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# Process Dimensions of Intervention Implementation: Evaluating the Quality of Professional Development Delivered to Teachers

Sarah Petters Fletcher

*Louisiana State University and Agricultural and Mechanical College, sarahpfletcher@gmail.com*

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PROCESS DIMENSIONS OF INTERVENTION IMPLEMENTATION: EVALUATING THE  
QUALITY OF PROFESSIONAL DEVELOPMENT DELIVERED TO TEACHERS

A Dissertation

Submitted to the Graduate Faculty of the  
Louisiana State University and  
Agricultural and Mechanical College  
in partial fulfillment of the  
requirements for the degree of  
Doctor of Philosophy

in

The Department of Psychology

by

Sarah Petters Fletcher  
B.S., Tulane University, 2006  
S.M., Harvard School of Public Health, 2008  
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## ABSTRACT

It is well-established that having a high-quality teacher can lead to long-lasting, significant effects on students' achievement. We know that teacher effectiveness reliably has an impact on student outcomes, but what impacts teacher effectiveness? One regularly recommended and prominent method for improving teacher effectiveness is through coaching. However, to date, the active components of coaching interventions have yet to be adequately specified, measured and investigated. The primary aim of the proposed study is to address this gap in the teacher coaching literature by examining which aspects of a coaching intervention, Making the Most of Classroom Interactions (MMCI), may lead to greater improvements in teacher effectiveness. More specifically, this study examined the influence of three process dimensions of coaching (i.e., coaching quality, ability to engage teachers, and rapport) on teachers' practice above and beyond other salient contributors to teacher effectiveness, such as content dimensions of the coaching intervention implemented (i.e., fidelity and dosage), relevant demographic variables and teacher burnout and self-efficacy.

## INTRODUCTION

Just as teachers can make or break a student's year, teacher coaches can have a dramatic influence on a teacher's year. High-quality teachers are more important than ever, as students in America are performing below the median in international assessments of math and science. In some parts of the country, some students perform as high as students in the top-ranked countries in the world, while in other parts students perform as low as students in the lowest-ranked countries in the world (Darling-Hammond, 2000). It is well-established that having just one good teacher at critical points in a child's education can lead to long-lasting effects on that child's academic achievement. There are not just large disparities among student outcomes, but also in the effect of teacher quality as well. A one standard deviation increase in teacher quality has been found to increase reading scores by 0.20 standard deviations, and math scores by 0.24 standard deviations on a nationally standardized scale (Rockoff, 2004). Further, the impact of having a good teacher was more pronounced for students of lower socio-economic status than for higher socio-economic status (Nye, Konstantopoulos, and Hedges, 2004). This is not surprising given that "in a single day, an elementary school teacher may engage in more than a thousand interpersonal exchanges with students" (Brophy & Good, 2008. p. 17).

In this century, the idea that all school-aged children should have access to "highly qualified teachers" who receive "high quality" professional development was cemented into the public education landscape with the No Child Left Behind Act (Bush, G. W., 2001). Although "teacher quality" is such an urgent priority, it is generally conceptualized in two different ways: teacher quality defined as student achievement and teacher quality defined as teacher qualifications (Cochran-Smith & Fries, 2005), and these definitions have different implications

for how improvements in teacher quality should be designed. However, they are not mutually exclusive.

Evidence has shown that individual teachers are the single largest factor that adds value to student learning, overshadowing students' previous achievement, class size, ethnic and socioeconomic status (Rivers & Sanders 2002). These outcomes can extend further than just performance on test scores. Using school district and tax records for more than one million children, Chetty, Friedman, and Rockoff (2014) found that students assigned to teachers who were considered "high value added" were more likely to attend college, earn higher salaries, and were less likely to have children as teenagers. They also found that replacing a teacher whose value-added score is in the bottom 5 percent with an average teacher would increase the students' lifetime income by approximately \$250,000 per classroom. By viewing teacher quality through the student achievement lens, researchers and policy makers can examine differences in student achievement outcomes that are associated with teacher characteristics and suggest implications for policies based around the characteristics associated with improvement.

Other research demonstrates that student learning depends substantially on the capacity of teachers, and most importantly, on their preparation and certification (Darling-Hammond, 2000). Many methodological challenges exist in this literature, and primary among them is the difficulty in isolating a teacher's ability to impact student outcomes, given influences like characteristics of students and schools. Additionally, there is inherent selection bias, as there may be unobserved teacher characteristics that impact the types of education and training teachers choose to obtain, schools where teachers work, and subsequent performance of teachers in the classroom. Lastly, it is complex to collect data that provides details on the various types of education teachers obtain over their careers, and further linking that training to the impact on the

students the teachers are serving. However, in the research that has been done, the evidence is generally positive but mixed on the effects of teacher experience on student achievement.

According to Harris and Sass (2007), there is little to no evidence of the efficacy of advanced degrees of teachers, except for in the cases of middle school math teachers. The first few years of experience substantially increases the productivity of elementary and middle school teachers, but this level of experience has little impact on the effectiveness of high school teachers. Further two studies (Jacob & Lefgren, 2004; Harris & Sass, 2007) have found no positive effects of in-service professional development for elementary school teachers, but positive effects on math teachers at the middle and high school levels. This could be a result of increased exposure to content-focused training, while the other forms of in-service coursework teachers commonly participate in are focused on pedagogy.

