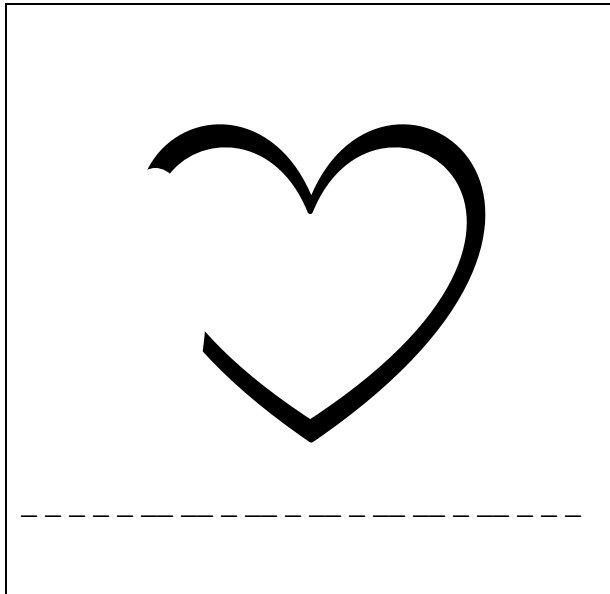
| Number | Description |
|--------|--|
| 1.a | Candidates use their understanding of how children grow, develop and learn to plan and implement developmentally appropriate and challenging learning experiences within environments that take into account the individual strengths and needs of children. |
| 1.b | Candidates use their understanding of individual differences and diverse families, cultures, and communities to plan and implement inclusive learning experiences and environments that build on children's strengths and address their individual needs. |
| 3.a | Candidates administer formative and summative assessments regularly to determine students' competencies and learning needs. |
| 3.d | Candidates differentiate instructional plans to meet the needs of diverse students in the classroom. |
| 3.f | Candidates explicitly support motivation and engagement in learning through diverse evidence- based practices. |
| 4.a | Candidates use a variety of instructional practices that support the learning of every child. |
| 4.d | Candidates provide constructive feedback to guide children's learning, increase motivation, and improve student engagement. |

Appendix B

Figural Transformations Tool Template

Name: _____ Figural Transformations

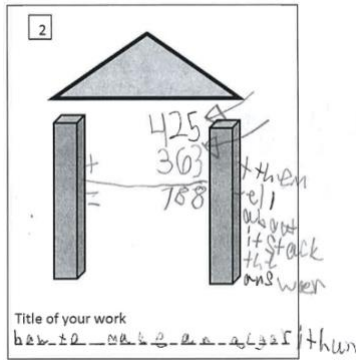
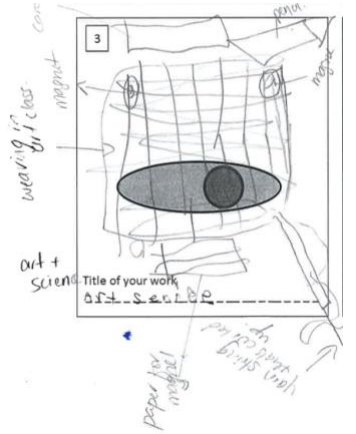
Make something related to _____ out of each figure by adding lines or details. Try to draw something no one else will think of. Make each drawing tell a story. Then add a clever title on the dashed line to explain what you have drawn.



[Type here]

Appendix C

Analysis of Figural Transformations Completed by a Second Grader and a Third Grader

| Transformation Number and Student Work | Analysis |
|--|---|
| <p>1.</p>  | <p>Subject: mathematics</p> <p>Type of knowledge: procedural</p> <p>Title: “How to make an algorithm”</p> <p>Note in the picture: “Then tell about it stack the answer”</p> <p>What is demonstrated: knowledge and understanding of how to add three-digit numbers</p> |
| <p>2.</p>  | <p>Subjects: science and art</p> <p>Title: “Art Science”</p> <p>Types of knowledge: factual and procedural</p> <p>Items in the picture: pencil, magnet, cardboard, paper for magnet, yarn string threads wired up</p> <p>Verbal Explanation: “A science experiment to figure out what sticks to magnet and what doesn’t.”</p> <p>Notes: the student choose to include multiple items he/she would test on a magnet. The weaving is something that he/she is learning in art.</p> <p>What is demonstrated: knowledge of how to conduct an experiment; knowledge of the properties of a magnet; connection between 2 subjects science and art and an understanding that various items can be used for achieving different goals (i.e. weaving and conducting a science experiment.)</p> |

(appendix continues)

 Transformation
 Number and Student Work

Analysis

3.



Subject: interdisciplinary

Type of knowledge: conceptual

Title: "Learning"

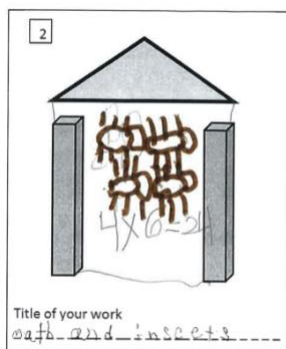
Verbal Explanation: "The girl is teaching the person."

Note in the picture with an arrow "this person is learning"

What is demonstrated: an understanding that brain activity is an important prerequisite for learning (the head is colored red).

Creative traits: emotional expressiveness (both people in the picture are smiling); unusual visualization (instead of using a shape as a silhouette of a person looking to the side, the student drew a person looking straight); internal visualization: the student drew a learning brain; colorfulness of imagery (learning is demonstrated through color "red")

4.



Subjects: science and mathematics

Type of knowledge: factual and procedural

Title: "Math and insects"

Verbal Explanation: "It's about math and insects so I drew 4 ants and each of them has 6 legs. Once I was done. I did $4 \times 6 = 24$ "

What is demonstrated: knowledge of science content (insects have 6 legs) and understanding of how to perform multiplication

Creative traits: internal visualization (the student modified the preexisting shapes into a container with bugs)

 (appendix continues)

[Type here]

 Transformation
 Number and Student Work

Analysis

5.



Subject: Science

Type of knowledge: procedural, conceptual, factual

Title: "Magnets"

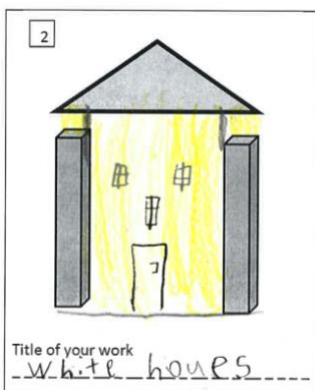
Verbal Explanation: "What this is is magnets. Magnets we would experiment with quarter, paper, cardboard and pencil and we would see what sticks to the magnet."

Note in the drawing: paperclip, cardboard, pencil, magnet, foil, magnet force

What is demonstrated: knowledge of how to conduct a science experiment, understanding of the types of interactions between magnets and various materials, an understanding of what these interactions will look like (attraction is indicated with arrows), understanding the concept of attraction (called "magnet force" in the drawing)

Creative traits: storytelling articulateness (the magnet "force" is demonstrated with arrows); richness of imagery (demonstrated through the level of detail in the drawing); movement or action (the student demonstrated attraction and movement of the objects toward the magnet with arrows)

6.



Subject: reading and social studies

Type of knowledge: factual

Title: "White house"

Verbal Explanation: "It's the president's house. People read about presidents and the readings usually talk about the White House."

What is demonstrated: knowledge that the United States Presidents live in the White House while performing their duties as presidents.

Creative traits: synthesis of incomplete figures (the student connected several preexisting shapes into one)

 (appendix continues)

[Type here]

Transformation
Number and Student Work

Analysis

7.



Subject: Science

Type of knowledge: factual

Title: "Frogs"

Note in the drawing: "a frog uses its back legs to jump high"

What is demonstrated: knowledge of body parts of frogs;
knowledge of the purpose of the hind legs of a frog;
understanding of how a frog jumps.

Creative traits: unusual visualization (the student modified the shape into a frog looking sideways instead of making the whole shape into an eye of a frog).

Appendix D

Creative Traits Identified by E. Paul Torrance

1. emotional expressiveness
2. unusual visualization
3. internal visualization
4. storytelling articulateness
5. extending or breaking boundaries
6. movement or action
7. synthesis of lines or circles
8. expressiveness of titles
9. humor
10. synthesis of incomplete figures
11. richness of imagery (figures)
12. colorfulness of imagery
13. fantasy

Increasing Pre-Service Teachers' Awareness of Student Engagement through Data-Driven Peer Feedback

Adam Akerson and Mark Montgomery

Stephen F. Austin State University

The primary role of an educator preparation program is to prepare future educators to meet the needs of all students. Field experiences play an important role in the growth and development of pre-service teachers (PSTs). These experiences allow PSTs to learn through observation and by taking on the roles of a classroom teacher. Field experience supervisors play a critical role in shaping the experiences of PSTs through their guidance and support, particularly in the method and practice of teaching, through the feedback they provide.

Hattie and Timperley (2007) define feedback as “information provided by an agent (e.g. teacher, peer, book, parent, self, experience) regarding aspects of one’s performance or understanding” (p. 81). In the context of teaching, feedback offered to a teacher of the lesson typically centers around the act of teaching itself, or the ‘performance,’ of the teacher. Teachers are continually receiving feedback about their teaching from a variety of educational stakeholders including students, parents, administrators, and other colleagues. Preparing PSTs to give, receive, and reflect on the feedback is essential in their continued growth as an educator. Providing opportunities for PSTs to engage in the feedback process with peers is a non-threatening way to practice these skills.

Obstacles to Peer Feedback

Peer feedback is a pedagogical approach that has the potential to promote reflection and collaboration (Wilkins et al., 2009). However, engaging peers in the feedback process can be

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challenging. With little instruction related to what feedback should include, peer feedback is often centered around what Hattie and Timperley (2007) describe as “the self as a person.” This form of feedback tends to be more personal in nature, and may include comments such as, “that was awesome” or “you did a great job.” This type of feedback may make the person feel good about themselves but does little to inform their future performance.

Directing peers to provide feedback beyond the self-level is challenging, particularly when the feedback being asked to provide is viewed as corrective or consequential to the performance of their peer (Hattie & Timperley, 2007). Feedback perceived as corrective, or critical, can feel unnatural, often leading the feedback to be delivered in the form of a “compliment sandwich”, where praise is offered prior to a criticism, followed by the criticism, then another form of praise (Reinholz, 2018). While adding praise before and after criticism makes it easier to provide critical feedback, it may not be beneficial to the recipient. Hattie and Clarke (2018) suggest that feedback about the learning should not be mixed with praise, as doing so can interfere with and dilute the message about learning.

Engaging PSTs in peer feedback can also be challenging because PSTs may not always see the value in giving and receiving feedback. Shin et al., (2007) noted that the most commonly cited reason for engaging in peer feedback is typically to fulfill a course requirement. This indicates that students may not understand the purpose and application of peer feedback to their future growth as an educator. In addition, Smith (2017) found that even the most dedicated students are likely to provide a weaker form of feedback, in comparison to an instructor. While students may engage in giving and receiving feedback for class assignments, they may not be prepared or realize their own capacity to provide feedback beyond a course requirement.

Recommendations for Feedback

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Given the many challenges to using peer feedback, all hope is not lost. Through training, students are capable of providing high quality feedback (Liu & Li, 2014). Furthermore, the ways in which students are supported to provide feedback can have a profound impact on the types of feedback they provide (Reinholz, 2018). Shin et al., (2007) recommend a structured instrument for engaging in the peer review process, including a list of teacher behaviors to observe. Another recommendation includes allowing multiple peers to observe one another for quality control purposes. Feedback should also be carried out on multiple occasions for ongoing and deeper reflection. With a structure in place, PST's can give and receive effective feedback.

Method

Context for the Study

Using our university charter school, a K-5 campus consisting of 12 classrooms, our program strives to provide our students a quality field experience. However, given the size of our program, we face a unique challenge of placing multiple PSTs in a single mentor teacher's classroom. At times, as many as eight PSTs can be placed with one mentor teacher. PSTs can spend a great deal of time not only observing the mentor teacher, but also their peers, as each PST takes their turn to teach. Multiple PSTs in a placement provided us with a unique opportunity, where for every PST lesson taught, in addition to the mentor teacher and field supervisor, there were multiple peer observers.

Even with guidance from instructors in providing peer feedback, oftentimes the types of feedback peers engaged in was superficial, with comments such as "that was a great lesson", but with little evidence to support the feedback. Rarely, if ever, did we observe peer feedback that offered areas of growth. As Liu and Li (2014) suggest, students are capable of providing high quality feedback, but must first receive training. As we considered our challenges related to peer

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feedback, we sought to enhance our students' ability to provide better peer feedback.

Contextual Framework

In seeking a framework for developing our students' abilities to provide feedback, Hattie and Timperley's (2007) conceptual analysis of feedback was consistently cited within the literature. Hattie and Timperley's model for effective feedback states that feedback should be able to answer three major questions. The first question, *Where am I going?* focuses on setting goals relative to a specific task. The second question, *How am I going?* typically involves a teacher, peer, task, or self-providing information relative to a task or performance goal. The third question, *Where to next?* uses the feedback provided to create future learning opportunities. These three questions work together to inform the feedback process (2007). Using these questions as a framework the researchers developed observational tools that support PSTs in providing, interpreting, reflecting, and using feedback. The cyclical nature of the process focuses PSTs toward continued growth in their own teaching capabilities.

Focus on Engagement

One of the most challenging aspects teachers report is dealing with classroom management. Bowsher et al., (2018) report that 45% of early career teachers indicate they were "not well-prepared" to handle a range of classroom management or discipline situations. In an analysis of classroom management research, the National Council on Teacher Quality (NCTQ) identified that teacher preparation programs tended to focus on rules, routines, and misbehavior in most of their coursework, while less than half of programs addressed another critical aspect of classroom management, student engagement (Greenberg et al., 2014). Darling-Hammond (2006) argues that pre-service teachers need to learn all aspects of classroom management, including, "many kinds of learning and teaching, through effective means of organizing and presenting

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information, managing discussions, organizing cooperative learning strategies, and supporting individual and group inquiry.” The connections between quality instruction and the engagement of students can be a struggle for PSTs, who often identify student engagement as NCTQ identified: solely related to classroom management. To help PSTs understand the relationship between teacher-developed instruction and student engagement, the researchers developed data collection tools that assist PSTs in providing peer feedback that can be used to reflect on the level of engagement throughout a lesson. These tools provide data, in the form of feedback to inform the teacher of a lesson. Table 1 describes an overview of the data collection tools that specifically relate to student engagement.

Table 1

Student Engagement Data Collection Tools Purpose and Procedures

| Data Collection Tool | Purpose | Procedures for Data Collection |
|----------------------|---|---|
| Student Study | To capture data related to one specific student over the course of a lesson. | The observer records detailed actions of one student at three-minute intervals over the course of a lesson. |
| Class Engagement | To capture the level of engagement of the whole class, throughout a lesson. | The observer takes a snapshot of the whole class at three-minute intervals recording the number of students who appear actively engaged, mostly engaged, and off-task, accompanied by an explanation of the rating. |
| Teacher Proximity | To capture the teacher’s movement around the room for the duration of the lesson. | The observer draws a map of the classroom noting areas where children are engaged in learning. Using the map, the observer indicates the teacher’s location in the classroom every two minutes. |

PST-Led Data Reflection

According to Beasley et al., (2014) pre-service teachers need opportunities to discuss what student engagement looks like, how it can be facilitated, and how it can be observed and

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measured. To facilitate these opportunities, and to answer the question *How am I going?* PST's were asked to first self-reflect on the data collected by their peers from their lesson by completing a Summary of Teaching Feedback form developed by the researchers. Once the Summary of Teaching Feedback was completed, the PST led a meeting about the feedback with the Field Supervisors. During this meeting the PST shared what they noticed about the data as it pertained to the engagement of students and its relation to their instructional decisions. In addition, PSTs identified how the data could be used to inform future teaching. The Field Supervisor was able to provide additional analysis and interpretation of the data to support PSTs as they set future *Where am I Going?* goals.

Data Collection & Analysis

Thirty (N=30) PST taught two science lessons and one mathematics lesson over a 12-week field experience placement prior to clinical teaching. For each of the three lessons taught, peers collected data using the Student Study, Student Engagement, and Teacher Proximity researcher-developed data collection tools. At the completion of each lesson peers provided the data as lesson feedback to the PST who taught the lesson. The PST was then asked to self-reflect on the data from the lesson using a Summary of Teaching Feedback form created by the researchers. The Summary of Teaching Feedback form asked PSTs to reflect on the feedback received from the lesson and provide what they learned from the student engagement data. To analyze the data the researchers used open coding to identify themes that emerged across each of the PSTs Summary of Teaching Feedback reflections, which were completed after each lesson taught. Open coding allowed the data to be analyzed for similarities and differences (Corbin & Strauss, 1990) across a total of 90 PST reflections. A variety of themes emerged related to the Student Study, Student Engagement, and Teacher Proximity data collection tools.

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Student Study

Analysis of 90 reflections centered around the Student Study tool resulted in three major themes: teaching and planned activities (28%), overall engagement (24%), and future considerations for teaching (13%). These themes seem to indicate differing levels of PST understanding pertaining to student behaviors and their level of engagement.

Teaching and Planned Activities

The first theme that emerged from PST interpretations of the Student Study data centered around the act of teaching and the activities used within a lesson. Responses to the Student Study tool indicated that PSTs were able to identify relationships between teaching and student engagement as evidenced by one PSTs' comment, "He was moving from card to card and following the directions and expectations of the lesson. I learned that when setting expectations and directions correctly the students will be on task and complete the work assigned." This PST, along with others, realized that student engagement is directly impacted by the choices made while carrying out the lesson.