Some research has found differences in where teachers are teaching that could be based on the qualifications of teachers. According to Wirt et al. (2001), public school teachers were almost twice as likely to have had SAT scores in the bottom quartile than in the top quartile. This ratio was almost flipped when compared with teachers in private schools, 33% of whose teachers scored in the top quartile. Twice as many teachers with GPAs below 2.75 were teaching in high-minority schools, according to Chen, Knepper, Geis & Henke (2000). This can lead to dramatic variations in the preparation and experience of school teachers, which can result in wide variations in the experiences of school children around the country. The teaching profession itself was historically one of the only professions open to women, and relatedly, the intellectual ability of teachers has been a central part of discussions around teacher quality. Teacher preparation was not a part of college or university programming until 1940. Expertise in subject matter aside, teachers have long been seen as possessing compensating personal qualities, like

altruism and idealism (Zumwalt and Craig, 2005b). The reality is that teaching requires a mix of intellectual and personal qualities. Howey and Strom (1987) suggested that teachers should be, “adaptable, questioning, critical, inventive, creative, self-renewing, and oriented to moral principles.” To date, there have not been any accurate methods of pre-selecting students who then become teachers to guarantee these outcomes.

It is no secret that teaching is an underpaid and often thankless job, which are only some of the reasons that may contribute to teachers leaving the profession. Some evidence points to the fact that teachers are leaving the profession in far higher numbers than are staying, and that non-retirement attrition is higher in the field of teaching than it is in other professions (like nursing, accounting, or social work; Borman & Dowling, 2008). More recent data indicates that teachers may be leaving the profession at slower rates than previously believed. According to results from the Beginning Teacher Longitudinal Study (Gray & Tale, 2015), among all beginning teachers in 2007-2008, 10 percent did not teach in 2008-2009, 12 percent did not teach in 2009-2010, 15 percent did not teach in 2010-2011, and 17 percent did not teach in 2011-2012. Some prior estimates of teacher attrition were around 30% within 5 years (Ingersoll, 2001), so these results are encouraging. For every teacher that leaves in the early years of teaching, the system never realizes the eventual payment from its investment in novice teachers and human resources. For instance, the Department of Labor estimates that attrition costs an employer 30% of the departing employee’s salary. A report published by the Alliance for Excellent Education (Bach, Walsh & Weathers, 2004) estimated that the cost of replacing public school teachers who dropped out of the profession to be nearly \$2.2 billion in the year 2000. Further, as we know that experience greatly enhances productivity of elementary and middle school teachers early in their careers, policies designed to promote the retention of young teachers in particular can yield significant

benefits over time (Harris and Sass, 2007). The ability of a school to attract, develop, and keep good teachers is a key lever in improving student outcomes.

Districts and states around the country are implementing programs to address this fact. California established the Beginning Teacher Support and Assessment (BTSA) Program, designed to mentor and retain new teachers. Results from this initiative indicated that while success rates were initially high, as the program was scaled up, implementation became uneven across the state, and that in some cases less than half of the participants in the program were seen by their mentor at least monthly. Instead, districts began providing orientation sessions and workshops rather than on-site coaching and mentoring which was judged to have been the most powerful component of the program (Shields et al., 2001). This is just one example of efforts around the country to use best practices of professional development and try to make them fit with the culture of their systems and teachers in their particular settings. Darling-Hammond (2003) stated,

Probably the most important thing a school administrator at the school or district level can do to improve student achievement is to attract, retain, and support the continued learning of well-prepared and committed teachers. When teachers have assembled the kind of training and experience that allows them to be successful with students, they constitute a valuable human resource for schools – one that needs to be treasured and supported if schools are to become and remain effective. While recruiting strong teachers is critically important, it is equally important to keep strong teachers, since attrition is a much greater problem in the overall teacher supply picture than is producing enough teachers to fill the nation's needs. School leaders need to understand the reasons for teacher attrition if they are to develop effective strategies for keeping their best teachers. (p. 2)

Finding ways to improve teacher effectiveness is one way to leverage resources to drive student achievement and improve student outcomes for students of all backgrounds. As the field of research on developing and keeping effective teachers grows, it will be crucial to understand what components of interventions lead to desired changes.

If the sources of early increases in novice teacher effectiveness can be attributed to on-the-job development, then more effective professional development and coaching provided to teachers can improve both student achievement outcomes as well as reduce the costs related to employee turnover by encouraging successful teachers to stay in the profession. With less teacher turnover, the teachers that do stay in the classroom would be of higher quality as they have more experience and have participated in more professional development. Investments in coaching interventions and professional development to improve teacher effectiveness could then be a high-efficiency cost expenditure for the district, by improving student outcomes and reducing costs of teacher turnover. Further, if investments in professional development are either not cost-effective or not impactful in either the distal outcomes of student achievement or teacher turnover, or the proximal outcomes of improving teacher effectiveness, it is important to determine which aspects of coaching and professional development interventions are key levers to improving outcomes.

The primary aim of the present study is to extend the literature on teacher effectiveness by examining which aspects of a coaching intervention may be the active ingredients that lead to greater improvements in teacher effectiveness. Specifically, this study will examine dimensions of treatment integrity (TI), the extent to which an intervention is implemented as prescribed (Gresham, Gansle, Noell, & Cohen, 1993), as they relate to a coaching intervention applied with a sample of teachers in public school districts throughout Louisiana. Despite present consensus that TI is a multi-dimensional construct, intervention research rarely measures aspects of the construct beyond adherence (the proportion of intervention components implemented). Therefore, a secondary aim of this study is to examine the influence of multiple dimensions alone and in combination on the outcomes of a teacher coaching intervention. The focus of this

study is on the process dimensions of TI (i.e., dimensions reflecting how well the intervention is delivered), as opposed to the content dimensions of TI (i.e., dimensions reflecting how much of the intervention is delivered), as there is a dearth of research on the influence of process dimensions (Durlak & Dupre, 2008).

### **Measuring Teacher Effectiveness**

Much of the research on teacher effectiveness is correlational, and teacher effectiveness as a dependent variable is often assessed through student academic performance outcomes. This is probably because the components of what makes an effective teacher are numerous, complicated, and conceptualized in many different ways for various students and school settings. Darling-Hammond, Wise, and Pease (1983) conducted a review of teacher evaluation methods. They argue that different conceptions of teaching practice imply different ways by which information is collected and judgments of worth are made about this information for purposes of evaluation. They conceptualize the work of a teacher in four ways: labor, craft, profession, and art (Mitchell & Kerchner, 1983). In this light, the labor of teaching is the act of planning lessons, organizing programmatically, and routinizing operating procedures for their classrooms. The craft of teaching is seen as requiring a repertoire of specialized techniques and generalized rules for their application. Viewing teaching as a profession implies that teachers not only have a repertoire of specialized techniques, but they use their judgment in the application of the techniques. If one views teaching as an art, teaching techniques are personalized rather than standardized, and calls for intuition, creativity and improvisation. These conceptions of teaching practice signal different visions of what success looks like for someone with the job of evaluating a teacher in a classroom. Teaching practice is clearly complicated, and therefore challenging to operationalize and evaluate.

The question of, “Who are the best teachers?” is difficult to answer. According to The New Teacher Project (Weisberg et al., 2009, p. 3), most school districts would report that, “almost every teacher is a great teacher, even at schools where the chance of succeeding academically amounts to a coin toss, at best.” The purpose of teacher evaluation systems is to provide meaningful information about teacher effectiveness, and it is apparent that many of the evaluation systems currently in use are not providing that information. A good evaluation system would identify and measure strengths and weaknesses so that the teachers know what areas they need to improve upon and districts and administrators know how to allocate their resources (Wei, 2015). Information about which teachers are good at their jobs should be an important part of common human resources decisions, like hiring, firing, retention and remediation. There are three general and commonly accepted methods of evaluating teacher effectiveness: student perception surveys, student achievement gains, and classroom observation instruments (Cantrell & Kane, 2013).

Surveys are less costly than other methods of evaluation and can easily be extended to non-tested grades and subjects. Burstein (1995) conducted a study where teachers were asked to complete surveys at two time points in a school year regarding their instructional practices. Over the course of the school year, 60% of the responses were exactly the same, and 90% were within one response category (i.e., “once or twice a week,” to “once or twice a month”). The researchers were able to compare their survey results to logs the teachers completed, and the correlations between logs and survey responses ranged from 0.21 to 0.65 depending on the task completed. However, it is important to note that because the logs were completed by the teachers, they did not constitute an external source for validating the surveys. More recent efforts have asked students themselves about their perceptions of the classroom instructional environment. This has

been a common practice in higher education, but has rarely been used in elementary and secondary education. The Tripod Survey (Bill & Melinda Gates Foundation, 2010) assessed the extent to which students experience the classroom as engaging, demanding, and supportive of their intellectual growth. Students were asked to agree or disagree with statements like, “My teacher knows when the class understands, and when we do not,” and, “When I turn in my work, my teacher gives me useful feedback that helps me improve.” The questions fell under seven constructs, called the Seven C’s: Care, Control, Clarify, Challenge, Captivate, Confer, and Consolidate. In the MET study findings, student perceptions of a given teacher’s strengths and weaknesses were consistent across different groups of students that they taught. Further, classrooms of students were able to clearly differentiate among their teachers, most clearly in their perceptions of their teacher’s ability to control a classroom and to challenge students with rigorous work (Kane & Cantrell, 2010).

The most prominent methods of teacher evaluations tend to fall in either one of two categories: summative or formative, and these are typically accomplished via the other two methods of evaluating student achievement gains or classroom observation instruments. Summative teacher evaluation is usually used for the purposes of administrative decision-making with respect to teacher certification, hiring, firing, promotion, tenure, and salary. Analysis of student achievement outcomes falls under this category. Observations, on the other hand, tend to fall into the category of formative assessments, as teachers should be able to change their practice soon after learning about their feedback. According to Millman (1982), formative teacher evaluation helps teachers improve their performance by providing data, judgments, and suggestions for what to teach and how.

Many teachers feel as if the sum of their job comes down to how well their students perform on a test. Methods like this may seem blunt, but there are ways to make it more nuanced. One way to determine which teachers are creating the most gains for their students is through value-added models (VAM). According to Gansle et al. (2015), VAM differs from traditional single-measurement assessments in that the extent to which their students' observed achievement is different from what would be predicted for them given information known about the student, classroom context, and their background. After controlling for other variables that make up a student's experience in school, this difference in observed score vs. expected score could be attributed to instruction, and that could be the basis upon which teachers are evaluated. The level of reliability of VAM frequently exceeds other methods of teacher evaluation practices, like observations. There are some downsides, however, in that some subjects will be broadly excluded or not comparable (i.e., foreign language), and some grade levels may be beyond the scope of coverage and their students may not participate in testing or have not participated in the year prior. There is also a debate about using this method for students with special needs, as it would be difficult to attribute one student's success to a single teacher (Gansle et al., 2015). Further, these methods are only helpful in identifying effective teachers and do not offer guidance on the practices responsible for their success (Kane, Taylor, & Wooten, 2011).