Similarly, a number of PST's referenced the planned activities as they relate to the level of student engagement, evident by one PST who stated "I learned that he got distracted multiple times throughout my lesson and seemed to be arguing with one of the other students about the assignment. This could have been due to the structure of my activity." Another PST used the data collection tool to specifically seek information about a particular student's understanding of a lesson, "Gage usually needs an extension, so I was looking to see if there was a time, he needed it. He didn't seem to need it which makes me feel that the lesson was at the right level for them and kept him engaged." This PST also noted the connection between an activity being at the appropriate level for an individual student, and how it relates to student engagement.

[Type here]

Overall Engagement

A second theme that emerged from the data related to the overall engagement of the student being observed. Examples of these statements include, “I learned that Kamry is a good worker. She seemed to do what she was asked to do and did not get off task.” Another PST stated, “The student that I had being observed was listening and doing what she was supposed to do. She communicated with (her) partner during this activity which is something she normally doesn't do well.” In these statements, PST's noted observations that describe the overall actions of the student being studied without linking the actions to the teaching of the lesson.

Other PSTs interpreted the Student Study data in more general terms. One PST stated, “This student appeared to be engaged for the majority of the lesson.” Other noticings pertaining to overall engagement were short, and utilized wording such as, the student “seemed to be”, or “looked like” he/she was on task. These interpretations acknowledge the actions of the student being studied over the course of the entire lesson, but do not suggest the actions were a result of the PST's teaching, or the activities planned by the PST.

Future Considerations

The third theme to develop from the Student Study tool related to interpretations of data to inform future teaching. Future considerations usually stemmed from an initial concern, or off-task behavior observed from the Student Study. For example, one PST stated, “To address this, I could set clearer expectations of what we should be doing during work time,” in response to data indicating that her observed student was distracted during the lesson. Another PST stated, “Moving forward, I think I will be a little more involved in the partnerships,” after analyzing the tool and reviewing the actions of her student with her assigned partner.

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Other interpretations varied to the extent in which PST's could adjust their future teaching based on the observed student data. Some PSTs suggested they should "check-in" on their observed students more frequently. While another PST suggested action steps for future teaching after seeing data that indicated a student that got off-task while on the rug: "I want to be able to support this student better in focusing. Idea: maybe something he can mess with in his hands?" This PST was able to use the data to come up with an idea that could be implemented in future teaching to assist this student's ability to engage in the lesson.

Student Engagement

Similar to the Student Study form, analysis of the 90 reflections indicated the same three themes emerged, but with differing regularity: overall engagement (44%), teaching and planned activities (28%), and future considerations for teaching (16%). Although the same themes emerged, PSTs interpreted the data from observations taken across the class as a whole, rather than an isolated student.

Overall Engagement

The most popular theme that emerged from analysis of Student Engagement data related to the overall engagement of the class throughout the lesson. The overall engagement interpretations ranged from specific to general noticings. Specific noticings included interpretations from PSTs acknowledging the whole class, but also included specific students, in regard to their level of engagement. For example, one PST stated, "Most of the students were engaged and on task throughout the entire lesson. There were only 3 times that off-task behavior was recorded. Westen, Parker, and Lydia were off-task 2 out of 3 of those recorded times." Another PST stated, "Almost all the students stayed on task, some of the same students kept getting off task, but I noticed that the times that I was at their table lined up to when they started

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staying on task.” PSTs with statements like these were often able to make a determination of engagement for individual students in addition to the class.

General interpretations from the Student Engagement data typically only referenced groups of students within the class, or the group’s level of engagement across a lesson. For example, several PSTs stated, “The majority of students were...”, or “A few students...” when making a determination as to whether students were recorded as being engaged or off-task. Similar interpretations focused on the actions of a group of students such as, “I learned there was a lot of talking going on throughout the whole lesson, even in independent work.”

Teaching and Planned Activities

The second theme emerging from the Student Engagement form related to the act of teaching and the planned activities that occurred within the lesson. The choices made while teaching came out in a number of PST interpretations, for example, “Throughout the activity, there was some off-task behavior and I do think it is because they were able to pick their own partners.” This PST was able to recognize that some of the off-task behavior that occurred during the lesson, may have been due to her decision to allow students to select their own partners. Another stated, “The times that students were off task were at the end of the fact writing times and there was not enough time to give them an extension.” This PST recognized that failure to provide an extension activity may have contributed to students being off task.

The choice of activities was also discussed by a number of PSTs as it relates to student engagement. One PST stated, “At the video station some of the students...would be talking to each other or not writing down information on the data sheet...However, when the students were at the rug or at the volcano station they were engaged.” This PST used the data from the student engagement as an indicator of which activities students were engaged in over the course of the

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lesson. Another PST stated, “I noticed that for the most part, the students were very engaged in the activity. I think choosing to do an activity about comic strips was very relatable to the students.” This PST attributed the choice of activity to students being “very engaged.”

Future Considerations

The third theme that emerged from the Student Engagement form focused on considerations for future teaching. A number of PST’s indicated the need to monitor students more closely throughout the lesson. For example, one PST stated, “There were some off-task behaviors that occurred that I was unaware of, which tells me that I still need to work on monitoring the room as I work with individual students.” In addition to more closely monitoring students, the importance of setting expectations became clear. One PST stated, “I will try to improve on making sure they are all on task during all parts of the lesson by setting expectations and following through with them.” For these PST’s, the Student Engagement data provided insight into off-task behaviors and provided strategies to help future student engagement.

Grouping of students became evident as PST’s made considerations for future teaching. Identifying partnerships that work well together allow PSTs to ensure quality work time for the students, while minimizing the number of students off-task due to their grouping. One PST stated, “There were a lot of students off task that I didn't notice during my lesson. I think some of that had to do with the groups that I put together.” Another PST stated, “There was some off-task behavior and I do think it is because they were able to pick their own partners...In the next lesson, I would like to see the difference in their behavior when I pick the partners.”

Understanding how students interact with each other allows the PSTs to make informed decisions for future teaching.

Teacher Proximity

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When coding data from 90 reflections related to teacher proximity, three themes emerged: intentional proximity (27%), duration (18%), and class coverage (15%). The themes represent a variety of PST understandings pertaining to the movements of the observed teacher over the course of a lesson.

Intentional Proximity

PSTs acknowledged that being intentional about their movement impacted their students. For example, one PST stated that movements were the result of needing to “keep my eye on all of the students,” while another stated that movements were the result of needing to be “where the students that struggled the most” were located. PSTs also considered how behavior issues were impacted by their proximity while teaching. “If I compare my [Class Engagement] sheet to my [Teacher Proximity] sheet, I can match up times when students were off task to when I was not in their physical proximity.” Another PST noticed that proximity was dependent upon the behavior of students at various times during the lesson. “I was moving around the classroom although I was at one table numerous times due to behavior issue[s].” Many PSTs made a connection between purposeful proximity as a way to assist in classroom and behavior management.

Duration

The duration, or length of time between movements, throughout a lesson also became evident. A variety of PST’s described their location in the lesson using terms that reference time, such as “a lot.” For example, one PST stated “I was at the front of the rug a lot during my lesson. I also spent a lot of time at table 4.” Another PST focused on proximity as it related to the different parts of the lesson, “I noticed that I was in the front of the room for the first 6 minutes and then moved to my station throughout the [work] time and then back to the front of the room

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for the [lesson closure].” Duration was also alluded to in PST reflections through time spent in different areas of the classroom. For example, “I saw that I was at some tables longer than others.” PSTs that made these noticings did not acknowledge a connection between their proximity and student management. Instead, their analysis focused on the duration of their movements without making a connection to the purpose or impact of such movements.

Class Coverage

Some PSTs identified proximity in relation to how many times they were recorded visiting each student location in the classroom. These PSTs focused on proximity as something that must be equitable for all students, ensuring that they were available for each student equally. One such PST indicated, “I went to every table at some point to check on the students. This sheet supports that because I have a time written next to each table.” Another stated, “I walked around the room pretty evenly with time and met with every table at least twice throughout my lesson.” Again, the focus in many of the reflections which related to class coverage is on circulating among the classroom, rather than intentional, or purposeful use of proximity.

Discussion

Peer feedback is often centered around what Hattie and Timperley (2007) describe as “the self as a person,” and can be viewed as corrective or consequential. For PSTs, this type of self-feedback does little to facilitate their growth as a teacher. The use of data collection tools provided a structured instrument with a focus on specific teacher behaviors that allowed peers to provide feedback about a task that was meaningful and useful. Using data collection tools with a specific focus (proximity, engagement, student study) and time sampling allowed PSTs to know specifically how to collect data that was given to peers as feedback. In addition, as PSTs collected focused data specific to their peers’ teaching, they were simultaneously attuned to areas

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of teaching to consider for their own practice.

The researcher-developed data collection tools provided rich opportunities for PSTs to analyze and reflect on from their teaching. Students often seek information to help them answer “how they are going”, although the answers they found may not always be well received given that feedback can be viewed as consequential, or corrective (Hattie & Timperley, 2007).

However, PSTs in this study analyzed and reflected on their peer-collected data, developing their own answers to “how am I going?” making their growth more personal and purposeful.

According to the National Council on Teacher Quality, “Teacher candidates are often not asked to critically evaluate their own teaching performance” (Greenburg et al., 2014, p. 15).

Through reflection of their personal data, PSTs were able to critically evaluate how their own teacher decisions (proximity, planned activities, lesson delivery) impacted students’ opportunities to engage in learning, rather than student engagement being simply a choice of each student to give attention to or participate in the lesson. As a result, PSTs were able to identify student engagement as more of a proactive planning of their lesson rather than as a reactive response while teaching.

Future considerations emerged as a theme in analysis of the data, and also became evident in PST-led feedback meetings. Many PSTs identified specific strategies for future lessons that would allow for increased student engagement. Grouping arrangements, individual students to monitor, as well as the impact of teacher movement on engagement were examples of considerations discussed by PSTs in their reflection of the data. PST reflections provided a focal point for discussion in the PST-led meeting with the field supervisor. Collaboratively, the field supervisor and PST discussed these ideas and set new goals to decide “*Where to next?*”

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Utilizing the processes discussed in this study, PSTs were provided opportunities to focus on areas of teaching critical to their success as a future educator. Engaging PSTs in peer-data collection allowed them to focus attention on specific components of engagement, thereby providing opportunities to consider the impact that each had on the lesson outcomes. In addition, receiving personal feedback on their own teaching, and reflecting on that peer-collected data, provided opportunities for PSTs to make meaningful interpretations and set teaching goals that could improve their own student engagement.

Conclusion

Field experiences play a critical role in the development of PSTs by helping to shape their development as educators. Often, the development is achieved through feedback provided solely by field supervisors and mentor teachers, but as evidenced in this study, and in agreement in Liu and Li (2014), PSTs can be trained to provide meaningful feedback to each other. In addition, with purposeful data-collection, PSTs are able to analyze and make changes to implement in their future teaching based on the peer-collected data. As Danielson (2014) suggests, feedback must be substantive and provide guidance to improve performance. With the use of researcher-created data collection tools, PSTs were able to use their own data to change future teaching. Utilizing a process for feedback, like the one established in this research, PSTs can begin to make sense of the feedback and use it to inform their practice. Student engagement represents just one component of teaching for which feedback can be provided. Future studies should consider identifying additional components of teaching that can be captured using a structured instrument to impact further teacher development.

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Building Resilient Teachers: How Feedback Training Contributes to New Teacher Success

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Grand Valley State University

Abstract

About 17% of teachers leave their profession within two to five years after beginning their career. It is important to retain new teachers for several reasons, including financial costs and student success. The current literature suggests multiple reasons for a lack of teacher retention. It has been found that resilience plays a large role in retaining teachers, and resilience can be learned through the proper provision of feedback between mentor and pre-service teachers. In this study, Grand Valley State University (GVSU), the Michigan Association of Secondary School Principals (MASSP), and a local elementary school partnered to provide professional development regarding the provision of feedback for mentor and pre-service teachers. It was found that feedback can be taught to teachers to increase their resilience and ultimately reduce the number of teachers leaving the profession.

Keywords: teacher retention, feedback, mentor teacher, pre-service teacher, resilience

Problem Statement

About 17% of teachers leave the teaching profession or the school they work at within two to five years after beginning their career (Office of Educator Excellence, 2020).

Importance of the Problem

Retaining new teachers is important for several reasons, including financial costs and student success. Replacing teachers is costly, with a national price of about seven billion dollars per year (Louisiana State University, 2017). This cost includes the price of recruiting, hiring, orientation, and professional development for pre-service teachers, all of which are necessary components of the hiring process. Furthermore, teacher retention influences student success. Teachers who are experienced because they have been retained are better equipped to serve students than new teachers who still need to learn about the school culture, the curriculum, and their students (Louisiana State University, 2017; McLaurin, Smith, & Smillie, 2009).

The inability to retain teachers leads to education inequity, which refers to the unequal distribution of academic resources. Students who attend schools with low teacher retention rates score lower in English and math than students who go to schools with better teacher retention rates (Louisiana State University, 2017; McLaurin, Smith, & Smillie, 2009). The schools with the lowest teacher retention tend to be schools in impoverished and underprivileged communities. This is giving students of color and of low socioeconomic status an unfair disadvantage in attaining a quality education.

Context of the Problem

The current literature suggests that there are several factors contributing to teacher attrition. These factors include a lack of support for first-year teachers (induction and ongoing support), lack of personalized professional development, negative building cultures (staff

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relationships, tone from administration), lack of growth opportunities for teachers to lead from the classroom, lack of input into decision making, feelings of underappreciation, and a lack of recognition (Kutsyuruba & Walker, 2015; Zdebb, 2018a).

Lack of Support for First-Year Teachers

Pre-service teachers need guidance for retention now more than ever, especially with the COVID-19 pandemic. Mentoring programs can be used to retain teachers. These programs give first-year teachers the guidance and support they require to remain in their teaching positions. Mentoring programs offer services like assistance in locating materials, feedback on teaching, and emotional support (Carmen, Giebelhaus, & Bowman, 2002; Zdebb, 2018a).

Lack of Personalized Professional Development

Pre-service and mentor teachers do not always require the same professional development opportunities. For example, an opportunity may be too remedial for mentor teachers or it could be too advanced for pre-service teachers. When teachers feel that professional development opportunities do not align with their needs, they can feel lost. When teachers feel that professional development opportunities do align with their needs, it encourages them to commit to learning communities and give back to these communities. Teachers also feel encouraged to remain in their teaching positions. To support retention, professional development opportunities need to be matched with each teacher's skills, level of experience, and areas of interest (Garcia, Weiss, & Economic Policy Institute, 2019; Zdebb, 2018a; Zdebb, 2018c).

Negative Building Cultures

School culture refers to how teachers, administrators, staff, students, parents, and the community work together to set the beliefs, values, and assumptions they share. Schools with a negative culture have difficulty retaining teachers. A negative culture refers to schools that do

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not have a clear sense of purpose, do not have good staff relationships, emphasize rules over people or their overall mission, do not have honest dialogue and feedback, focus on self-preservation rather than collaboration, and focus on punishment rather than recognition or rewards. Schools with a positive culture support healthy staff relationship; focus on collaboration and teamwork; offer feedback and open, honest communication; provide professional development opportunities; use rewards rather than punishments; and have a clear purpose. To develop positive school culture, school administrators, teachers, students, parents, and the community need to work together. For example, one task school administrators can complete is providing induction and mentoring programs for new teachers. Forming a positive school culture is an ongoing process and requires a deep dedication, but once it is created, a positive school culture can lead to a strongly bonded environment that will benefit student achievement and teacher retention (Ryan, 2017; Zdebb, 2018a; Zdebb, 2018b; Zdebb, 2018c; Zdebb, 2018d).

Lack of Growth Opportunities for Teachers to Lead from the Classroom

It is insufficient for pre-service teachers to solely work on surviving in the teaching profession. They need to focus on how to thrive and how to develop into teacher-leaders. In order to develop into teacher-leaders, teachers need to have opportunities to lead. Too often teachers are expected to follow what administrators say, rather than having a say themselves. For example, curriculum decisions are often made for teachers. When teachers are able to develop trusting and collaborative relationships with colleagues and administrators, they are able to become teacher-leaders and are motivated to remain in their teaching positions (Kutsyuruba & Walker, 2015; Zdebb, 2018a).

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Lack of Input into Decision Making

It is important to include teachers when making decisions. While teachers are often able to make decisions regarding their classrooms and teaching, they are unable to have input on school-level decisions. Barriers to teacher input include an insufficient amount of time, false opportunities to participate that lead to teacher disillusionment, and a lack of support from principals. Giving teachers input opportunities allows them to have more control, and their input can help to create a more positive school culture. This can then lead to increased morale and an increased commitment to the school among teachers (Kemper, 2017; Zdebb, 2018a).

Feelings of Underappreciation and a Lack of Recognition

More than fifty percent of teachers do not feel supported or appreciated by their administrators, which leads to low levels of teacher retention (Economic Policy Institute, 2019). One way to increase feelings of appreciation is to increase teacher salaries. Teachers are not being compensated fairly for the work they do. They often continue working on schoolwork once they return home from a day at school, and one in five teachers has a second job to make ends meet. Working a second job can lead to more burnout and distraction from their teaching positions. Another method is to recognize teachers for their successes. It is important to have a positive reinforcement system in place that can be used to acknowledge and celebrate teacher successes that may go unnoticed. Using this system will boost teacher morale and can create a greater commitment to the school as a whole, which will lead to higher rates of teacher retention (Organization for Economic Co-operation and Development, 2014; Zdebb, 2018a).