For those teachers and subjects where this model can be applied, The Bill and Melinda Gates Foundation (Kane & Cantrell, 2010) found that a teacher's past success in raising student achievement on state tests is one of the strongest predictors of future success. This is the "value-added" impact of a teacher, adjusting for the level where each of the students starts from. A student assigned to a very good teacher for a single school year may gain up to a full year's

worth of additional academic growth compared to a student assigned to a very poor teacher. This impact is compounded with consecutive years of strong or weak teachers: high needs students with three consecutive years of good teachers can outperform students taught by ineffective teachers three years in a row by as much as 50 percentile points (Weisberg et al., 2009). Additionally, teachers with high value-added on state tests tend to promote deeper conceptual understanding, as corroborated by evidence comparing both outcomes on state assessments as well as assessments with open-ended and constructed responses (Kane & Cantrell, 2010). And it is teachers who matter the most when compared to all other school-related factors when it comes to student achievement (Wright, Horn & Sanders, 1997).

Observations are a common tool used for the purposes of formative assessment, but come at a higher cost than the other two methods described. Many of these observational tools are locally developed, though some are research-based. There is no one agreed-upon set of characteristics that teachers should be evaluated upon. Most have some set of skills or competencies that are believed to, in sum, describe the complexities of the teacher's role, and then various attributes that make up each of those competencies. However, their use is not always optimal or reliable. In The New Teacher Project's study of twelve districts in four states (over 15,000 teachers), they found that evaluations were often short and infrequent, based on two or fewer observations and conducted by administrators without extensive training (Weisberg et al., 2009). With this approach, frequency and intensity, teachers are not getting the feedback they need to improve their practice, administrations are not getting the information they need to make important human capital decisions, and most importantly, it is impossible to reliably tell if students are being adequately served by their teachers. The Measures of Effective Teaching (MET) study (Cantrell & Kane, 2013) found that generally speaking, more observations led to

more reliability, and if those observations could be done by more than one person, that increased reliability further. Additional analyses suggest that observations based on the first 15 minutes of lessons were about 60% as reliable as the full lesson observations, while only requiring a third as much observer time. The authors suggested that having three different observers each observe for 15 minutes may be more economical than having an additional observer sit in for 45 minutes. However, it is still important to have some full-length observations, as not all aspects of teaching that are scored on common frameworks or rubrics occur during a given 15-minute window of class.

An example of a locally-developed observational tool is the KIPP Framework for Excellent Teaching. This tool incorporates “the four elements of excellent teaching,” which include understanding of Self and Others, Classroom Culture, The Teaching Cycle and Knowledge. Within Self and Others, the teacher is rated on attributes like Self-Awareness and Self-Adjustment, Cultural Competence, Communication, and Building Relationships ("KIPP Framework for Excellent Teaching," 2011). A more peer-reviewed and research-based formative assessment observation tool is the Framework for Teaching developed by Danielson (1996), which also uses a similar model or framework of establishing broad domains that make up the practice of teaching, and each domain has more specific sub-components or skills that make up the domain (Alvarez & Anderson-Ketchmark, 2011). In all of these systems, the teachers are rated on a scale so that their performance can be summed up in one average number that would indicate their general effectiveness.

The most widely used observational measure of teacher-child interactions in early childhood classrooms is the Classroom Assessment Scoring System (CLASS; Pianta, La Paro, & Hamre, 2008; Pianta, Karen, La Paro, & Hamre, 2008). Within the global construct of classroom

quality, teacher-child interactions have emerged as part of the relationship between teacher quality and impact on student outcomes. According to Hamre et al. (2012), teacher-child interactions are the “daily back and forth exchanges that teachers have with one another throughout the day, including those that are social and instructional in nature.” These interactions have been found to be incredibly important in setting the context in which students are learning. Howes et al. (2008) found that effective teaching, defined as sensitive interactions with adults around instructional content within a positive climate, was a stronger predictor of children’s language and literacy outcomes than materials or activities. Similarly, and using the same data, Mashburn et al. (2008) found that instructional support was a stronger predictor of children’s academic outcomes at the end of Pre-K than structural features of quality like class size, ratio, or provision of comprehensive services. Intuitively, positive teacher-child interactions have been indirectly linked to reading performance through increased classroom engagement (Ponitz, Rimm-Kaufman, Grimm, & Curby, 2009). The National Association for the Education of Young Children’s (NAEYC) position statement includes the following assertion about teacher-child interactions: “Effective teachers are intentional in their use of a variety of approaches and strategies to support interest and ability in each learning domain,” and, “Curriculum is very important, but what the teacher does is paramount” (NAEYC, 2009).

The CLASS tool includes 10 dimensions of teacher-child interactions that are organized into three domains: Emotional Support, Classroom Organization, and Instructional Support. Each of these domains has been linked to children’s academic or social outcomes (Curby, Rimm-Kaufman, & Ponitz, 2009; Rimm-Kaufman, Curby, Grimm, Nathanson, & Brock, 2009). The Emotional Support domain reflects the extent to which teachers support the emotional and social functioning of the classroom, and includes respect and enjoyment demonstrated by both teachers

and students in the classroom, teachers' responsivity to children's concerns, and teachers' emphasis on children's interests. The Classroom Organization domain reflects processes related to appropriately preventing and redirecting student problem behavior, maximize time spent engaged in learning through the use of routines, and varied use of learning activities to keep students' attention. The Instructional Support domain refers to the extent to which teachers provide feedback to students and promote higher-order and critical thinking.

There is an established logic of using teacher evaluation of effectiveness as a strategy for school improvement, as there is a causal relationship between teacher growth and student learning (Hallinger, Heck, & Murphy, 2014). If there are direct ways to improve teacher-child interactions which can improve the effectiveness of instructional delivery and therefore school climate and student outcomes at the same time, this would be a key lever for possible investment in teacher training.