The Role of Resilience in Retaining Teachers

Resilience plays a large role in retaining teachers. Despite the number of overwhelming reasons that mitigate against retention, resilience stands as a concept that allows a teacher to

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overcome these challenges. According to Doney (2013) and Gu and Day (2013), resilience is a protective factor, allowing more new teachers to be retained.

For teachers, resilience refers to the ability to adjust to various situations and to improve confidence when faced with adverse situations (Soulen & Wine, 2018). Teacher training institutions have limited, if any, effect on the circumstances that first-year teachers find themselves in. However, teacher preparation has a great impact on intentional training to build the resilience in pre-service teachers that will allow them to thrive in their first-year placements (Doney, 2013).

Resilience is not innate; however, it can be learned and is a process that results from positive adaptation to adversity. Resilience cannot be built without stress. Teachers can use resilience to overcome the unanticipated hurdles that are a part of everyday teaching struggles, and it is up to the school environment to foster teacher resilience (Doney, 2013; Gu & Day, 2013).

One of the best ways for pre-service teachers to build resilience and prepare for a career in teaching is coaching by their cooperating teachers during their time as a student teacher (Clarke, Triggs, & Nielsen, 2014). This opportunity allows pre-service teachers to transition into the classroom, and allows them to develop their values, beliefs, and teaching skills. Cooperating teachers are imperative in the preparation process as they are the ones who set the tone for the experience (Weasmer & Woods, 2003).

Doney (2013) quotes VanBreda (2001, p. 1). “Resilience theory speaks to the strengths that people and systems demonstrate that enable them to rise above adversity.” People need protective factors, like friends, family, and high self-esteem to be successful. Focusing on strengths and promoting relational development increases resilience in teachers. For example,

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administrators could promote relational development by facilitating meetings where teachers are able to connect.

Teacher Agency and Feedback Training

Teacher agency refers to the ability of teachers to act deliberately and effectively to guide their own professional development and to aid in the professional development of their peers. Agency is not something a teacher can have, but is something a teacher can achieve (Priestley, Biesta, & Robinson, 2015). Teacher agency has several parts, which include teachers recognizing challenges, developing strategies to overcome those challenges, and implementing those strategies. This process can be used to build resilience in teachers and can also allow teachers to develop into teacher-leaders (Bartell, Cho, Drake, Petchauer, & Richmond, 2019; Zdebb, 2018c).

Feedback is an important part of a student teachers' sense of agency in a professional community. According to Bartell et al. (2019), many teachers leave the profession due to a lack of agency. They often cite standardized testing, curriculum restrictions, negative impacts on the social-emotional well-being of children, and a lack of respect for their profession. If teachers are to remain in the profession, their voices and agency must be respected. According to Toom, Pietarinen, Soini, & Pyhältö (2017), feedback is an important part of a student teachers' sense of agency in a professional community, as it allows them to continue to grow and develop professionally. Although feedback is an important part of teacher agency and retention, it is important that the feedback being given is of a high quality. If it is not, it will not be effective in increasing teacher agency or in lowering teacher attrition (Ferguson, 2011). Feedback and its necessary components will be discussed further in the following sections.

Coaching Components and Feedback

Coaching Practices

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There are many forms of coaching practices, and they all share feedback as a central component. All forms also share the goal of facilitating pre-service teacher's teaching knowledge, skills, and dispositions across multiple instructional domains (Matsko et al., 2018). According to Feiman-Nemser (2001a), it is important to cultivate pre-service teachers' habits and abilities so they can continue to learn from their own practice throughout their careers in addition to improving their teaching practice.

The many forms of coaching practices need to contain certain elements to be successful. Although there is not much research empirically supporting these practices, the literature deems them as important (Feiman-Nemser, 2001b). One necessary element is that pre-service and cooperating teachers need to go into the process with similar expectations, or there will be more obstacles to overcome (Rajuan, Beijaard, & Verloop, 2007).

A Necessary Element

A necessary element of coaching practice intended to promote teacher growth is the provision of feedback. According to Hattie and Timperley (2007) and Anderson, Silet, and Fleming (2012), feedback is one of the most powerful influences on learning and achievement, but it will not work and can, in fact, be detrimental if not done in a constructive, positive, and healthy manner. Surprisingly, several studies suggest that cooperating teachers rarely conduct observations or offer feedback to their pre-service teachers (Borko & Mayfield, 1995; Valencia, Martin, Place, & Grossman, 2009). When feedback is offered, the literature often characterizes the quality of feedback as being too descriptive (Guyton & McIntyre, 1990); disproportionately focused on classroom management; more summative rather than formative (Grossman, Ronfeldt, & Cohen, 2012); or overly technical, "emphasizing the *what* and *how* rather than the *why* of practice" (Clarke et al., 2014, p. 175). There is some evidence that training mentors to conduct

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inquiry-oriented observations and facilitate reflective conversations with pre-service teachers results in more frequent and higher-quality feedback (Carmen et al., 2002). However, there does not seem to be consensus in the literature about what constitutes “higher-quality” feedback.

According to Hattie and Timperley (2007, p. 86), to be effective, feedback needs to answer three questions: “Where am I going? (What are the goals?), How am I going? (What progress is being made toward the goal?), and Where to next? (What activities need to be undertaken to make better progress).” The authors also suggest four levels or focus areas for feedback. These levels include (a) feedback about a task or product, (b) feedback about the process used to create a product or complete a task, (c) feedback about the pre-service teacher’s self-regulation abilities, and (d) feedback about the “self,” like “You are a great student.”

According to Anderson et al. (2012), feedback is not only important for pre-service teachers to receive, but it is also important for their mentor teacher to receive as well. Further research and greater investments are needed to support cooperating teachers and pre-service teachers in providing quality feedback. This data can then be used in training mentor teachers in best practices. (Clarke et al., 2014; Grimmer & Ratzlaff, 1986; Grossman et al., 2012; Valencia et al., 2009).

Rationale for Study

Other necessary elements of coaching practices come in the form of collaborative work between pre-service and cooperating teachers. This work includes the co-planning of lessons, co-teaching of lessons, and sustained inquiry into teaching practices. All of these activities authentically initiate pre-service teachers into the complexities of teaching and learning.

Numerous studies have also emphasized the importance of a coaching context that facilitates trusting relationships (Ronfeldt, Reininger, & Kwok, 2013), encourages risk-taking, and balances

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appropriate support with sufficient autonomy (Yendol-Hoppey, 2007). These aspects of cooperating teacher coaching, while frequently named as important in the literature, have little empirical support. There is empirical support for cooperating teachers to be trained in supervision, but no specific elements have been linked to pre-service teacher's performance of better teaching or feeling better prepared to teach (Carmen et al., 2002).

For this reason, it was our goal in our research to shed more light on the process of feedback for cooperating and pre-service teachers. We believe that the proper feedback can lead to teacher resilience, which can, in turn, lead to teacher retention. Training in effective feedback can lay the groundwork for teacher leaders by establishing, maintaining, and sustaining collaborative and trusting relationships. Trust is the cornerstone of the relationship between pre-service and mentor teachers as it is the element that lets teachers be vulnerable with one another and ask for help. More research needs to be added to the literature about what feedback is and is not necessary in the mentoring/coaching relationship, and what elements pre-service teachers feel best support them in their teaching careers (Kutsyuruba & Walker, 2015; Zdebb, 2018e).

Methods

Partnership and Workshops

To complete this project, the College of Education at Grand Valley State University (GVSU), a local elementary school, and the Michigan Association of Secondary School Principals (MASSP) partnered to promote a series of professional development workshops at an elementary school that focused on the role teacher resilience plays in increasing the likelihood of new teacher retention. The workshops built upon the work done by MASSP in recent years in identifying and addressing key factors that lead to teacher resilience. Factors such as the development of sustainable collaborative structures, building a culture of inquiry, reflection,

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climate specific to the building, and promoting positive relationships and tone were addressed. In several of the workshops, pre-service and mentor teachers were able to learn about phrases and questions they can use when giving and receiving feedback. The teachers then had the opportunity to practice giving and receiving feedback throughout the workshops. In addition to practicing giving and receiving feedback, pre-service and mentor teachers also had the opportunity to solve real problems they were facing and to set goals for their time together.

Research Question

How do the ways in which mentor and pre-service teachers think and act about healthy and positive communication in the act of giving and receiving feedback change after learning strategies for utilizing positive communication and giving and receiving feedback through engaging together in professional development trainings?

Hypothesis

Both mentor and pre-service teachers will acknowledge a change in their thoughts regarding healthy and positive communication in the act of giving and receiving feedback. Specifically, pre-service student teachers and mentor teachers will hold healthy and positive communication in the act of giving and receiving feedback in high regard, noting each component's importance to their overall experience.

Participants

The researchers used purposive sampling to recruit participants who were either a mentor or pre-service teacher currently participating in pre-service co-teaching at a local elementary school. Nine mentor teachers and eight pre-service teachers participated. According to Swanson, O'Connor, and Cooney (1990), pre-service teachers are defined specifically as pre-service student teachers. There are varying definitions of mentor teachers, so for the purposes of this

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study, mentor teachers were defined as teachers who are no longer students in college and are currently actively in service.

Research Design

The researchers used an exploratory, qualitative, quasi-experimental design for this study. Participants were not randomly assigned to groups.

Data Collection

Before conducting this research, the researchers obtained GVSU's IRB approval. The researchers also obtained approval from the local elementary school's principal to conduct the research with teachers from that school.

To collect the data, the researchers asked participants (the pairs of mentor and pre-service teachers who were working together as co-teaching pairs) to complete either the mentor or pre-service teacher survey on Qualtrics, depending on their status as either a mentor or a pre-service teacher. The surveys are attached in Appendix A and Appendix B. The participants completed this survey both before and after attending professional development training so the researchers could look for changes. The mentor teachers attended all five professional development workshops, and the pre-service teachers attended three workshops (specifically the second, third, and fourth trainings). Due to time constraints, the post-survey was given after the third training.

Data Analysis

Once the researchers stopped receiving a steady influx of survey responses, they started to analyze the data. Eight out of nine mentor teachers answered the pre- and post-surveys. Eight out of eight pre-service teachers answered the pre-survey, and six out of eight pre-service teachers answered the post-survey. To analyze the data, the researchers compared the answers of

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the mentors to the answers of the pre-service teachers. The researchers also looked for changes in the answers of the mentors and pre-service teachers between the pre- and post-surveys.

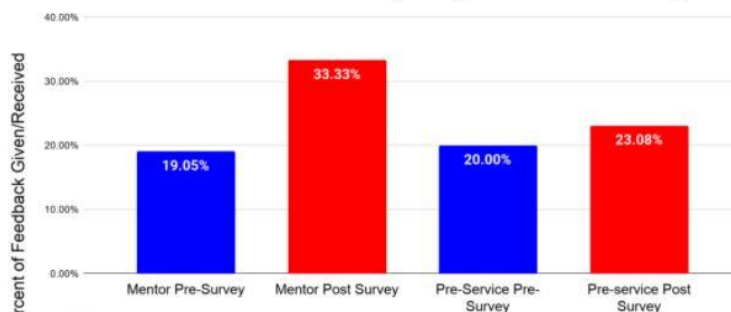
Results

Both mentor and pre-service teachers valued feedback in their relationship. It was also found that both mentors and pre-service teachers changed in the areas in which they were giving and receiving feedback. For example, Figure 1 shows that mentors reported receiving — and pre-service teachers reported giving — more feedback

related to pre-service teachers sharing what aspects of their mentor's approach worked well and which areas could be improved. Both mentor and pre-service teachers also reported an increase in the amount of discussion regarding the effectiveness of the feedback they received, which was a main focus in the professional development trainings. Pre-service teachers also reported an increase in the amount of feedback they gave to their mentors. At the beginning of the study, not

Figure 1

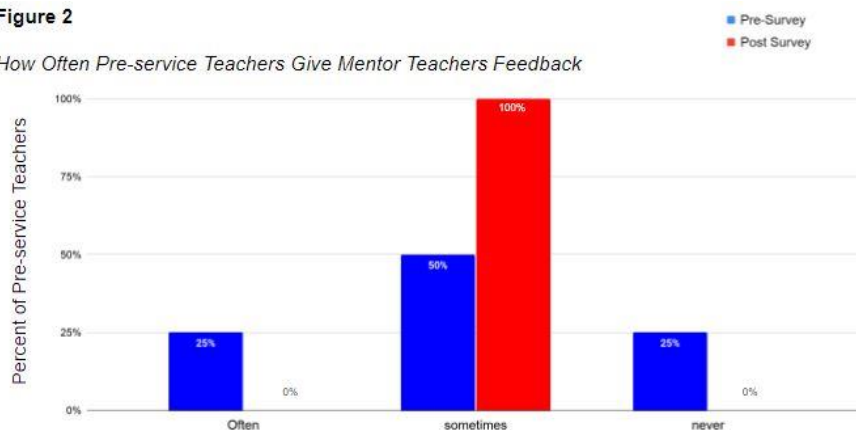
Percent of Feedback Given/Received Regarding a Mentor Teacher's Approach



Note. Pre-service and mentor teacher responses to the frequency in which pre-service teachers give feedback and mentor teachers receive feedback regarding what aspects of a mentor's approach are working for the pre-service teacher as well as what the mentor teacher can improve.

Figure 2

How Often Pre-service Teachers Give Mentor Teachers Feedback



Note. The chart shows pre-service teacher responses to the question, "How often do you give feedback to your mentor teacher?"

every pre-service teacher gave their mentor feedback. At the end of the study, every pre-service teacher reported giving their mentor feedback, which is shown in Figure 2.

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Although the results supported the hypothesis overall, there were a few discrepancies. Mentor and pre-service teachers did not agree on the amount of feedback they gave and received in various content areas. For example, pre-service teachers reported a decrease in the amount of feedback they received in the “Acknowledgment of ways in which my performance has shown improvement over previous performances” content area, while mentor teachers reported they gave more feedback in this area.

Discussion

The primary purpose of this study was to determine whether resilience can be taught to teachers by training them to give and receive feedback, as part of being resilient involves being able to learn and grow from criticism. Overall, the results supported the hypothesis. The data showed that mentor and pre-service teachers both acknowledged a change in their thoughts regarding healthy and positive communication in the act of giving and receiving feedback. Also, both mentor and pre-service teachers held healthy and positive communication in the act of giving and receiving feedback in high regard, noting each component’s importance to their overall experience. All mentor and pre-service teachers were able to learn how to effectively give and receive feedback without letting it defeat them, thus supporting increased resilience. Mentor and pre-service teachers acknowledged the importance of feedback, and that the way in which feedback is given and received can be changed and controlled. If a teacher can learn to appropriately give and receive feedback, they might increase their potential to learn and grow and ultimately be less likely to leave the profession. This will allow more teachers to be retained.

The researchers acknowledge that there were a few discrepancies in the data (e.g., mentor and pre-service teachers reporting giving and receiving different amounts of feedback in certain areas to/from each other). The researchers believe this to be caused by power differentials,

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COVID-19, and a learning curve. Power differentials could play a role in the amount of feedback a pre-service teacher gives their mentor. For example, a mentor teacher may be less receptive to feedback or a pre-service teacher may feel too inadequate to give feedback to their mentor.

COVID-19 could play a role because it may have put extra work on the teachers and decreased the amount of time teachers have to give and receive feedback. A learning curve could have also played a role as the techniques the teachers were asked to use were new to them. It may take time for the teachers to correctly implement the techniques. The researchers recommend completing further research regarding the noted discrepancies and their causes.

Limitations

There are limitations to this study, including nonresponse to the surveys by mentor and pre-service teachers and a time limit. The results may have differed slightly if all teachers involved in the study had responded to both surveys. The researchers also faced a time limit, which could have slightly changed the results. The researchers had to have the study completed by a certain date and therefore had to send the post-survey out after three professional development training workshops rather than after all five trainings had been completed.

Conclusion

The results of this study revealed that resilience can be taught to teachers by training them to properly give and receive feedback, as part of being resilient involves being able to learn and grow from criticism. When teachers are able to build upon their resilience, they are less likely to leave the profession. Further research needs to be done regarding other ways in which teachers' resilience can be increased.

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Appendix A

Pre-Service Teacher Pre- and Post-Survey

The Grand Valley State University College of Education is conducting a study on pre-service teachers and mentor teachers. The purpose of this research is to explore effective interactions between mentor teachers and pre-service teachers using a preservice co-teaching model. You have been identified as a GVSU pre-service teacher who is currently working with a mentor teacher in a co-teaching placement. We are asking you to please complete this brief 7-question survey about your experience regarding effective interactions between mentor teachers and pre-service teachers. Participation in this study is voluntary and refusing to participate or discontinuing participation will not lead to any penalty or loss of benefits to which the participant is otherwise entitled. **All of your answers will be kept confidential, and you will not be able to be identified from your survey.** This study has been reviewed and approved by GVSU's Institutional Review Board (Protocol number 20-168-H). By completing this survey, you consent to participate in this research. If you have any questions, please contact Doug Busman at busmando@gvsu.edu.

1. I am able to reflect upon the effectiveness of co-teaching models that we implement in the classroom.
 - a. Yes
 - b. No
 - c. Sometimes

2. Please select the answer(s) that most accurately describe the feedback that you provide to the teacher who is mentoring you (Anderson, Silet, & Fleming, 2011).
 - a. Sharing what aspects of their mentoring approach are working for me as well as what areas they can improve in.
 - b. Reflections on their availability and openness to answering my questions and providing feedback.
 - c. Thoughts on the quality and usefulness of the feedback they are providing.
 - d. An evaluation of the effectiveness of the assistance and support they provide.
 - e. I do not provide feedback to my mentor teacher.

3. Please select the answer(s) that best describe the feedback you receive from the teacher who is mentoring you (Hattie & Timperly, 2007).
 - a. Feedback related to my level of knowledge/understanding related to the lessons I teach and areas for improvement.
 - b. Strategies I can use to improve the knowledge/understanding mentioned above.
 - c. Acknowledgment of ways in which my performance has shown improvement over previous performances.
 - d. Actions I can take to improve my skills/strategies/procedures.
 - e. Reflections of what improvements have occurred in my progress toward being an effective teacher and identifying the causes of the improvements.
 - f. Gauging my ability for self-monitoring and self-correction.

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- g. Sharing observations of evidence of improvement in my self-monitoring and self-correction.
 - h. I do not receive feedback from my mentor teacher.
4. How important is it to provide feedback to the teacher who is mentoring you?
- a. Very Important
 - b. Somewhat Important
 - c. Not Important
5. How important is it for your mentor teacher to give you feedback?
- a. Very Important
 - b. Somewhat Important
 - c. Not Important
6. How often do you receive feedback from your mentor teacher?
- a. Often
 - b. Sometimes
 - c. Never
7. How often do you give feedback to your mentor teacher?
- a. Often
 - b. Sometimes
 - c. Never

Appendix B

Mentor Teacher Pre- and Post-Survey

The Grand Valley State University College of Education is conducting a study based on pre-service teachers and their mentor teachers. The purpose of this research is to explore effective interactions between mentor teachers and pre-service teachers using a preservice co-teaching model. You have been identified as a mentor teacher who is working with a GVSU pre-service teacher in a co-teaching placement. We are asking you to please complete this brief 7-question survey about your experience regarding effective interactions between mentor teachers and pre-service teachers. Participation in this study is voluntary, and refusing to participate or discontinuing participation will not lead to any penalty or loss of benefits to which the participant is otherwise entitled. **All of your answers will be kept confidential and you will not be able to be identified from your survey.** This study has been reviewed and approved by GVSU's Institutional Review Board (Protocol number 20-168-H). By completing this survey, you consent to participate in this research. If you have any questions, please contact Doug Busman at busmando@gvsu.edu.

1. I am able to reflect upon the effectiveness of co-teaching models that we implement in the classroom.
 - a. Yes
 - b. No
 - c. Sometimes

2. Please select the answer(s) that most accurately describe the feedback that you provide to a pre-service teacher that you are mentoring (Hattie & Timperly, 2007).
 - a. The pre-service teacher's level of knowledge/understanding related to the lessons they teach and areas for improvement.
 - b. Strategies the pre-service teacher can take to improve the knowledge/understanding mentioned above.
 - c. Acknowledgment of ways in which the pre-service teacher's performance has shown improvement over previous performances.
 - d. Acknowledgment of the skills/strategies/procedures used by the pre-service teacher that worked, as well as those that did not work or that need more practice.
 - e. Actions the pre-service teacher can take to improve their skills/strategies/procedures.
 - f. Reflections of what improvements have occurred in progress toward being an effective teacher and identifying the causes of the improvements.
 - g. Gauging the pre-service teacher's ability for self-monitoring and self-correction.
 - h. Sharing observations of evidence of improvement in the pre-service teacher's self-monitoring and self-correction.
 - i. I do not give feedback to my pre-service teacher.

3. Please select the answer(s) that best describe the feedback from a pre-service teacher you are mentoring (Anderson, Silet, & Fleming, 2011).
 - a. Sharing what aspects of my mentoring approach are working for my pre-service teacher as well as what areas I can improve in.

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- b. Reflections on my availability and openness to answering questions and providing feedback.
 - c. Thoughts on the quality and usefulness of the feedback I am providing.
 - d. An evaluation of the effectiveness of the assistance and support I provide.
 - e. I do not receive feedback from my pre-service teacher.
4. How important is it to provide feedback to the pre-service teacher you are mentoring?
- a. Very Important
 - b. Somewhat Important
 - c. Not Important
5. How important is it for the pre-service teacher to give feedback to you as their mentor?
- a. Very Important
 - b. Somewhat Important
 - c. Not Important
6. How often do you receive feedback from the pre-service teacher that you mentor?
- a. Often
 - b. Sometimes
 - c. Never
7. How often do you give feedback to the pre-service teacher that you mentor?
- a. Often
 - b. Sometimes
 - c. Never

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**A Predictive Correlational Study of The Relationship Between
Grit and Self-Efficacy Beliefs Among Pre-Service Teachers**

Rosetta Riddle

Clayton State University

Abstract

The purpose of this predictive correlational study was to examine the relationship between the non-cognitive personality trait of grit and pre-service teacher self-efficacy. The predictor variable of grit to the criterion variable of self-efficacy for pre-service teachers enrolled in a teacher preparation program at a Mid-Atlantic university was studied. Investigating connections between motivation and resilience that might result in self-efficacious behaviors was the focus of the study. The study was important because although some research studies existed regarding content specific self-efficacy of pre-service teachers, limited research had been conducted regarding self-efficacy beliefs of pre-service teachers based on school level. This was a correlational research design study to determine if a significant relationship existed between grit and self-efficacy of pre-service teachers. The Short Grit Scale (Grit-S) and the Teacher's Sense of Efficacy Scale (TSES) were the instruments used for the collection of data. The instruments were completed online and data was collected electronically. A bivariate regression analysis was used to determine the strength and direction of the relationship. The study included responses from 73 participants obtained from a voluntary convenience sample of students completing the student teaching phase of the clinical field experience at a Mid-Atlantic private university. Results of the study indicated a moderately significant positive correlation between grit and self-efficacy ($F(1, 71) = 42.45, p < .001, r^2 = 0.37$).

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Keywords: clinical field experience, grit, grit theory, pre-service teachers, resilience, self-efficacy, teacher preparation

Background

Brown, Lee, and Collins (2015) propose that “Teachers with a high sense of teaching efficacy are likely to view a challenging situation as a challenge to be overcome, whereas a teacher with low efficacy will see it as a roadblock” (p. 78). Developing the belief in one’s ability to implement effective teaching and learning strategies is one of the major functions of teacher preparation courses. However, teacher preparation programs across the nation have been criticized for failing to prepare effective new teachers adequately (Zeichner, 2014). Pre-service teachers in most teacher preparation programs participate in a clinical field experience designed to develop confidence in their ability to implement essential knowledge and skills related to effective teaching (National Council for the Accreditation of Teacher Education [NCATE], 2010). This study investigated the personality trait of grit as a predictor of self-efficacy beliefs of pre-service teachers completing a teacher preparation program in a Mid-Atlantic university.

Teacher preparation has been a topic of intense debate in American education for more than 40 years (NCATE, 2010; Gurvitch & Metzler, 2009). One of the desired outcomes of teacher education programs is the production of graduates who will become high quality teachers; therefore, it is important for teacher candidates to believe that they can positively influence student achievement and performance (Derosier & Soslau, 2014; Mansfield, Beltman, Broadley, & Weatherby-Fell, 2016). The clinical experience is one of the most important components of the pre-service teacher preparation program in developing pre-service teachers’ confidence levels (Kim & Cho, 2014; Martins, Costa, & Onofre, 2015; NCATE, 2010). In addition, confidence is important for pre-service teachers in building a positive attitude toward their ability to motivate

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students to learn (Derosier & Soslau, 2014). Besides developing professional attitudes during the clinical practice, pre-service candidates implement motivational strategies to influence student learning with the intended outcome of assisting each student in achieving academic success (Mansfield et al., 2016).

More than three decades following the publication of *A Nation at Risk: The Imperative for Educational Reform* (National Commission on Excellence and Education, 1983), the problems and challenges regarding ineffective programs faced by educator preparation in the United States continue as topics of debate. Within the last five years, Congress passed the Every Student Succeeds Act (ESSA, 2015) to address the application of standards and criteria in each state aimed at measuring the effectiveness of both university teacher preparation programs and alternative certification programs. This increased emphasis on teacher preparation programs reflects the perspective of several public and private organizations regarding the ineffectiveness of university programs for teacher preparation (NCATE, 2010; Ziechner, 2014). From the 1960s to the 1990s, institutions of higher education monopolized the preparation of teachers; however, beginning in the 1990s many teachers entered the field of teaching through alternative teaching programs instead of the traditional university teacher preparation programs (NCATE, 2010; Ziechner, 2014).

Problem Statement

Teacher preparation programs across the nation are criticized for not adequately preparing pre-service teachers to meet the demands of the classroom (Martins et al., 2015; NCATE, 2010). In addition, prospective teachers often express a lack of self-efficacy related to their ability to assume the responsibilities of the regular teacher during the practicum and internship clinical experiences (Goldhaber & Cowan, 2014). Some candidates exhibit strong self-efficacy while others remain unsure of their ability to manage the classroom, use effective instructional strategies,

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and engage students in relevant learning opportunities (Martins et al., 2015; Meristo, Ljalikova, & Löffström, 2013). This condition affects not only student teachers but also the quality of student learning for the students in classrooms led by pre-service and new teachers (Martins et al., 2015). Current research explains the effects of self-efficacy beliefs on pre-service teacher behaviors; however, the research has not addressed possible sources of efficacious behaviors (Morris, Usher, & Chen, 2016; Moulding et al., 2014). The problem is that numerous pre-service teachers struggle during the completion of the clinical field experience possibly due to a lack of grit and self-efficacy.

Significance of the Study

More than 4000 universities across the nation offer teacher preparation programs as a major area of study (NCATE, 2010; U.S. DoEd., 2016). Teacher preparation programs provide a learning foundation for many aspiring teachers and provide pre-service teacher candidates with the initial knowledge, skills, and dispositions that are associated with effective teachers (Cano, Swan, & Wolf, 2011). Most teacher education preparation programs require a clinical field experience ranging from one semester to one year that provides students with the opportunity to apprentice in a real-life school setting (NCATE, 2010). The clinical experience is an important component in the preparation of aspiring teachers (Cano et al., 2011; NCATE, 2010). Though the effectiveness of teacher preparation programs has been investigated, there is a scarcity of information related to the influence of self-efficacy in the development of pre-service teacher candidate behaviors as outcomes of the clinical field experience (Cano, et al., 2011; Jamil et al., 2012). In addition, Fitzgerald (2016), suggests that examining the relationship between grit and self-efficacy could be important in making decisions related to the recruitment, preparation, induction, and development of new teachers.

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This study adds to the body of research related to improving and transforming the effective preparation of pre-service and new teachers. Research addressing many facets regarding self-efficacy in content and subject areas exists (Hoy & Spero, 2005; Moseley et al., 2014). However, increasing the research base regarding self-efficacy and grit may provide teacher preparation programs with information to initiate meaningful program changes that will increase student teacher success rates. Although extensive research has been conducted regarding content specific self-efficacy of pre-service teachers, limited research studies have been conducted regarding the effectiveness of pre-service teachers (Jamil et al., 2012; Mansfield et al., 2016).

Research Question

This study was designed to answer the following research question (RQ):

RQ: Can the grit score as measured by the Short Grit Scale (Grit-S) predict pre-service teachers' self-efficacy beliefs as measured by the Teachers' Sense of Efficacy Scale (TSES)?

Theoretical Frameworks

This research is grounded in the theoretical frameworks of self-efficacy, which is based on Bandura's (1977) social behavior theory (1977) and Duckworth's (2009) Grit theory (2009) which focuses on the effect of the power of passion and perseverance on achieving success. Bandura's self-efficacy construct has provided the basis for research regarding beliefs, attitudes, and behaviors among numerous social groups for more than 50 years while Duckworth's Grit theory has served as the focus of studies related to behaviors and success for the last decade. These frameworks provide the foundation for this study regarding the investigation of the relationship between reported levels of grit and pre-service teacher self-efficacy.

Self-Efficacy Theory

The concept of self-efficacy originated from Bandura's work regarding social behavior

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theory (Bandura, 1977). Almost two decades later, Bandura (1997) presented the construct of self-efficacy which is defined as an individual's beliefs regarding one's ability to make a difference by influencing the capacity of others to achieve desired performance levels. During the clinical experience, pre-service teachers have the opportunity to practice their beliefs by participating in the teaching internship that is designed to guide the development of teaching mastery (NCATE 2010; Zeichner, 2014). During the internship phase, pre-service teachers engage in activities that support the acquisition of teaching knowledge and skills while working in the classroom with a veteran teacher (NCATE 2010; Zeichner, 2014). Thus, the clinical student teaching experience can be an excellent opportunity to develop students' sense of efficacy (Bandura, 1997).

Grit Theory

The Grit theory is a relatively new construct developed by Angela Duckworth that focuses on personality as a factor in achieving levels of success. Duckworth (2016) asserts that grit is the "combination of passion and perseverance" (p. 8) that defines high achievers. The Grit theory proposes that talent and ability are less important for long-term success than the combination of the characteristics of passion and perseverance. The distinction must be noted that the Grit theory does not apply equally to short-term and long-term success. For example, regarding long-term success, Robertson-Kraft and Duckworth (2014) conducted studies on two longitudinal samples of first- and second-year teachers in low-income districts and found that "Grittier teachers outperformed their less gritty colleagues" (p. 1). In addition, the Grit theory complements the work of Dweck (2006) regarding the role of fixed and growth mindsets as motivational success factors. Building on the growth mindset concepts, Duckworth (2016) alludes to the importance of "truly believing" (p. 162) in the ability of individuals to grow. Thus, developing grit during the pre-service experience can potentially assist teacher candidates in becoming highly resilient and

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effective teachers (Von Culin, Tsukayama, & Duckworth, 2014). applying the concept of hope in perseverance toward a stated goal (Duckworth, 2016). In other words, individuals with high levels of grit find intrinsic enjoyment in accomplishing their goals and include hope as an element across the four Grit Theory stages.

Literature Review

University teacher preparation programs serve as the major suppliers of new teachers for classrooms across the nation. Educators at various school levels including elementary, secondary, and post-secondary engage in debate regarding the quality of these programs and the readiness of program graduates to enter the teaching profession (Gurvitch & Metzler, 2009; NCATE, 2010). The role of teacher education programs in the development of teacher efficacy is central to prospective teachers' ability to motivate change in students' classroom performance (Ashton, 1984; Gurvitch & Metzler, 2009). Transforming students' performance in the classroom is one of the qualities of effective teachers and self-efficacy is related to teachers' ability to use motivational techniques that promote student success and increase pre-service teacher effectiveness.

Pre-service Teachers' Attitudes and Beliefs

Attitudes and beliefs are inherent in the construct of teacher-efficacy. Several studies examined the beliefs and attitudes of pre-service teachers regarding the teaching profession and found that beliefs indeed affect attitudes (Demirtas, Comert, & Ozer, 2011; Karakus & Akbulut, 2010). Findings from these studies also indicated that it is difficult to change teacher beliefs once established (Demirtas et al., 2011; Karakus & Akbulut, 2010). In some cases, this resistance to change is demonstrated by pre-service teachers who continuously approach planning as a chore instead of a necessity of providing quality teaching and learning (Demirtas et al., 2011; Karakus & Akbulut, 2010). Likewise, several studies examined the self-efficacy of freshman and senior

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pre-service teachers of mathematics and concurred with the apparent connection between beliefs and attitudes toward teaching abilities as well as the educational community (Demirtas et al., 2011; Karakus & Akbulut, 2010). These findings support the importance of universities focusing on the development of self-efficacy as they prepare pre-service teachers to practice the implementation of teaching responsibilities during the internship period.

While believing in one's ability to perform can be beneficial, there may also be some drawbacks when beliefs are excessively strong (Pendergast, Garvis, & Keogh, 2011). Pre-service teachers indicating very strong beliefs entering the field experience may encounter "reality shock" (p. 55) during the actual performance of teaching duties as reported in a mixed-methods study of 175 undergraduate and graduate pre-service teachers at an Australian university (Pendergast et al., 2011). In addition, according to Cano et al. (2011), behaviors learned and exhibited in the clinical experience are instrumental in defining professional teaching practices. Therefore, the development of the construct of self-efficacy needs to be explored to identify methods of developing self-efficacy during the pre-service clinical experience.

Grit and Mindset

Another essential element related to the development of grit is an individual's mindset. According to Duckworth (2016), mindset may play a pivotal role in teachers' belief in their ability to make a difference with all students. The concept of mindset was developed by Dweck (2006) and identifies growth and fixed as the two types of mindsets that individuals typically demonstrate. A fixed mindset is characterized by an individual's belief that intelligence is an unchangeable factor and a growth mindset is characterized by an individual's value of displaying effort (Dweck, 2006). In other words, those with a fixed mindset subscribe to the belief of

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measuring intelligence by a particular number while those with a growth mindset operate with the belief that intelligence levels can be increased.

While both categories of mindset help to provide insight into individuals' internal thinking processes, most people are combinations of both mindsets (Dweck, 2006). Duckworth (2016) concluded that having a growth mindset could be an asset in helping an individual in the development of grit. Since self-efficacy involves the approach over a long-term to achieving success, it seems reasonable to expect that a growth mindset helps in reaching those goals. The connections between mindset, grit, and self-efficacy are intertwined as the characteristics of one psychological trait and one's beliefs and attitudes influence the other areas on the ability to develop and achieve success with long-term goals.