### **Factors Associated with Teacher Effectiveness**

As tools for measuring teacher effectiveness vary widely, and as the idea of a "high-quality" teacher is so complex, so are the many areas for possible intervention to improve teacher effectiveness. To date, research suggests that salient factors associated with teacher effectiveness include the preparation, certification, and pre-service training of teachers; teacher-related characteristics, teachers' past performance; and the provision of in-service professional development supports.

#### **Teacher-related variables**

There is evidence to suggest that teacher effectiveness increases sharply after the first few years of teaching (Kain & Singleton, 1996) and that teacher experience is an important factor related to improving effectiveness. Students taught by second-year teachers have larger average

achievement gains than students of first-year teachers. Similar but smaller average achievement gains were found when comparing third-year teachers to second-year teachers (Kane, Rockoff, & Staiger, 2008). These gains between the early years of teaching may be impacted by the differential attrition rates of less effective teachers, whereby less effective teachers are more likely to leave the profession after their first year (Henry, Bastian, & Fortner, 2011). A report from the National Commission on Teaching and America's Future (NCTAF, 2003) showed that beginning teachers who had any training in child psychology or learning theory, observed other classes, or gotten feedback on their own teaching left the profession at lower rates than their peers who did not receive any of these supports.

Brophy and Good (2008, p. 304) list several well-replicated findings between teacher-level effects and positive student outcomes. In addition to teacher experience, teacher expectancies and sense of self-efficacy have been associated with changes in student outcomes. Teachers with high expectations are teachers who believe their students are capable of learning. Teachers with higher self-efficacy believe that they themselves are capable of teaching and that when students do not understand something the first time, they are capable of remediation. Further, teachers who organize their classrooms as effective learning environments and who use group-management approaches allow their students to spend more time on learning and therefore have better student outcomes. Teachers who instruct actively by demonstrating skills, explaining concepts, conducting activities requiring participation, as well as who move through the curriculum rapidly but in relatively small steps, are the ones whose students see the largest gains. Teachers who can maintain a pleasant, friendly, enthusiastic and supportive learning environment are also generally more successful, as well as are those who monitor each student's progress and provide feedback and remedial instruction as needed.

In regard to teacher demographics and its impact on student outcomes, gender is the only demographic variable in which research demonstrates no significant differences. Investigations into the impact of race and ethnicity of teachers has resulted in mixed results, and knowledge of the impact of SES background and age of teachers is limited by lack of research in these areas (Zumwalt and Craig, 2005b).

Teacher burnout is described as emotional exhaustion, sense of depersonalization, and reduced personal accomplishment (Maslach, Jackson, & Leiter, 1996). Teacher burnout has been associated with decreases in self-rated health, decreases in work ability, and increases in teachers' intentions of leaving the profession. It is also moderately-to-strongly correlated with self-efficacy (Skaalvik & Skaalvik, 2010), which is related to student outcomes. Further, there is reason to suggest that the development and maintenance of supportive teacher-student relationships and effective classroom management is influenced by the teacher's social and emotional competence, in which burnout can be a factor (Jennings and Greenberg, 2009).

### **Pre-service training programming**

Rice (2003) reviewed literature that suggested that selectivity/prestige of the institution attended by the teacher had a positive effect on student achievement. Additionally, having an advanced degree in math or science improved high school students' achievement in those areas, and teachers being certified in high school math was related to better high school mathematics achievement. Rice (2003) additionally suggested that pedagogical coursework seemed to contribute to teacher effectiveness at all grade levels. As in other fields, past performance is a good indicator of future performance. One study examining outcomes for teachers in New York City found that performance in the first two years of a teacher's career is a reliable indicator of a teacher's future effectiveness (Kane et al., 2008). We also know that the more time teachers have

to spend on behavior management is associated with decreases in effective teacher practices (Blazar & Kraft, 2015). Wayne and Youngs (2003) concluded that students learn more from teachers with certain characteristics, like having attended a college with certain characteristics, which skills they were tested on, and knowledge, however the results were inconclusive about the impact of coursework, degrees, and certification.

### **In-service coaching and professional development**

There has been a paradigm shift in the past 30 years in the field of teacher professional development. Traditional models of professional development have focused on providing teachers with the skills and knowledge necessary to be better educators, which have been grounded in the assumption that with increased knowledge comes better practice, and that this knowledge comes from researchers outside of the practice of day-to-day teaching. Professional development was viewed commonly as, “a prescription for better teaching,” and followed a “knowledge FOR practice” model. In light of new reform agenda priorities that increased both autonomy of teachers as well as accountability, teachers not only were asked to become content experts but also constant learners themselves, and their success as a teacher often depended on their ability to adapt and change from year to year. Professional Learning Communities (PLCs) were born out of these new demands and were borrowed from the business world following research on how organizations and companies as a whole were able to learn (Thompson, Gregg, & Niska, 2004). This represented a shift to “knowledge OF practice,” and assumed that the knowledge teachers need to teach well is generated when teachers treat their own classrooms and schools as sites for intentional investigation at the same time as they treat the knowledge and theory produced by others as generative material for interrogation and interpretation (Cochran-Smith & Lytle, 1999). Once PLCs were established in the field of education, it was relatively

easy to discover teachers' perceptions about the value of them, but there has been a relative dearth of research connecting the impact of PLCs to teacher effectiveness in the classroom or student learning. One review of the research (Vescio, Ross & Adams, 2008) found that educators support and value PLCs. They additionally found that participation in learning communities made teachers more student-focused, which in turn improved teaching culture through increased collaboration with a focus on student learning and teacher empowerment. Further, student achievement scores increased when teachers participated in PLCs, although only six studies presented such data.