Student Achievement

At the heart of teacher preparation is the goal of developing teachers who possess the knowledge, skills, and capacity to provide students with curriculum, instruction, and assessment experiences that lead to increased student achievement. Wheatley (2005) reported that confident teachers with high levels of self-efficacy are more likely to use innovative instructional methods and participate in more professional development opportunities. Furthermore, teacher confidence leads to a positive teacher attitude toward the ability to motivate students to learn (Derosier & Soslau, 2014). In the clinical experience, pre-service candidates practice using motivational strategies to influence student learning with the intended outcome of assisting each student in achieving academic success. Along these lines, Judge, Jackson, Shaw, Scott, and Rich (2007) examined the level of a teacher's self-efficacy to predict individual performance levels for student achievement. The increased use of democratic teaching and constructivist approaches is more often observed in classrooms of teachers who report higher self-efficacy perceptions

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(Tschannen-Moran, Woolfolk Hoy & Hoy, 1998). Teacher candidates must believe in their ability to affect student achievement and performance positively for all students. This ability is required with diverse student populations who often present unexpected challenges such as disruptive student behavior and unmotivated students that require the application of creative learning strategies over an extended period of time (Pendergast et al., 2011).

These findings suggest that the inclusion of grit in the curriculum of teacher preparation programs through challenging and rigorous course assignments may support the development of skills, attitudes, and behaviors that lead to successful careers in the classroom. Also, based on the study findings, it was predicted that the study participants would become successful teachers and demonstrate the ability to support their students in the development of grit and other persevering behaviors. As diversity in classrooms across the nation increases, the education field will require a cadre of teachers who are capable of relating to and meeting the needs of students from various ethnic, socio-economic, and socio-cultural backgrounds (Cone, 2009). This impending change supports the need for the development of teachers who have a strong sense of self-efficacy and believe in their ability to assist all students in achieving academic success.

Participants and Setting

The participants for this study were drawn from a voluntary convenience sample of students majoring in education at a private Mid-Atlantic university who are completing the student teaching phase of the clinical field experience. All students completing student teaching were invited to participate. The School of Education (SOE) at the University places more than 300 students each year in local and remote public and private elementary, middle, and high schools. The University enrollment consists of more than 100,000 students including residential and online students.

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Instrumentation

Participants in this study completed two questionnaires, the Short Grit Scale (Grit-S) and the Teacher's Sense of Efficacy Scale (TSES). The Grit-S was used to measure the grit level and the TSES was used to measure the level of teacher-efficacy. Scores on the instruments were analyzed to determine if a correlational relationship exists between the two variables of grit and self-efficacy. The participants accessed the survey online through the Qualtrics survey platform. Demographic information was included at the beginning of the survey. Once the questionnaires were available in Qualtrics and approvals were received an e-mail was sent to students currently completing the clinical field experience. The e-mail explained the study, invited student participation, and provided links to the online consent form and research surveys. Surveys were distributed to 564 pre-service teachers and 73 (13%) were returned. The sample consisted of 56 (77%) females and 17 (23%) males. Most of the survey respondents were graduate students (62%) and most were completing their internships in elementary schools (46%). Regarding ethnicities, there were 21 (29%) African-Americans, 46 (62%) Caucasians, and 6 (8%) Hispanics. More than half of the participants (60%) were pursuing certification in special education.

Findings

The findings for this study support the results, implications, and recommendations from several previous studies related to grit and self-efficacy. For example, study results support the assertions of Dweck (2006) regarding the positive connections between mindset, grit, and self-efficacy beliefs as influences on the ability to successfully achieve long-term goals. The concentration of self-efficacy scores on the higher end of the score distribution indicated that relatively few study participants held low self-efficacy beliefs regarding their knowledge, skills and abilities in the areas of instructional strategies, classroom management, and student

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engagement. Along similar lines, the high self-efficacy scores support the argument presented by Dial (2015) regarding the false sense of efficacy that pre-service teachers may express in the initial stage of the internship experience. In addition, the findings of this research agree with the small-scale study conducted by Yates et al. (2015) which examined the role of grit in the participants' recruitment, retention, certification, and overall success. Results from this small-scale study identified grit as a predictor of success. Likewise, in this study, grit is associated with pre-service teacher effectiveness using overall self-efficacy scores as a measure of pre-service teacher trajectory for success in the classroom.

Encouraging the conversation regarding self-efficacy and grit can provide teacher preparation programs and school districts with information to access programs and institute changes to address retention and success rates for pre-service and new teachers. Additionally, exploring the connection between grit and self-efficacy can be beneficial for teacher education programs as they endeavor to develop experiences for pre-service teachers that target the development of grit, perseverance, and resilience (Mansfield et al., 2016; Martins et al., 2015).

Additionally, the findings of this research study support previous study results recommending that faculty in university teacher preparation programs should challenge students to problem-solve and focus on development of the growth mindset as a means to achieving long-term goals (Dweck, 2006). According to Bandura (1977), self-efficacy is the belief that one possesses the ability to plan and successfully execute plans that produce the attainment of desired results. Achieving this goal presents the urgency for teacher education programs to review and revise program designs to focus on teacher-efficacy in the preparation of pre-service teachers and warrants exploration for development during the pre-service clinical experience (Zeichner, 2014). Therefore, the inclusion of grit and self-efficacy assessments as components in identifying

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candidates for teacher preparation programs which may assist in the determination of the pre-service candidates' needs for specific skill development. Including these types of assessments may provide extra insight for the identification and effective preparation of quality new teachers. Furthermore, incorporating opportunities to develop grit and self-efficacy in introductory teacher preparation programs can provide essential data to support the growth of confident and effective teacher candidates.

Implications

Teacher preparation programs in universities across the nation face continued scrutiny and critique from public and private organizations. There are several implications that can be derived from the results of this research study to make an important contribution to improving and transforming the effective preparation of pre-service and new teachers. The findings of this research also add to the body of research related to the role of motivation in the effective preparation of aspiring teachers. Some research exists regarding content specific self-efficacy of pre-service teachers; however, limited research has been conducted regarding self-efficacy beliefs of pre-service teachers during the student teaching phase of the teacher preparation program (Gurvitch, & Metzler, 2009; Ziechner, 2014).

Encouraging the conversation regarding self-efficacy and grit can provide teacher preparation programs and school districts with information to access programs and institute changes to address retention and success rates for pre-service and new teachers. Additionally, exploring the connection between grit and self-efficacy can be beneficial for teacher education programs as they endeavor to develop experiences for pre-service teachers that target the development of grit, perseverance, and resilience (Mansfield et al., 2016; Martins et al., 2015).

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The findings of this present research support the previous study results recommending that faculty in university teacher preparation programs should challenge students to problem-solve and focus on development of the growth mindset as a means to achieving long-term goals (Dweck, 2006). According to Bandura (1977), self-efficacy is the belief that one possesses the ability to plan and successfully execute plans that produce the attainment of desired results. Achieving this goal presents the urgency for teacher education programs to review and revise program designs to focus on teacher-efficacy in the preparation of pre-service teachers and warrants exploration for development during the pre-service clinical experience (Zeichner, 2014). Therefore, the inclusion of grit and self-efficacy assessments as components in identifying candidates for teacher preparation programs which may assist in the determination of the pre-service candidates' needs for specific skill development. Including these types of assessments may provide extra insight for the identification and effective preparation of quality new teachers. Furthermore, incorporating opportunities to develop grit and self-efficacy in introductory teacher preparation programs can provide essential data to support the growth of confident and effective teacher candidates. In addition, universities might consider partnering with high school administrators and guidance counselors to extend the early development of grit and self-efficacy to high school students interested in pursuing a career in teaching before they enter college. This early identification and preparation practice could also lead to increased retention rates.

Limitations

Several important limitations need to be considered related to this study. Researchers need to identify both internal and external threats that may affect the validity of the study (Creswell, 2013). One limitation of the study involved an external validity concern related to population validity which addresses the ability of the results of the study to be applied to the target population

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(Gall, Gall, & Borg, 2007). In this case, the study was conducted with participants from a singular university in the Mid-Atlantic region of the United States and the generalizability of these results may or not be transferable to the target population of pre-service teachers at universities in other regions of the county.

Recommendations for Future Research

The findings and results of this study present a number of important recommendations for future practice by university teacher preparation programs in the effective development of pre-service teachers. A natural progression in the continuation of this work might include the following research opportunities:

- a) Examination of pre-service teachers' student teaching grit and self-efficacy scores compared to the grit and self-efficacy scores upon completion of the student teaching experience to determine change in beliefs during the clinical field experience.
- b) Comparison of the self-efficacy beliefs of pre-service teachers and their assigned mentors to determine if a relationship exists between the mentors' self-efficacy beliefs and the beliefs of the teacher candidate.
- c) Replication of the present study at universities in various regions across the country to address the limitation of this study associated with collecting data from a single university.
- d) Investigation of the relationship between grit and self-efficacy on the retention rates of new teachers.

Preparing high quality teachers is important work for universities and by addressing grit and self-efficacy, new teachers may be better prepared to meet the continually increasing challenges in today's diverse classrooms. Additionally, the number of effective teachers may

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increase along with long-term improvements in student achievement. Perhaps the present point in time, with the focus on the development of effective teachers, is the appropriate time for the inclusion of transformative practices in teacher preparation programs that lead to positive results for the nation's future generations of students.

Conclusion

In conclusion, this study investigated the relationship between the two variables of grit and self-efficacy of pre-service teachers. The results of the study indicated a limited predictive relationship between grit and self-efficacy ($F(1, 71) = 42.45, p < .001, r^2 = 0.37$). As the United States continues to face problems associated with increases in teacher shortages, as well as the retention of quality teachers, discussing avenues to prepare effective teachers is an essential focus for educational discourse. Further studies investigating variables related to the topics of grit and self-efficacy are needed. Preparing high quality teachers is important work for universities and by addressing grit and self-efficacy, new teachers may be better prepared to meet the continually increasing challenges in today's diverse classrooms. Additionally, the number of effective teachers may increase along with long-term improvements in student achievement. Perhaps the present point in time, with the focus on the development of effective teachers, is the appropriate time for the inclusion of transformative practices in teacher preparation programs that lead to positive results for the nation's future generations of students.

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**Mentors as Coaches: Increasing Teacher Candidate
Readiness by Establishing a Culture of Coaching**

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Has teaching become a revolving door profession? With a majority of baby boomers retiring from the teaching profession, twenty-five percent of teachers have five or less years of experience (Ingersoll, 2012). In a national, longitudinal study, American Association of Colleges for Teacher Education (2018) found that only 40% of those prepared to teach were still working as teachers 4 years after finishing college. In addition, 90% of open teaching positions are resultant of teachers leaving the profession (Carver-Thomas & Darling-Hammond, 2017). With influences such as lack of support from mentors, colleagues, and administrators, low salaries, testing and accountability pressure, lack of opportunities for advancement, and dissatisfaction with working conditions, attrition in the profession of teaching is a problem that must be addressed (Carver-Thomas & Darling-Hammond, 2017; Schlichte, Yssl, & Merbler, 2010).

As a result, many state education agencies have adopted formal mentoring programs to combat the high rate of attrition (Heider, 2005). However, the increased number of these mentoring programs (from 50% of new teachers in such programs in 1990 to 91% in 2008) has not resulted in improved retention (Goldrick, Osta, Barlin, & Burn, 2012). For teacher preparation providers, the new question becomes: what is missing in the preparation of teacher candidates that would improve readiness and retention?

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In exploring strategies for improved readiness for teacher candidates, the role of mentor becomes paramount in establishing best practice in candidates. As Knight (2007) explains, having a mentor who is a successful teacher is not enough for teacher candidates. Just as teachers need lesson plans, procedures, and strategies for their students, mentor teachers need the same for the teacher candidates they are coaching. Too often, experienced teachers are called on to be mentors or coaches to candidates with little training or support given. The thought behind such appointments is that successful, seasoned teachers should be able to transfer their success to the teacher candidates. Unfortunately, success as a teacher is not enough to prepare one to be successful at mentoring or coaching (Knight, 2007).

With national trends indicating an expansion to a year-long field experience (Dennis, 2016) and teacher attrition as a must-faced reality (Carver-Thomas, et al., 2017), the purpose of this study is to explore best practices for preparing and retaining teacher candidates through high-quality coaching and support, based on strong partnerships with school-based mentor teachers, university faculty, and district partners.

Context

In Louisiana, where this study takes place, the Department of Education (2016) adopted a one-year residency program to increase opportunities for teacher candidates to experience a longer, more scaffolded field experience prior to completion of certification programs. This includes a trained mentor paired with a teacher candidate in a yearlong teaching experience rather than a standard one-semester student teaching experience. Through completion of a state-provided or state-approved mentor training program, which includes portfolio-based assessments, classroom teachers become mentor teachers who co-teach with yearlong undergraduate or post-baccalaureate teacher candidates (LDOE, 2016). Prior to this, student

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teaching followed the national average of a ten to fifteen-week student teaching experience for teacher candidates (National Council for Accreditation of Teacher Education, 2010).

With the trade of university-based instruction for increased K-12 classroom field experience, the need for strategic, deliberate mentoring and coaching by university faculty and mentor teachers within the field placement is clear. The National Council on Teacher Quality (2011) warns that an increased timeframe in the field alone is not a solution. Agreeing with this is a survey of 1,057 student teachers by Ronfeldt and Reininger (2012), whose data suggest that quality of the student teaching has more impact on outcomes than the length of time in student teaching.

With his focus on post-modern curriculum studies, Patrick Slattery (2013) indicated that a reevaluation of the efforts in methods courses and clinical practice is in order to increase student learning and teacher retention. His nod to peer coaching and team teaching as a means of re-conceptualizing curriculum practices are given with the understanding that support is necessary for success. In navigating these multifaceted changes, teacher preparation programs are tasked with ensuring that their candidates are provided with quality field experiences (Caukin, Dillard, & Goodin, 2016). By building a culture of coaching that includes all stakeholders in K-12 school districts and teacher preparation providers, strong relationships among higher education and K-12 stakeholders can result (Knight, 2007).

Structures

In a small, regional university in Louisiana, support for teacher candidate growth in content pedagogy and professionalism begins during junior year course-based field experiences and extends through senior year residency experiences. Teacher candidate success and professional growth in these field and residency experiences are founded in the strength of

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university-district partnerships utilized to make strategic mentor pairings, stakeholder training, progress monitoring, and embedded reflective practices throughout the program.

District partnerships with key stakeholders for personnel management and school-based support from administrators set the tone for positive clinical experiences, but the quality of daily support and feedback provided by classroom-based mentors can be the most influential on overall teacher candidate growth (Ell, Haigh, Cochran-Smith, Grudnoff, Ludlow, & Hill, 2017). Mentor teachers for the residency year are selected based on evidence of positive impact on student learning, significant content pedagogy, strong communication skills and potential to mentor teacher candidates with state guidelines and required credentialing established by the Louisiana Department of Education (2018). Pairings of teacher candidates and mentor teachers are made with mutual input of university representatives, district partners, and teacher candidates. This mutual selection process is vital to establishing a positive working environment in which effective coaching can impact teacher candidate growth.

Once mentor teachers and teacher candidates are paired, stakeholder training to establish norms and expectations is the next critical step in the development of a coaching culture (Aslan & Ocal-Dayioglu, 2012). Joint trainings to support quality feedback first include critical components of pre-conference, observation, post-conference (POP) cycles. This helps evaluators and teacher candidates to see how pre-planning, instruction, and reflection are connected within and between POP cycles that take place during each semester of residency. This part of the training also includes group norming to the university's Evaluation of Performance Rubric adapted from the Danielson Framework for Effective Teaching (Danielson, 2014). This rubric is used for all formal residency observations and training, which includes activities that emphasize characteristics of high-quality oral and written feedback with high-leverage action steps for

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improvement. This interactive training includes activities in which stakeholders evaluate authentic samples of rubric scores and written feedback from previous teacher candidate cohorts, and participants are given opportunities to collaboratively reflect and practice developing high-quality feedback and action steps that would best support teacher candidate growth. Additionally, evaluators and teacher candidates are trained on how to analyze the impact of instructional choices such as differentiation practices, assessment strategies, and classroom management approaches on student outcomes such as student engagement, learning, and behavior. Using an integrated approach in training, evaluation forms, and the departmental lesson plan template, helps all stakeholders to make explicit connections between teacher candidate actions and student outcomes, and this has enriched coaching conversations that take place during formal cycles and in daily conversations between mentors and teacher candidates.

Ongoing professional development with mentor teachers, university supervisors, teacher candidates, and other faculty evaluators focuses on best practices in co-planning and co-teaching and high-quality feedback practices. St. Cloud University (2011) co-teaching strategies are introduced to teacher candidates early in their programs. Candidates practice these strategies in their early courses and field experiences. This early introduction to co-teaching strategies predisposes the candidates for greater success with this practice in residency. Prior to residency, specific interactive sessions with paired residents and mentors on co-teaching and co-planning practices are led by faculty. Regarding the on-going POP cycle training sessions, the pre-conferencing aspect of the cycle includes lesson plan discussion and allows for built-in time for co-planning, which is highlighted in these sessions. Co-planning and co-teaching practices further support the strength of feedback provided to teacher candidates based on the

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collaborative structures set forth throughout instructional planning, implementation, and reflection cycles.

Once key stakeholders understand the qualities of effective feedback and coaching practices, additional support is provided to structure formal observation and feedback cycles that will support teacher candidate growth and foster a consistent mechanism for program evaluation and improvement planning. The pre-observation conference, observation with the university's Evaluation of Performance rubric, and post-observation conference model (POP) was adapted from training models developed by US PREP (2016). Although POP cycles require more hands-on contact time between teacher candidates and evaluators, the ability to discuss lesson plans prior to observations has improved teacher candidate self-efficacy during delivery of lessons and the quality of conversations that support the coaching environment before, during, and after formal observations.

As teacher candidates progress through the residency year, attention to progress monitoring becomes more focused as data points on candidate proficiency accumulate. An observation tracking document (See Appendix A) is used by teacher candidates and assigned evaluators to help analyze patterns of performance on observations over time and by rubric domains. This is also a mechanism that can be used by program leadership to compare performance ratings by evaluator for norming and training on use of evaluation tools. The observation tracking document includes both quantitative and qualitative analysis and reflection components that can inform coaching conversations and evidence-based action steps in documented areas of need. The observation tracking document also serves as a data source in the development of a professional growth plan. Teacher candidates and university evaluators use the professional growth plan to identify high leverage areas for improvement, plan strategies to

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affect growth in identified areas, and to monitor progress toward professional goals during each semester of residency. This integrated approach for data-driven goal setting and progress monitoring sets the tone for ongoing reflective practice as a shared responsibility for teacher candidates and their assigned support team, and it provides a strong foundation for these practices to improve self-efficacy, first-year readiness, and retention in the profession upon graduation.

Data Set: Residency 1 Elementary & Secondary

In Fall 2019, data from teacher candidates' observation tracking documents were analyzed across the cohort. Data include quantitative data of scores from all observations as measured on the university's Evaluation of Performance (observation) rubric and qualitative data through teacher candidate reflections of that quantitative observation data. The observation rubric maintains four domains: (1) planning and preparation, (2) classroom environment, (3) instruction, and (4) professionalism. The quantitative data categories as indicated within the four domains of the observation rubric include the following: instructional objectives (planning and preparation); procedures, behavior (classroom environment); questioning, student engagement, assessment, communicating, flexibility (instruction); and modeling professional knowledge, skills, and dispositions (professionalism). With the Fall 2019 cohort of teacher candidates (n=39; 87% response rate), the highest indicators across observation data collected were professionalism (56%) and planning (23%). Twenty-nine out of thirty-nine teacher candidates agreed with the findings (74%). The lowest indicators identified were questioning (25.6%) and flexibility (23%). Twenty-three out of thirty-nine (59%) teacher candidates agreed with the findings as documented in their observation tracker.

Analysis of Findings

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Professionalism and planning are both indicators that are heavily modeled, applied, and assessed throughout the teacher candidates' professional coursework, including courses taken prior to residency; therefore, this finding is not surprising. In regards to the lowest indicators, questioning and flexibility are both in the instruction domain of the observation rubric, and while teacher candidates have opportunities to practice questioning and flexibility in the field experience components of their methods courses prior to residency, these skills are more consistently developed during residencies. These findings regarding program-wide areas for improvement in questioning strategies also align with the feedback received during external evaluations facilitated by LDOE. Planning impacts questioning and flexibility; however, proficiency in these indicators requires mid-teaching adjustments to be carried out more effectively in the teaching environment supported during the residency.

With the end goal of exploring best practices for teacher candidates in order to increase their preparedness and retention in the field of education, it is important to further examine the discrepancies as they apply to comparing observation results to the perceptions of teacher candidates in regards to their strengths and areas of need. Only 59% of teacher candidates agreed with the ratings regarding their areas of need, with 74% agreeing with the findings regarding the areas of strengths. Even though the ratings on the observation rubric were supported with specific incidences during the observation that connected to domain indicators, the teacher candidates were less likely to agree with the area of need than the area of strength. Even more interesting, not all teacher candidates agreed with their areas of strength.

Conclusion

Guided self-reflection and self-awareness are critical aspects toward building a growth mindset (Dweck, 2015). How teacher candidates perceive their abilities affects their performance.

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Furthermore, if a mindset can be changed, then teacher candidate achievement can increase. For this cohort of teacher candidates, it seems that more support is needed for them to think and reflect critically, which includes self-awareness. Scaffolding using the Observation Tracker should occur earlier in the teacher candidates' professional coursework (prior to residency), so that candidates have ample opportunity to reflect on their practices as it applies to the specific observational feedback supplied by classroom supervisors and university faculty. This allows them to more closely assess their perceptions of their abilities as compared to those who are mentoring and training them. It is also important to build alignment and expectations across course assignments with the feedback tools and structures already in place. This would allow a more integrated use of the structures regarding strategic decisions on teacher candidate performance, and therefore better impact the quality of the feedback offered through the university's Evaluation of Performance Rubric. These measures would increase the validity and reliability of this tool and offer more robust and actionable feedback to teacher candidates. Perhaps then, the findings would be more in line with the teacher candidates' perceptions of their abilities.

These findings and conclusions help to inform the role that continuous improvement plays in helping to answer the question as to what is missing in the preparation of teacher candidates that could improve readiness and retention. Alignment of expectations, the use of consistent scaffolding in critical thinking and reflection throughout professional coursework, and opportunities to receive specific, actionable feedback from all invested parties, have the most opportunity to impact a positive growth mindset in teacher candidates. Ultimately, all stakeholders are coaches, the mentor teacher, faculty supervisor, and teacher candidate, thus establishing a positive and effective culture of coaching. This consensus among stakeholders will best prepare

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the teacher candidates for the roles and responsibilities of the classroom teacher and have the greatest chance to positively impact teacher retention.

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Appendix A

Observation Tracking Document

| Data Tracking (observation data should be entered after each observation completed by university and school representatives) | | | | | | | | |
|--|----------|--------------------------|--------------------------|--------------------------|----------------------|----------------------|----------------------|----------------------|
| Teacher Candidate Name: | | | | University Supervisor: | | | | |
| Mentor Name: | | | | School Site: | | | | |
| | | Supervisor Observation 1 | Supervisor Observation 2 | Supervisor Observation 3 | Mentor Observation 1 | Mentor Observation 2 | Mentor Observation 3 | Average by Indicator |
| Indicators | # Ind. | Enter Date | Enter Date | Enter Date | Enter Date | Enter Date | Enter Date | |
| Domain 1: Planning and Preparation - Criteria A: Setting Instructional Objectives (COMPASS 1c.) | <u>7</u> | | | | | | | |
| Domain 2: The Classroom Environment - Criteria A: Managing classroom procedures (COMPASS 2c.) | <u>5</u> | | | | | | | |
| Domain 2: The Classroom Environment - Criteria B: Managing Student Behavior | 2 | | | | | | | |
| Domain 3: Instruction – Criteria A: Using Questioning and Discussion Techniques (COMPASS 3b.) | <u>4</u> | | | | | | | |
| Domain 3: Instruction – Criteria B: Engaging Students in Learning (COMPASS 3c.) | <u>5</u> | | | | | | | |
| Domain 3: Instruction – Criteria C: Using Assessment in Instruction (COMPASS 3d.) | <u>4</u> | | | | | | | |
| Domain 3: Instruction – Criteria D: Communicating with students | 4 | | | | | | | |
| Domain 3: Instruction – Criteria E: Demonstrating | 1 | | | | | | | |

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|---|---|--|--|--|--|--|--|--|
| <i>flexibility and responsiveness</i> | | | | | | | | |
| Domain 4: Professionalism – Criteria A: Modeling Professional Knowledge, Skills, and Dispositions | 6 | | | | | | | |
| <i>Average by Observation</i> | | | | | | | | |
| Reflections Questions (to be completed in the transition between Residency 1 to Residency 2 semesters) | | | | | | | | |
| What pattern of performance do you see from your first university supervisor observation to your last? | | | | | | | | |
| How do your university observations compare to your school-based observations? | | | | | | | | |
| What is your overall highest indicator? Do you feel this reflects your own self-assessment? | | | | | | | | |
| What is your overall lowest indicator? Do you feel this reflects your own self-assessment? | | | | | | | | |
| What have you learned from this activity, and what are your next steps with your US based on this activity? | | | | | | | | |

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**Powering Up With STEM:
Connecting Field Experience with Community**

Lisa Etheridge, Eva Kane, and Angela Carpenter

Troy University

STEM and STEM education have recently been placed in the national spotlight because of mediocre student achievement in these disciplines (Bush, 2019; National Center for Education Statistics (NCES), 2015) and declining student performance compared to other nations (Organization for Economic Cooperation and Development (OECD), 2013; Schaffhauser, 2019). There has also been concern over decreasing student interest in science resulting in fewer students entering the STEM pipeline to prepare for professional roles in STEM-related fields (Bybee, 2010; National Academies, 2007; Rozek et al., 2019). With fewer students entering STEM fields, employers are apprehensive that the workforce will be unprepared to solve future challenges faced by our nation and world, such as feeding and fueling a growing world population. Furthermore, our world is rapidly changing, and it is increasingly critical for all citizens to develop the ability to apply knowledge of STEM to personal and local issues (Bybee, 2010; Falloon et al., 2020; Feinstein, 2011). Although emphasis on science is often placed at the secondary level, the elementary grades are a critical time for developing students' foundational knowledge and interest in STEM (Clements & Sarama, 2016; Conderman & Woods, 2008; DeJarnette, 2012). Research has found that student interest in science declines significantly as they progress through the elementary grades. However, elementary teachers are primarily trained as generalists (Li, 2008; Rozek et al., 2019; Schwartz & Gess-Newsome, 2008) and often enter teacher education programs lacking confidence and interest in teaching STEM subjects (Falloon

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et al., 2020; Weiss et al., 2001). Therefore, addressing concerns regarding declining student interest in STEM requires new approaches for engaging elementary students and preparing elementary teachers.

What is STEM?

STEM is a multi-disciplinary approach to teaching and learning that integrates science, technology, engineering and mathematics. The objective of STEM teaching and learning is to present students with real world, authentic problems to solve. It encourages teachers and students to see the interaction between the four disciplines and to approach teaching and learning with these connections in mind. The STEM approach is a combination of “hands on” and “minds on” learning that encourages the teaching of problem solving and critical thinking. An emphasis on design and problem solving allows students to use cross-disciplinary tools for discovery and for developing solutions to problems that are open-ended. STEM education creates critical thinkers, increases science literacy, and enables the next generation of innovation. Innovation leads to new products and processes that sustain our economy. This innovation and science literacy depends on a solid knowledge base in the STEM areas. Studies indicate that most jobs of the future will require a basic understanding of mathematics and science (Fayer et al.,2017). In fact, according to the U. S. Department of Commerce (2017), STEM occupations are growing at 24.4, while other occupations are growing at 4%. STEM degree holders have a higher income even in non-STEM careers (Wang et al., 2016). Science, technology, engineering and mathematics workers play a key role in the sustained growth and stability of the U.S. economy, and are a critical component to helping the U.S. win the future. Despite these compelling facts, mathematics and science scores on average among U.S. students are lagging behind those of students in other developing countries.

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In order to compete in a global economy, STEM education and careers must be a priority. By introducing students to STEM at an early age and allowing them to engage in activities that show real-life applications of STEM, we can begin to bridge the gap and help show how they benefit our society.

Elementary Teacher Development in STEM

Currently, most teacher education programs prepare elementary teachers to teach all subject areas within the curriculum (Li, 2008; Schwartz & Gess-Newsome, 2008). With their generalist background, elementary teachers typically take few content courses in STEM subjects (Weiss et al., 2001). The 2000 National Survey of Science and Mathematics Education found that elementary teachers' perceptions of their content preparation were significantly lower in science than other subjects, with only 18-29% of elementary teachers considering themselves to be very well qualified to teach science compared to 52-67% when asked about social studies, mathematics, and reading/language arts (as cited in Weiss et al., 2001). In addition to a lack of learning experiences in STEM subjects, many students who enter elementary teacher education programs have had negative learning experiences in their own mathematics or science courses leading to insecurities, anxiety, and negative attitudes towards STEM subjects (Amato, 2004; Jarrett, 1997; Philippou & Christou, 1998). Teacher candidates' attitudes towards STEM subjects affect their attitudes towards teaching those subjects and the ways they will teach in the future (Appleton & Kindt, 2002; Bursal & Paznokas, 2006; Goulding et al., 2002; Jarrett, 1997). Elementary teachers' negative attitudes toward STEM subjects can lead to reduced time spent teaching science and mathematics, increased reliance on textbooks, and teaching approaches that are less focused on engaging students in authentic inquiry-based activities (Appleton & Kindt, 2002).

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In teacher preparation programs, methods courses can play an important role in addressing conceptual understanding and attitudes toward STEM for beginning elementary teachers. Margot & Kettler (2019) found that when beginning teachers participate in hands-on STEM learning experiences they develop increased confidence and self-efficacy as STEM teachers. For example, Cantrell, Young, & Moore (2003) examined the self-efficacy of teacher candidates when teaching science and found that the largest improvements occurred when teacher candidates engaged in hands-on, inquiry related experiences. Bleicher (2007) also found significant correlations between changes in elementary teacher candidate science conceptual understandings and their self-efficacy beliefs when participating in a science teaching methods course focused on supporting conceptual understanding through a hands-on, minds-on approach. Similarly, Amato (2004) found improved attitudes toward mathematics in teacher candidates who were given the opportunity to develop conceptual and relational understanding of mathematics through engaging in a collection of hands-on, real-world learning activities using a variety of tools and representations of mathematical ideas.

Providing opportunities to teach using authentic outdoor science activities can also lead to positive teacher development and self-efficacy. Carrier (2009) examined elementary teacher candidates' perceptions of science teaching self-efficacy during a science methods course in which they had the opportunity to teach science lessons to elementary students at an outdoor science camp. Carrier found that the teacher candidates' initial fears and lack of confidence regarding the teaching of science were reduced after seeing the elementary students' excitement and enthusiasm during the lessons. These examples suggest that providing opportunities for teacher candidates to experience success, first as learners, and then as teachers of mathematics and science, can support their development of both skill and comfort as STEM teachers

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Rural Schools in Alabama

In the United States, 18.7% of all students attend rural public schools (Showalter et al., 2019). However, in Alabama, more than half of all students attend school in a rural district (Showalter et al., 2019). This is the second highest rate in the nation (Showalter et al.,). Also, one out of five of the state's nearly 265,000 rural students live in low-income families (Showalter et al., 2019). Rural schools and districts in the state are among the nations largest, and instructional spending (about \$4,800 per pupil) and educator salaries (an average of just under \$50,000) are among the lowest. The state has the nation's lowest score for rural students in both 4th and 8th grade math (NAEP, 2016). Rural high school and rural non-white graduation rates are below average, and rural participation in AP courses is among the nations' lowest at 11.2%.

Lack of funding make it difficult for rural schools to attract and keep highly qualified STEM teachers and administrators (Sipple & Brent, 2008). State and federal incentives often lure professionals to urban schools where they may receive monetary bonuses or graduate tuition. Rural teachers with backgrounds in chemistry, physics, or calculus may be unable to teach these courses because the student body is too small to support advanced courses—or one teacher may require much preparation to teach multiple small classes.

One strategy that can bridge the gap between teaching in rural school settings and more affluent suburban areas is the formation of community partnerships. The partnerships provide teachers and students the opportunity to make connections with the content being taught, especially in the area of STEM education. Many colleges and universities are open to doing so because they can connect with potential students, and businesses are seeing increasing value in these partnerships in helping create the workplace of the future. STEM

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ecosystems are one way these partnerships are being formed. Through hard work and creativity, rural schools can have access to better STEM options than in the past.

Teacher Education and Field Experiences

Multiple studies in teacher education in the United States have linked fully prepared and certified teachers with successful classroom practices and student achievement (Danley, et al., 2020; Darling-Hammond, 2000; Darling-Hammond et al., 2002; Evertson et al., 1985; Greenburg, 1983; Haberman, 1984; Olsen, 1985). Wilson et al., (2001) found clinical experiences played an important role in teacher preparation and also asserted that it must be interwoven with coursework to be most effective. The National Commission on Teaching and America's Future (1996) further supported the claim that extensive clinical experience which complements and supports coursework is a critical component of teacher preparation. Furthermore, field experiences allow teachers to better understand the students' out- of-school experiences in order to effectively address them in their classrooms.

Field experiences are also important because pre-service educators enter teacher education programs with strong beliefs and values about teaching and learning, as they have been students for the majority of their lifetime (Darling-Hammond, 2006). These beliefs are unlikely to change unless students are offered experiences that “challenge their validity” (Feiman-Nemser & Buchman, 1987, p. 9). Marx (2004) argued that these types of field experiences are important given that, “the dominant face of the American teacher workforce is female, white and English speaking and one child in five was estimated to be the child of an immigrant, and almost 47 million people over the age of five living the U.S. were considered non-native speakers of English” (p. 36).

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Research suggests that using cross-cultural, community-based field experiences can potentially enhance teacher education programs because they give teacher candidates insight into students' lives outside of the school (Sleeter, 2008). Participation in multiple field experiences in areas such as rural and urban school districts as well as community-based programs has been regarded as a positive method of teacher preparation in that these placements often allow teacher candidates the opportunity to disrupt their own biases and to challenge the deficit paradigm (Sleeter, 2008). Sleeter (2008) suggested that teacher candidates also need training in the context in which they will be teaching.

Teacher candidates must be involved in the communities in which they are trained, not only in their individual schools, but also with families and community partners. Given the unique characteristics of urban, rural and suburban districts, teacher candidates need that exposes them and allows time for reflection on the communities in which they work. Oakes et al. (2006) also suggest that teacher candidates need to understand “local urban cultures, the urban political economy, the bureaucratic structure of urban schools and the community and social service support networks serving urban centers” (p. 229).

Methodology

This qualitative study utilized two separate sets of data. Data were collected from the teacher candidates and camp participants via their reflection journals, individual interviews, and focus groups. The data was analyzed following the procedures presented by Strauss and Corbin (1998) whereby open, axial, and selective coding was utilized to develop themes or categories. A second set of data were collected from the camp participants via surveys to determine the overall effectiveness of the camp.