Hargreaves and Dawe (1990) proposed that classroom isolation as well as the poor implementation of curriculum, or otherwise planned educational change, are intimately connected. They describe that as the desire for increased accountability has grown, teachers have felt more anxiety about their effectiveness, which in turn makes them more reluctant to explore alternative teaching practices or approaches which may challenge them beyond their present levels of knowledge and performance. Research understandings and knowledge about teacher isolation, as well as the problem of poor curriculum implementation, lead to initiatives and strategies of professional development that bring teachers together in working relationships with each other, which can include strategies like PLCs. At the same time, however, there was a significant trend toward the centralization of bureaucratic control, and a tightening of administrative surveillance over both curriculum content and pedagogical process in school systems. Hargreaves (1989) says that this is due to fundamental crises of legitimation and belief, and of motivation and purpose through economically destabilized societies – to reconstruct new forms of motivation and belief among economically at-risk groups of working class and ethnic minority students and among the employees of the state who teach them. At the same time

teachers were being asked to collaborate more, there is less for them to collaborate about. Hargreaves writes, “It helps explain why most administratively supported initiatives in collaborative teacher development take the form not of extended critical reflection of action research for instance, but of collective exposure to an externally designed process of instructional training in purportedly new teaching strategies,” (p. 282). There had traditionally been a “deficit” interpretation of teacher’s knowledge and thinking, and against that emerged a theoretical argument for dignity in the area of teachers’ practical knowledge in the rapidly changing classroom environment, and a shift from “working on teachers” to “working with teachers.” Hargreaves writes, “Collaborative professional development strategies are often presented and interpreted as empowering and emancipatory for teachers, when in actuality they may well be fostering disempowerment and dispositional adjustment,” (p. 230). Hargreaves uses the example of coaching to highlight differences between collaborative teacher cultures, which develop curriculum and pedagogical reform from within the profession, and contrived collegiality, which are administratively designed to smooth the path of externally imposed innovation on the other. Coaching has a highly practical focus, in that it is intensive and enduring in its application and depends on the development of strong and trusting collegial relationships.

In tracking teachers from one year to the next across a five-year span, the Beginning Teacher Longitudinal Study (Gray & Taie, 2015) found that in each follow-up year, the percentage of beginning teachers who were currently teaching was larger among those who were assigned a first-year mentor than among those not assigned a first-year mentor (92% vs. 84% in 2008-2009, 91% and 77% in 2009-2010, 88 percent and 73% in 2010-2011 and 86% and 71% in 2011-2012). Results such as these indicate that the amount of support and guidance teachers receive can increase the likelihood of those teachers remaining in the profession. According to

another report by the NCTAF (1996), some districts have been able to reduce beginning teacher attrition rates by more than two-thirds by providing expert mentors with release time to coach beginners in their first year on the job, through a program called the Peer Assistance and Evaluation Program. In turn, those beginning teachers were judged to have become more competent more quickly. In each of these successful districts, the mentors were selected based on rigorous evaluation procedures which judged not only the mentor's abilities in the classroom, but their capacity for leadership and ability to build a relationship with their mentee. Further, the mentors reported that mentoring other teachers created an incentive for them to remain in the teaching profession, as they enjoyed the challenges, stimulation, and learning from other colleagues.

Another related way to improve teacher effectiveness is hypothesized to be through coaching. Garnston (1987) identified 3 different forms of coaching: technical coaching, collegial coaching, and challenge coaching. Technical coaching focuses on learning and transfer of new skills into existing repertoires. Collegial coaching is directed more to the context of teaching and processes of self-reflection and professional dialogue to improve teacher practice. Challenge coaching addresses specific problems in instructional design and delivery that need attention. Asserting that one method of teacher coaching works, or does not work, does not have much meaning unless the components of the coaching model and attributes of the coach are specified. As any teacher would report, there is an enormous variance in the type, amount, or components of coaching that a coach might provide. One study from the Netherlands (Darling-Hammond, Wei, Andree, Richardson, & Orphanos, 2009) found that coached teachers were not more effective than teachers who were not coached, though coached teachers felt more confident in their practice. On the other hand, Ross (1992) found that there was a relationship between

student achievement, teacher effectiveness and how much interactions teachers had with coaches. There was higher student achievement in classes where teachers had more contact with coaches, but there was no interaction between teacher efficacy (as measured by the measure of personal teaching efficacy and general teaching efficacy by Gibson and Dembo [1984]) and coaching.

Teacher coaching, in any form, is a very common practice, though specification of what makes teacher coaching effective (when it is) is largely unknown. However, there is a credible link between coaching and improved teacher effectiveness. For example, in a comprehensive review of the implementation research literature, Fixsen, Naoom, Blasé, Friedman and Wallace (2005) found that coaching made clear contributions to practitioner's implementation of programs and practices. According to Ross (1992), "teachers who believe they will make a difference are more likely to see coaching as an opportunity to expand and consolidate their teaching techniques. In contrast, teachers who see student learning as swamped by uncontrollable forces might regard coaching as nothing but more work." They go on to argue that teachers who believe in their own effectiveness may be more receptive to negative feedback, and coaches may be more motivated by high-efficacy teachers.

Results from a national probability sample of math and science teachers indicated three core professional development activities that have significant, positive effects on teachers' self-reported increases in knowledge and skills in addition to changes in classroom practice: (1) focus on content knowledge; (2) opportunities for active learning, and (3) coherence with other learning activities. The following structural features of professional development were also significantly associated with self-reported teacher learning: (1) the form of the activity (e.g., workshop vs. study group); (2) collective participation of teachers from the same school, grade,

or subject, and (3) the duration of the activity (Garet, Porter, Desimone, Birman & Yoon, 2001). As with much of the research in the area of teachers' responsiveness to professional development, there may be an impact of the Hawthorn effect, which traditionally describes the change in a subject's behavior due to their knowledge of being observed. In this case, teachers may not want to admit that the time they spent in professional development did not amount to practical change in their classroom. This particular area of research should be linked to more objective measures of teacher effectiveness instead of just self-report.

More recently, several prominent approaches that combine skills training with coaching/consultation have been linked to improved teacher-child interactions, which can be more objectively measured, as well as positive outcomes for children. Early Childhood Mental Health Consultation (ECMHC) is an example of this approach, in which mental health professionals work with teachers to improve classroom climate and behavior management, teach social skills, and address individual children's behavioral and mental health challenges (Duran et al., n.d.), and has been linked to improved classroom climate as well as a reduction in externalizing behavior (Brennan, Bradley, Allen & Perry, 2008; Perry, Allen, Brennan & Bradley, 2010). Another promising approach is Teacher-Child Interaction Training (TCIT), which uses both didactic instruction and behavioral coaching with teachers to improve communication, behavior management and prevention strategies for children with difficult behaviors. Use of TCIT has been correlated with decreased behavioral concerns for all children and improved social skills for students whose social skills were low at baseline (Garbacz, Zychinski, Feuer, Carter, & Budd, 2014). The current study evaluates a professional development model that couples skills training with in-service consultation. The current study evaluates a professional development model that couples skills training with in-service

coaching/consultation: Making the Most of Classroom Interactions (MMCI). This approach differs from ECMCH or TCIT in that it focuses on instructional support in addition to classroom climate and management.

### **Coaching Best Practices**

The best-known and most influential form of technical coaching has been developed by Joyce and Showers (1980, 1981, 1982). They maintain that although teachers are good learners (Joyce and Showers, 1980), they require certain conditions to improve their practice and increase their teaching repertoires. According to Joyce and Showers (2002), good teacher training should consist of four main components: developing knowledge (through exploring theory to understand the concepts behind a skill or strategy), demonstration or modeling of the skill, practicing the skill, and peer coaching. Peer coaching contributes to the transfer of training. By transfer, they mean the influence of prior learning upon later learning by generalizing new knowledge and skills to a new task of the same complexity or to one of a higher order. It has long been established that students receive instruction best when they are taught when and how to apply skills, along with opportunities to use them. Traditional curriculum development posited that instructional strands were hierarchies of knowledge that must be proceeded through linearly. Teachers had to present, and students had to start, at the lowest level first, and movement to the higher levels would only occur after mastery of lower levels had been accomplished. More recent theory and research suggest that the way we all learn as humans is not organized into such a hierarchical fashion, and is better represented as a knowledge network. These networks of knowledge include facts, concepts, generalizations, related values, procedural knowledge (implementation skills), and conditional knowledge of when and how to apply parts of the network. Most importantly, one can enter and begin to learn about the network almost anywhere,

not just at the lower end of the hierarchy. In this way, we can learn from each other's experiences (Brophy & Good, 2008, p. 282). More advanced students can be paired with less advanced students, much in the same way that adults learn from each other when there is a diversity of experiences present.

Notably, it has been found that the percentage of trainees who applied skills significantly increased only when the coaching component was added to their training model. Ninety-five percent of teachers exposed to peer coaching began applying the new skills they learned directly with their students. This is supported by later research, which examined professional learning communities. Darling-Hammond et al. (2009) found that attending 5-14 hours of professional development was not associated with any student gains, but attending between 30-100 hours did have an impact on student achievement. They also found that participating in active professional learning communities was a better predictor of student achievement than hours of professional development attended.

Joyce and Showers (1981) state that the coaching process is characterized by an observation and feedback cycle for the purposes of integrating mastered skills and strategies into curriculum, set of instructional goals, time span, and personal teaching style. They propose that all coaching models emphasize practice and feedback as a means of reflecting on instructional quality, which is in contrast to a model that stresses adherence to a specific skill or set of skills. A longitudinal study of teachers participating in professional development found that similar key features are effective in improving teacher practice, including active learning, collective participation and coherence (Desimone, Porter, Garet, Yoon, & Birman, 2002). Similarly, the MMCI program follows many of these established best practices. The program first focuses on developing the knowledge of the teacher through exploring the theory behind a skill or strategy,

and then follows that knowledge acquisition with demonstration or modeling of the skill. The teachers have the chance to practice the skill and coach each other on the skill. This comprises a cyclical and collegial cycle of observation and feedback.

One feature of coaching that has received empirical attention in the research literature is feedback. More specifically, performance feedback has been shown to increase job performance in many areas of work, and has specifically been shown to increase intervention implementation by teachers in schools. Traditionally, performance feedback has been defined as information that is provided to an individual or group about the quantity or quality of their behavior that provides information about how well they are doing. This information supports improvements and can increase human capital utilization (Noell & Gansle, 2014). Though reviews and meta-analyses point to the efficacy of performance feedback, many questions still remain about the variety of procedures that have been used to deliver feedback, the source of feedback, and schedules of delivery. As Noell and Gansle (2014) point out, the utility of performance feedback may change depending on the function of the feedback: at times it is considered positive reinforcement, negative reinforcement, a prompt, a discriminative stimulus, or may elicit rule-governed behavior. This can depend upon the relationship the subject, or in this case the teacher, has with the person providing the feedback, in this case the coach. It may well depend on what the results of the evaluation will be used for. However, a vast body of evidence in the field of education and other employment areas indicate that performance feedback is efficacious for improving targeted behaviors, especially “when delivered by a supervisor, when there are consequences tied to the feedback, and when graphic feedback is provided” (Long et al., 2016; Noell & Gansle, 2014). In a study of teachers implementing a proactive classroom management program and who were provided with ongoing coaching, Reinke, Stormont, Herman, and Newcomer (2014) found

that teachers who received more performance feedback had higher levels of implementation over time as compared to teachers who received less feedback.