Power Up with STEM Project

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Power Up with STEM was a partnership supported through a grant between a rural south Alabama electric company, a south Alabama university, NASA, and a local organization in the rural community that serviced low socio-economic students from diverse backgrounds in an afterschool capacity as well as a summer program. The local organization, along with the university's department of teacher education's professors and instructors, and teacher candidates developed two 6-day summer camps that focusing on STEM and energy education for children in grades 2nd through 5th. Students had the opportunity to explore several topics, through inquiry-based STEM activities, such as the concepts of energy, their use, and the impact on the community, environment, economy, and society. According to the National Assessment for Educational Progress (NAEP, 2016), low socio-economic status students demonstrated a 28% gap in applying science, technology, engineering, and mathematics skills to real life situations and problems compared to students who come from more affluent backgrounds. The Power Up for STEM camp provided students the opportunity to learn through STEM and acquire the tools needed to develop the 21st Century skills that have been identified as skills necessary for students to have future success in our new, global workforce. The learning objectives were designed to develop students' skills as:

- **Problem-solvers** — define questions and problems, design investigations to gather data, collect and organize data, draw conclusions, and then apply understandings to new and novel situations.
- **Innovators** — creatively use science, mathematics, and technology concepts and principles by applying them to the engineering design process.
- **Inventors** — recognize the needs of the world and creatively design, test, redesign, and then implement solutions (engineering process).

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- **Self-reliant** — use initiative and self-motivation to set agendas, develop and gain self-confidence, and work within time specified time frames.
- **Logical thinkers** — apply rational and logical thought processes of science, mathematics, and engineering design to innovation and invention.
- **Technologically literate** — understand and explain the nature of technology, develop the skills needed, and apply technology appropriately.

Planning Stage

After being awarded the grant for the STEM summer camp, the co-facilitators planned the dates for sessions A and B of the camp. The teacher candidates enrolled in the Pre-Teacher Education Program block of courses for the summer and completed their field experience requirements through working with the STEM camp. The Natural Energy STEM curriculum was utilized for the teacher candidates to build their lessons and activities. The content from the curriculum was aligned with state and national science standards. Once the semester began, teacher candidates were oriented and trained on how to use the Natural Energy STEM curriculum to develop and write their lessons and activities based upon the edTPA guidelines. Other teacher education faculty was utilized to plan out the other requirements of their particular courses. This allowed for true integrated and authentic learning to occur. After the teacher candidates wrote their lessons, they gathered the necessary materials and supplies that were needed to carry out their lessons and began to prepare for the implementation stage.

Implementation Stage

During implementation, the teacher candidates worked collaboratively in small groups to set up their station and teach their lessons or activities to the camp participants. The camp participants rotated through the different stations. The teacher candidates were responsible for

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the STEM lessons as well as any classroom management routines and procedures that the camp participants were required to follow. During the implementation stage, the camp participants were treated to presentations by the local energy company as well as a presentation from NASA. The teacher candidates were required to keep a journal and reflect on their experiences from each day of the camp. The university faculty used discussions and/or reflections within their courses with the teacher candidates to evaluate their strengths and weaknesses and to use the discussions as teachable moments to further the teacher candidates' learning experience.

Impact of Project

It is clear that the Power Up for STEM summer camp provided camp participants the opportunity to explore and learn about energy and how it impacts our society, economy, and environment through an inquiry based, hands-on approach. Camp participants were interviewed about their camp experience and based upon the interviews three themes emerged: fun, engaging, and girls and STEM. Most of the comments centered on the themes fun and engaging. For example one camp participant stated that *"the camp was fun and I liked doing all of the activities."* Another participant interviewed stated, *"the camp was fun. I learned to make s'mores from pizza boxes."* Several female camp participants commented that it was fun that they could *"get up and do things that boys get to do, but we do it a little better."* Another female participant stated, *"I like to learn to do the same things that the boys get to do."* Based upon the camp participant interviews and the comments that were made, the Power Up for STEM camp had a positive impact on the students. It was evident that the students liked learning through an integrated approach that allowed them to explore and investigate without fear of failing.

The teacher candidates that were involved in the Power Up for STEM camp participated in interviews and a focus group to discuss their experiences related to the camp. Their responses

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were categorized into the following themes: (1) relationships, (2) diversity, and (3) struggling/reflecting/improving as a teacher. Several teacher candidates discussed the fact that relationship building was the “key” to facilitating their lessons and activities. They felt the summer STEM camp created an environment where they could take time to get to know the camp participants and then engage them in curriculum. One teacher candidate stated *“You had to learn each student and figure out what learning style would work best for that particular student.”* Several teacher candidates also noted that *“working together as a team created a positive learning environment.”* Teacher candidates expressed their new found abilities of building relationships with students all while facilitating lessons. One teacher candidate explained *“by allowing us to build relationships with the camp participants, we were able to get to know what made each student tick and want to learn.”*

The second theme that emerged from the focus group was diversity. Facilitating lessons within a diverse student body can be a challenge. Teacher candidates were able to apply content from their university courses to take on this challenge. Various ages, cultures, soci-economic statuses were among the challenges that our teacher candidates were able to problem-solve within their learning communities. Several teacher candidates stated, *“You learn to talk about the differences and work through it.”*

The third theme that came from the focus group was struggling/reflecting/improving as a teacher. Teacher candidates were able to struggle/reflect/ and improve their instruction by trial and error. Teacher candidates stated, *“Throwing us in there and allowing us to sink or swim really helped.”* Time Management was a common area all teacher candidates felt that was a weakness that developed within the theme of struggling/reflecting/improving. Teacher candidates self-reflected and improved their practice when given a second opportunity during the

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second section of the STEM camp. Teacher candidates stated, *“You have to just work through the challenges and make it work.”*

As faculty, we had a pre-conceived notion that having the pre teacher education program (Pre-TEP) teacher candidates facilitate lessons pertaining to STEM may not have been the best idea due to the fact that they have had little training relating STEM. The Pre-TEP teacher candidates are students taking foundational education courses and have not been admitted into the teacher education program. However, the teacher candidates stated, *“Having the opportunity to “sink” or “swim” without fear of failure was a “relaxing experience.”* They also stated, *“this was one of their favorite placements and they would gladly work the summer STEM camp again.”*

Power Up with STEM Project Evaluation

In order to determine the effectiveness of the project, an end of camp ten question survey was administered to all camp participants. The survey consisted of questions that focused on participants' opinions of the camp, including the lessons, hands-on activities, did they learn something new, and would the participant like to participate in a STEM camp again. The results of the survey indicated that the participants overwhelmingly liked the STEM camp and would want to participate in another one. While the participants liked all the lessons and activities, the survey indicated that their favorite lesson and activity was on solar energy and creating a solar oven to roast s'mores. The results also indicated that the camp allowed the participants to learn something new and increased their interest in STEM. The survey results also indicated that the camp participants would like to work in smaller group settings and for the camp to be longer each day.

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The results of the survey, as well as the lessons learned from the teacher candidates provide meaningful information on what the stakeholders would need to rethink or change if we were to offer a STEM camp again. One change that would be made would be to group the camp participants into smaller groups so that classroom management could be more manageable. The smaller group sizes would also provide the camp participants the opportunity to have a more engaging experience. A second change that would be made is to provide time to allow the camp participants to showcase what they had learned from the camp experience through a team project and presentation.

Conclusion

The Power Up for STEM camp was a success for both the local organization and the University. The camp participants were afforded the opportunity to learn about science and STEM in a inquiry based, hands-on approach that provided opportunities for student to become real world problem solvers. The University teacher candidates also learned about teaching through real world application. In order to meet the needs of our global workforce, teacher candidates need to be provided field experiences that are authentic and provide opportunities for meaningful learning and engagement. By allowing teacher candidates to be immersed in every aspect of the camp, from planning and preparation to implementation, they were able to experience all facets of teaching. As well, the teacher candidates became comfortable with teaching STEM using an integrated approach rather than teaching content in silos. By allowing the teaching candidates to gain experiences and become comfortable with this approach, we are hopeful it will translate to their own classrooms one day.

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**Physical Education Cooperating Teacher Participation and Beliefs as a Student
Teacher Supervisor**

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Abstract

Identifying ideal student teaching placements for physical education preservice teachers includes understanding the placement context and recognizing the practices and beliefs of the cooperating teacher. This study aimed to design and examine the use of a standardized measurement instrument to help identify ideal physical education cooperating teacher placements and support the cooperating teacher for their supervisory role. Specifically, by establishing how physical education cooperating teachers participate and how they believe cooperating teachers should participate during the student teaching experience. The survey instrument from this study could be used as a tool to recruit and retain physical education cooperating teachers who are successful matches for a physical education teacher education program and student teachers.

Keywords: student teaching, field experience, physical education teacher preparation

The importance of the capstone student teaching experience is well documented and has been identified as “a central component of nearly every U.S. teacher education program” (Rozelle & Wilson, 2012, p. 1196). It is believed that preservice teachers learn most from the teaching practice elements of teaching training courses where they get to engage with experienced teachers on a day-to-day basis (Keay, 2007). For field experience placements to benefit preservice teachers, they should be well planned in positive learning environments with quality educational professionals and institutions (Bernhardt & Koester, 2015).

Currently, many teacher preparation programs are tasked with responding to different field placement and field experience challenges (i.e., identifying quality cooperating teacher (CT) assignments, diverse contextual placements). However, there seems to be a lack of systematic approaches to evaluate the impact and implications of these various preparation program initiatives at the program or institution level. Information about student teaching placement alignments between the CT and preparation program would help further identify and overcome field placement challenges. As a result of these challenges, an effort is currently underway to standardize a survey instrument (called the Physical Education Cooperating Teacher Participation & Beliefs Survey) to identify the participation and beliefs of physical education cooperating teachers (PECTs) during their supervisory role. This development effort is motivated by the need for a standardized measurement instrument to identify ideal PECT placements for the student teaching experience and support the PECT for their supervisory role.

The developed instrument is primarily built off the work of Clarke and colleagues (2014) seminal work studying CTs. Clarke et al. (2014), in their review of 60 years of literature, identified 11 teacher educator roles CTs might participate in throughout the student teaching experience: (a) *Providers of Feedback*- The role of providing information regarding aspects of

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the student teacher's performance or understanding, (b) *Gatekeeper of the Profession*- The role of providing both formative and summative assessment of student teachers, the latter of which plays a significant role of student teachers' entry into the profession, (c) *Modeler of Practice*- The role of modeling teaching practice for student teachers, (d) *Supporter of Reflection*- The role of encouraging and engaging student teachers in reflective practice, (e) *Purveyor of Context*- The role of providing context for the student teacher as well as the often-hidden dimensions of K-12 teaching, (f) *Convener of Relation*- The role of building and maintaining a working relationship with the student teacher, (g) *Agent of Socialization*- The role of socializing student teachers into the teaching profession, (h) *Advocate of the Practical*- The role of providing first-hand knowledge of the day-to-day workings of a classroom, a dimension of teaching that is important to successful classroom practice, (i) *Gleaner of Knowledge*- The role of serving as a CT is an increase in one's own professional knowledge because of the interaction with student teachers, (j) *Abider of Change*- The role of making changes in day to day duties, responsibilities and educator role to accommodate the student teacher who is to be a part of or taking a leadership role in their classroom environment, and (k) *Teacher of Children*- The role of being a K-12 teacher.

The primary purpose of this study was to develop and test an instrument to measure the extent to which PECTs participate in the 11 teacher educator roles identified by Clarke and colleagues (2014) and determine PECTs' beliefs about the importance of each of these roles and present the results of this pilot study for the first time. The empirical testing sought to determine the (a) level of PECTs' participation in the 11 identified teacher educator roles during the student teaching experience, (b) the level of importance PECTs believe PECTs should participate in these roles during the student teaching experience, and (c) if there is a relationship between

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participation and beliefs of PECTs regarding the teacher educator roles. These findings will offer PETE programs an informed perspective of how to best identify, prepare and support PECTs for their supervisory roles during the student teaching experience.

Methods

Instrumentation Development

The instrument developed for this study, the Physical Education Cooperating Teacher Participation & Beliefs Survey (Appendix A), was created based on work from the Clarke et al. (2014) review of the literature. Dillman, Smyth, and Christian's (2009) tailored design method was used to develop the electronic survey instrument and data collection process. PECTs were asked to indicate their level of agreement of their level of participation in the 11 identified roles of a teacher educator on a five-point Likert-type scale, Level of Agreement (1= Strongly Disagree, 2= Disagree, 3=Neither Agree nor Disagree, 4= Agree, 5= Strongly Agree) (Vagias, 2006), (See Appendix A). Participants were also asked to indicate how important they believe the identified teacher educator roles are for PECTs to participate in during the student teaching experience (1= Strongly Disagree, 2= Disagree, 3=Neither Agree nor Disagree, 4= Agree, 5= Strongly Agree), (Vagias, 2006), (See Appendix A).

The survey instrument includes four sections. Section One of the survey collected demographic information. Section Two of the survey asked for PECTs to identify the extent to which they believed they participate in the 11 teacher educator roles during the student teaching supervisory experience (e.g., I participate in being a provider of feedback). Section Three asked for PECTs to identify the extent to which they believed the 11 teacher educator roles are essential roles for PECTs to partake during the student teaching experience (e.g., I believe CTs should be providers of feedback). Both Section Two and Three of the survey used a 5-point

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Likert scale, ranging from *Strongly Disagree (1)* to *Strongly Agree (5)* using positively-phrased items. Section Four of the survey included a question regarding why participants selected their particular ratings.

To establish content and face validity, one university professor, who has extensively published research surrounding field experiences and CT literature, along with two PECTs, critiqued the readability, clarity, conciseness, and layout of each section of the survey, which contributed to content validity evidence (DeVellis, 1991). A preliminary calculation of internal consistency and reliability was calculated for the combined and individual subscales using Cronbach's alpha (α) for Section Two and Section Three of the survey. Table 1 presents the Cronbach's alpha for the survey instrument, suggesting internal consistency, ranging from .520-.829. One potential theory for the difference in the alphas for each educator role construct is potentially partly due to the lack of understanding and familiarity of the language used in the survey. For example, PECTs' general understanding of the role of 'Advocates of the practical' is likely to be murkier than their understanding of the role of 'Provider of Feedback.' A definition list of the 11 teacher education roles was added to the survey for PECTs to review and reference while completing the survey to support any confusion or uncertainty about the language used in the survey instrument.

Data Collection

Upon Institutional Review Board approval, the lead researcher sent an email request to 180 PETE program coordinators across the United States, asking the coordinators to send the participation email invitation to their PECT contacts. Additionally, the request was sent to 41 Society of Health and Physical Educators (SHAPE) state-level organizations' presidents, requesting the survey invitation be distributed to their member contact list. It is unknown how

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many PECTs received the survey from the respective PETE program coordinator or SHAPE affiliate; therefore, a response rate is unidentified.

Data collection took place in the fall of 2017, resulting in the completion of 131 surveys. While 184 participants started the survey, only completed surveys were retained for analyses, resulting in a 71.2% completion rate of those who started the survey ($n = 131$). During analysis, 13 data sets were unusable due to questions being misinterpreted. Examples of misinterpretation included participants not reading the rating scales correctly by marking low levels of participation or low levels of agreement, and then contradicting the rating scales by providing descriptions and examples of high levels of agreement and participation in the teacher educator roles in the open-ended response question on the survey. Two of the participants who misinterpreted the rating scale were contacted to see if they did answer incorrectly. Both of the PECTs confirmed answering the rating scales incorrectly. The assumption was made for the remaining 11 survey results as also misinterpreted and were not calculated in the data analysis. Once the data set was cleaned, 118 survey responses were usable for analysis, resulting in a 64.1% usable rate.

Participants

The participants of this study consisted of 118 physical education teachers (57% female, 43% male; $M_{\text{age}} = 47$) who served as student teaching PECTs across 14 of the United States within the past 10 years. Of all participants, 89% had over 10 years of teaching experience, 83% held at least a Master's degree, 51% had mentored more than 10 student teachers, and 22% had received formal training to become a PECT. General demographics and characteristics of the respondents are summarized in Table 2.

Data Analysis

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Upon completion of data collection, the quantitative data were analyzed using the newest available version of Statistical Package for the Social Sciences (SPSS). Descriptive statistics were used to analyze demographic and individual response item data to understand the data. Summated means (grand means) were calculated for the Spearman correlation. The Spearman correlation evaluates the relationship between two continuous or ordinal variables and is based on the ranked values for each variable rather than the raw data (Hauke & Kossowski, 2011). An alpha level of 0.05 is deemed appropriate and acceptable for computing bivariate correlations. Additionally, Cronbach's alpha coefficients were calculated after collecting surveys from the sample to determine reliability. Reliability coefficients ranged from $\alpha=1$ to $\alpha=.7$ to be considered acceptable to excellent (George & Mallery, 2003).

Results

To answer research question one, *What level of participation of the 11 identified teacher educator roles do PECTs participate in during the student teaching experience?*, the analysis included descriptive statistics (measures of central tendency) for each of the 11 constructs. PECTs reported level of participation was (GM=4.59, SD= .379) in the 11 teacher educator roles during the student teaching experience. Table 3 presents the individual role category results. Table 3 shows that, on average, the respondents do participate in all 11 teacher educator roles. Furthermore, PECTs participation in the role of 'Modelers of Practice' (M=4.87, SD= .365) compared to participation in 'Conveners of Relation' (M=4.28, SD=.759) would suggest that PECTs report participating more strongly as 'Modelers of Practice' M=4.87 than as 'Conveners as Relation' M=4.28. However, these differences between 'Agree=4' and 'Strongly Agree =5' still suggest that the PECTs are reporting to participate in those roles. There is a larger deviation on the scale for the role 'Teachers of Children' (SD=.891) and 'Gatekeepers of the Profession'

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(SD=.816), meaning that the differences in responses to these two items were more prominent compared to the other nine items.

To answer research question two, *What level of importance do PECTs believe PECTs should participate in the 11 identified teacher educator roles during the student teaching experience?*, the analysis for this question included descriptive statistics (measures of central tendency) of the 11 constructs. PECTs reported level of beliefs about participating in the 11 categories was (GM=4.65, SD=.392). Table 4 presents the individual role category results. Table 4 displays that the respondents believe that all 11 teacher educator roles are important for PECTs to participate in during the student teaching experience. Additionally, PECTs beliefs about the importance of PECT participation in the role of ‘Modelers of Practice’ (M=4.83, SD= .396) compared to participation in ‘Conveners of Relation’ (M=4.42, SD=.749) would suggest that PECTs believe PECT participation is more important as ‘Modelers of Practice’ (M=4.83) than as ‘Conveners of Relation’ (M=4.42). However, the differences between ‘Agree=4’ and ‘Strongly Agree =5’ still suggest that the PECTs still believe all 11 teacher educator roles are important for PECTs to participate. There is a larger deviation on the scale for the role, ‘Teachers of Children’ (SD=.918), meaning that the differences in responses to this item were more significant than the other ten items, which will be further discussed in the subsequent section of the chapter.

To answer research question three, *Is there a relationship between participation and beliefs of PECTs regarding the 11 identified teacher educator roles?*, the analysis employed a Spearman’s correlation to measure the relationship between the PECTs level of participation and beliefs. Correlations were statistically significant and are reported in Table 5. The results suggest that 11 out of 11 correlations were statistically significant for the Spearman’s correlation. For example, a PECTs who reports ‘4=Agree’ to participate as a ‘Supporter of Reflection’ will most

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likely, with a high probability, also report to '4-Agree' that the role of 'Supporter of Reflection' is important for PECTs to engage in during the student teaching experience. In summary, PECTS participation level was found to be a strong conjecturer of PECTs belief levels.

Discussion

Results indicate that PECTs report participating in all 11 teacher educator roles. The average level of PECT participation in the 11 teacher educator roles was $GM=4.59$. Concluding, on average, the respondents agree to participate in the 11 teacher educator roles during the student teaching experience. This study discloses PECTs' perceptions regarding the level of participation in teacher educator roles during the student teaching experience. The findings are consistent with Clarke and colleagues (2014), who suggested the 11 ways CTs participate during the student teaching experience. In the present study, such participation included; Providers of Feedback, Gatekeepers of the Profession, Modelers of Practice, Supporters of Reflection, Gleaners of Knowledge, Purveyors of Context, Conveners of Relation, Agents of Socialization, Advocates of the Practical, Abiders of Change and Teachers of Children.

Similarly, the PECTs beliefs about participating in the 11 categories on average were $GM=4.65$. Conclusively, the PECTs agree to believe that PECTs should participate in the 11 teacher educator roles, consistent with Clarke et al. (2014) that reported the 11 ways in which CTs participate during the student teaching experience. Understanding teachers' belief structures are critical to improving teacher education programs and teaching practices (Pajares, 1992; Calderhead, 1996). Richardson (1996) states that "attitudes and beliefs are important concepts in understanding teachers' thought processes, classroom practices, change, and learning to teach" (p.102). Whether positive or negative, the beliefs of the CT will determine the development of the preservice teacher (Hewson, et al., 1999). Thus, understanding teachers' beliefs, specifically

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PECTs beliefs, will help understand their classroom practices and potentially their supervisory practices. For teacher education and professional development programs to be successful, CTs' beliefs about teaching and learning should be considered (Verloop, Van Driel, & Meijer, 2001). Researchers have proposed models of teacher education that more fully integrate doing and knowing as preservice teachers learn (van Velzen, Volman, Brekelmans, & White, 2012; Zeichner, 2010). As student teachers follow their CTs example and model of practice in how they engage in their educator role, they are working within a template for practice set before them. While initial attempts appear more like mimicking, student teachers use the template from their CT to hone in on their own teaching style and persona. PETE programs should be aware of the beliefs of the PECTs with whom their student teachers associate to make sure the PECTs beliefs of their role align with the PETE programs' beliefs of the PECTs role.

This study explored the relationship between the participation and beliefs of PECTS regarding the 11 identified teacher educator roles to answer the call for further investigation into studying the degree to which beliefs influence the nature of teachers' actions (Tsangaridou & O'Sullivan, 2003). In the daily practice of teaching, beliefs play a significant role in shaping teachers' behavior. This study indicates that a strong relationship exists between the practices and beliefs of PECTs about their role in supervising student teachers. It was not surprising to see high correlations between PECTs' reported levels of participation and beliefs, as teachers' beliefs are understood to profoundly influence their classroom practices (Amaral-da-Cunha et al., 2018; Kuzborska, 2011). If PECTs are going to participate and engage in specific responsibilities when supervising a student teacher, they need to believe the roles are important.

The study's results indicate that the level of education and the number of student teachers do not affect how the PECTs participate or their beliefs about how PECTs should participate

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during the student teaching experience. Moreover, 22% of the participants in this study received formal training before beginning their supervisory role. With only 22% of PECTs receiving formal training, there could be a vast knowledge gap or disconnect with the needs of each constituency.

Limitations and Future Research

The findings of this study represent information from 118 survey responses, which is a small sample compared to the number of PECTs in the United States. A second limitation includes threats to internal validity due to the nature of self-reporting. The self-reporting of the PECTs' participation and beliefs could have been inaccurate due to the possibility that PECTs may have responded with socially desirable answers.

Continued research into validating an objective measure or mechanism to identify if PECTs have done their role well would further support a deep understanding of the PECT role. This topic is critical as PECTs offer one of the most valued academic experiences for physical education majors. Validating this survey instrument for future use would be helpful to the PETE faculty so they may target ideal professional development for PECTs. The current study has implications for PETE programs to incorporate the PECT Practice and Beliefs Survey to identify ideal PECTs. By conducting a confirmatory factor analysis of the PECT Practices and Beliefs Survey instrument could permit the survey to be used as a tool in the recruitment and retention of PECTs who are successful matches for PETE programs and student teachers. Likewise, this survey instrument could potentially be piloted for other content areas and for use in other countries. Further research in this area is needed before this complex and multifaceted role can be completely understood. Beyond the understanding of the role, continued research can help

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identify the support structures required to assist PECTs throughout the student teaching experience.

Conclusion

This study attempted to answer the call from Clarke et al. (2014), who noted “without a clear understating of how CTs participate- or are expected to participate- in teacher education, it is difficult to know how best to support or facilitate that work” (p. 164.). Building off and contributing to the research on CTs, this study identifies and highlights how some PECTs in the United States participate and their beliefs of 11 teacher educator roles. The PECTs in this study confirmed that they participate in numerous teacher educator roles during the student teaching experience, and they believe PECTs should participate in the roles. There is a relationship between their participation and beliefs about the roles.

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Table 1*Categories, Number of Items, and Internal Consistency of Researcher-Designed Instrument*

| Category | Number of items | Alpha ^a |
|-------------------------------|-----------------|--------------------|
| Providers of feedback | 2 | .829 |
| Gatekeepers of the profession | 2 | .807 |
| Modelers of practice | 2 | .649 |
| Supporters of reflection | 2 | .680 |
| Gleaners of knowledge | 2 | .718 |
| Purveyors of context | 2 | .675 |
| Conveners or relation | 2 | .882 |
| Agents of socialization | 2 | .683 |
| Advocates of the practical | 2 | .520 |
| Abiders of change | 2 | .858 |
| Teachers of children | 2 | .804 |

^aαCronbach's alpha. Scale: >.9 = Excellent, >.8 = Good, >.7 = Acceptable, >.6 = Questionable, >.5 = Poor and <.5 = Unacceptable (George & Mallery, 2003). ^bn=3.

Table 2
Summary of Demographic Characteristics for Online Survey (N = 118)

| Characteristic | n | % |
|------------------------------|----|------|
| Gender | | |
| Male | 51 | 43.2 |
| Female | 67 | 56.8 |
| Age | | |
| 20-29 | 3 | 2.5 |
| 30-39 | 27 | 22.9 |
| 40-49 | 39 | 33.1 |
| 50-59 | 37 | 31.4 |
| 60-65 | 12 | 10.2 |
| Teaching Level | | |
| Elementary School | 69 | 58.5 |
| Middle School | 35 | 29.7 |
| High School | 41 | 34.7 |
| School Location | | |
| AZ | 7 | 5.9 |
| CA | 1 | .8 |
| CO | 33 | 28 |
| GA | 1 | .8 |
| HI | 1 | .8 |
| ID | 3 | 2.5 |
| IL | 1 | .8 |
| KS | 2 | 1.7 |
| ND | 1 | .8 |
| NM | 1 | .8 |
| NY | 61 | 52 |
| OK | 1 | .8 |
| SD | 4 | 3.4 |
| UT | 1 | .8 |
| Education Level | | |
| Bachelor's Degree | 19 | 16.1 |
| Master's Degree | 98 | 83.1 |
| Doctorate Degree | 1 | .8 |
| Years of Teaching Experience | | |
| >5 years | 2 | 1.7 |
| 6-10 years | 10 | 8.5 |
| 11-20 years | 50 | 42.4 |
| 21-30 years | 36 | 30.5 |
| 31-40 years | 19 | 16.1 |
| >40 years | 1 | .8 |
| Number of Student Teachers | | |
| 1 | 12 | 10.2 |
| 2-5 | 46 | 39 |
| 6-10 | 31 | 26.3 |
| 11-15 | 16 | 13.6 |
| 16-20 | 7 | 5.9 |
| 21-25 | 3 | 2.5 |
| >25 | 3 | 2.5 |
| Received Formal Training | | |
| Yes | 26 | 22 |
| No | 92 | 78 |

[Type here]

Table 3
Means and Standard Deviations for PECTs' Participation

| Category | M | SD |
|-------------------------------|------|------|
| Providers of Feedback | 4.67 | .509 |
| Gatekeepers of the Profession | 4.33 | .816 |
| Modelers of Practice | 4.87 | .365 |
| Supporters of Reflection | 4.72 | .507 |
| Gleaners of Knowledge | 4.49 | .613 |
| Purveyors of Context | 4.79 | .451 |
| Conveners or Relation | 4.28 | .759 |
| Agents of Socialization | 4.75 | .472 |
| Advocates of the Practical | 4.49 | .613 |
| Abiders of Change | 4.54 | .668 |
| Teachers of Children | 4.59 | .891 |

Table 4
Means and Standard Deviations of PECTs' Beliefs

| Category | M | SD |
|-------------------------------|------|------|
| Providers of Feedback | 4.74 | .441 |
| Gatekeepers of the Profession | 4.55 | .665 |
| Modelers of Practice | 4.83 | .396 |
| Supporters of Reflection | 4.82 | .410 |
| Gleaners of Knowledge | 4.64 | .533 |
| Purveyors of Context | 4.77 | .446 |
| Conveners or Relation | 4.42 | .749 |
| Agents of Socialization | 4.79 | .408 |
| Advocates of the Practical | 4.66 | .528 |
| Abiders of Change | 4.52 | .718 |
| Teachers of Children | 4.43 | .918 |

Table 5
Correlation of PECTs' Practice to Beliefs

| Category | Spearman's Correlation |
|-------------------------------|------------------------|
| Providers of Feedback | .748** |
| Gatekeepers of the Profession | .687** |
| Modelers of Practice | .580** |
| Supporters of Reflection | .581** |
| Gleaners of Knowledge | .580** |
| Purveyors of Context | .582** |
| Conveners or Relation | .789** |
| Agents of Socialization | .552** |
| Advocates of the Practical | .461** |
| Abiders of Change | .695** |
| Teachers of Children | .634** |

**Correlation is significant at the 0.05 level (2-tailed).

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APPENDIX A

PHYSICAL EDUCATION COOPERATING TEACHER PARTICIPATION AND BELIEFS SURVEY

-WITH SKIP LOGIC DIRECTIONS EMBEDDED

(Consent Form has been signed). Please confirm that you are or have been a physical education cooperating teacher in the past 1-10 years. (Yes-continued participation in survey, if No-individual is thanked for their time).

This online survey consists of 15 questions, several of which have multiple parts. There are two questions which ask about your participation and beliefs in several teacher educator roles. Please review the definitions for each teacher educator role, before you begin the survey. Thank you again for your participation!

Definition of Terms

Providers of Feedback- *The role of providing information regarding aspects of the student teacher's performance or understanding.*

Gatekeeper of the Profession- *The role of providing both formative and summative assessment of student teachers, the latter of which plays a significant role of student teachers' entry into the profession.*

Modeler of Practice- *The role of modeling teaching practice for student teachers.*

Supporter of Reflection- *The role of encouraging and engaging student teachers in reflective practice.*

Purveyor of Context- *The role of providing context for the student teacher as well as the often-hidden dimensions of K-12 teaching.*

Convener of Relation- *The role of building and maintaining a working relationship with the student teacher.*

Agent of Socialization- *The role of socializing student teachers into the teaching profession.*

Advocate of the Practical- *The role of providing first-hand knowledge of the day-to-day workings of a classroom, a dimension of teaching that is important to successful classroom practice.*

Gleaner of Knowledge- *The role of serving as a CT is an increase in one's own professional knowledge because of the interaction with student teachers.*

Abider of Change- *The role of making changes in day to day duties, responsibilities and educator role to accommodate the student teacher who is to be a part of or taking a leadership role in their classroom environment.*

Teacher of Children- *The role of being a K-12 teacher.*

| Number | Question | Answer |
|--------|---|--|
| 1 | What is your age? | (Fill in answer) |
| 2 | Gender? | (Male or Female or Prefer not to answer) |
| 3 | What level of physical education do you teach? (Check all that apply) | (Elementary, Middle School, |

[Type here]

| | | | | | |
|---|--|---------------------------------------|--------------------------------------|-----------|--------------------------|
| | | High School, Other) | | | |
| 4 | Where is your school located (City, State) | (Fill in answer) | | | |
| 5 | What level of education have you completed? | (Bachelors, Masters, Doctorate) | | | |
| 6 | How many years of experience do you have as a physical education teacher? | (Fill in answer) | | | |
| 7 | How many student teachers have you mentored? | (Fill in answer) | | | |
| 8 | Please indicate the University(s) you have had student teachers from: | (Fill in the answer) | | | |
| 9 | Have you ever received formal training for your role as a cooperating teacher? | (Yes or No) | | | |
| 10 | (Skip Logic if answered Yes to number 9) If Yes, please indicate which university(s) or physical education teacher preparation program(s) provided the formal training? | (Fill in answer) | | | |
| 11 | Please describe your roles and responsibilities as a cooperating teacher. | (Fill in answer) | | | |
| 12 | PART ONE: Please indicate how you participate in the following categories of teacher education as a cooperating teacher: | | | | |
| | The level of agreement of Cooperating Teachers' Participation | | | | |
| | (1) Strongly Disagree | (2) Disagree | (3) Neither Agree nor Disagree | (4) Agree | (5) Strongly Agree |
| I participate in being a Provider of Feedback | O | O | O | O | O |
| I participate in being a Gate Keeper of the Profession | O | O | O | O | O |
| I participate in being a Modeler of Practice | O | O | O | O | O |
| I participate in being a Supporter of Reflection | O | O | O | O | O |
| I participate in being a Purveyor of Context | O | O | O | O | O |
| I participate in being a | O | O | O | O | O |

[Type here]

| | | | | | |
|---|--|-------------------------|---|-----------------------|-----------------------------------|
| Convenor of Relation | | | | | |
| I participate in being an Agent of Socialization | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I participate in being an Advocate of the Practical | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I participate in being a Gleaner of Knowledge | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I participate in being an Abider of Change | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I participate in being a Teacher of Children | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 13 | PART TWO: Please indicate how important you believe the identified teacher educator roles are for PECTs to participate in during the student teaching experience: | | | | |
| | The level of agreement of how Cooperating Teachers' believe Cooperating Teachers (CTs) should participate in Teacher Educator roles | | | | |
| | (1) Strongly Disagree | (2) Disagree | (3) Neither Agree nor Disagree | (4) Agree | (5) Strongly Agree |
| I believe CTs should be Providers of Feedback | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I believe CTs should be Gate Keepers of the Profession | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I believe CTs should be Modelers of Practice | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I believe CTs should be Supporters of Reflection | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I believe CTs should be | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

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| | | | | |
|---|--|-----------------------|-----------------------|-----------------------|
| Purveyors of Context | | | | |
| I believe CTs should be Convenors of Relation | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I believe CTs should be Agents of Socialization | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I believe CTs should be Advocates of the Practical | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I believe CTs should be Gleaners of Knowledge | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I believe CTs should be Abiders of Change | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I believe CTs should be Teachers of Children | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 14 | Please describe why you believe cooperating teachers should or should not participate in the previously mentioned teacher educator roles during the student teaching experience. | | | (Fill in answer) |
| 15 | Would you be available and interested in participating in a 40-45-minute interview to learn more about your experience and participation in teacher education as a cooperating teacher? If selected and interviewed, you will receive a \$25 gift card of your choice after the interview is completed | | | (Yes or No) |
| 16 | (Skip Logic- If answered YES to question 14) Please leave a phone number or email address in the space provided and someone will be in contact with you. Thank You! | | | (Fill in answer) |

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