As Hamre, Pardee and Mulcahy (2017) noted, research is lacking on what specific components of professional development lead to changes in teaching practices. Synder et al. (2012) attempted to categorize these components in their summary of the characteristics of professional development among early childhood educators. They found that most PD studies include methods for observation (59%) and verbal feedback (58%). Many included modeling (35%) and written feedback (22%). Less frequently used methods were role-play (4%) and side-by-side verbal support (6%). It is still unclear to what extent these elements are essential for leading to changes in practice. As Hamre et al. (2017) pointed out, we do not yet know, for example, how verbal feedback compares with written feedback when communicating with teachers, or how video review compares to in-person coach observations and conversations.

### **Coaching Intervention**

For the purposes of this study, the Louisiana Department of Education utilized a group coaching model called Making the Most of Classroom Interactions (MMCI) developed by researchers at the University of Virginia (Early et al., 2014), who also developed the Classroom Assessment and Scoring System (CLASS; Pianta, La Paro et al., 2008; Pianta, Karen et al., 2008). In a group coaching setting, multiple teachers attend professional development presented by an expert. The coach, in this instance, acts more as a facilitator. The CLASS measures the quality of classroom interactions between the teacher and his/her students and provides behavioral targets that the MMCI program is based upon. The MMCI program includes all established best practice coaching components.

MMCI is a face-to-face coaching model in which a group of teachers meet regularly with trained instructors to “identify and analyze effective interactions in classrooms and discuss ways to interact intentionally to increase children’s learning.” In this model, teachers have access to print and web-based resources, and they complete homework assignments that involve watching videos and practicing interactions in their own classroom. The program involves ten two-and-a-half hour sessions. The program first focuses on developing the knowledge of the teacher through exploring the theory behind a skill or strategy, and then follows that knowledge acquisition with demonstration or modeling of the skill. Then teachers have the chance to practice the skill and coaching each other on the skill. Previous research (Hamre et al., 2012) has shown that this model has been effective to improve teacher knowledge and increase scores on the Emotional Support and Instructional Support domains as measured by the CLASS.

Researchers from the University of Virginia who developed the CLASS tool as well as MMCI also developed an individual coaching model called My Teaching Partner (MTP), where teachers provided their coach with videos and received remote feedback, and were also provided with access to an online video library. Through a Race to the Top Grant, these researchers were able to test the implementation and effectiveness of these two models among pre-K teachers in Georgia. They found that the group coaching model, MMCI, was effective in improving interactions in the Emotional Support and Instructional Support domains. Following a series of structured interviews with teachers and coaches, the researchers identified that working with a partner and peer coaching within the sessions to discuss videos of other teachers and their interactions was an effective piece of the MMCI format. It seemed that buy-in was more difficult one-on-one in the individual coaching format, and while some teachers were motivated, others felt like they were being punished and the expectations were too high. This is consistent with

(Joyce & Showers, 2002) that identified that skill transfer is higher when there is peer coaching involved. In these sessions, there is also the opportunity for teachers to critically evaluate videos of other teachers together instead of providing feedback to an individual teacher face-to-face. It may be easier to critically evaluate components of effective practice when feelings like these are removed. The skill of the facilitator becomes critically important in these settings to guide the group conversation in a manner that is productive.

The MMCI program was piloted during the 2014-2015 academic year by Georgia's Department of Early Care and Learning (DECAL) program with Pre-K teachers, as part of a pilot study comparing professional development frameworks that might improve Instructional Support Domain indicators as rated on the CLASS rubric. Scores in this domain tended to be markedly lower than scores in the other two domains, and this domain is most closely linked to children's early academic gains (Mashburn, et al., 2008). The models compared all contained elements of My Teaching Partner (MTP) and MMCI, and also employed additional Teachstone-developed resources to support delivery. Each program was delivered by consultants who were employees of DECAL and had completed extensive training through Teachstone. The three models were: Professional Learning Communities with coaching (PLC-C); MMCI, Increased focus on Instructional Support Domain Indicators, without coaching (MMCI w/o C); and MMCI, Increased focus on Instructional Support Domain Indicators, with coaching (MMCI, w/C). As evidenced by their names, the MMCI programs were revised and adapted. The standard MMCI model was enhanced for this project by increasing the focus on the Instructional Support domain. MMCI does not typically include an individual coaching component, but this was added in the MMCI w/C model, where the coach observed the teacher's classroom for 20-30 minutes between each of the 5 full-day MMCI sessions and provided direct feedback and observation. The results

of the study indicated that scores on the Instructional Support domain improved for all three groups, but the difference between the three groups as to which model improved scores more was negligible. Additionally, the teachers in the two models with coaching (PLC-C and MMCI w/C) also showed significant improvements in Emotional Support, and teachers in PLC-C showed significant improvement in Classroom Organization. After accounting for pre-test scores, all three CLASS-based professional development groups had higher posttest scores in all three domains than a group of randomly selected teachers in a control group from other studies who did not receive CLASS-specific professional development (Early, Pan, Hume & Kraus, 2016).

Another study was conducted the following school year, in 2015-2016, with DECAL Pre-K teachers in Georgia with the aim of improving teacher-child interactions as measured by the CLASS. As in the study from the previous year, three models were tested with an intentional focus on the Instructional Support domain. Further, the analyses presented by the study did not take into account the nesting of teachers within schools or nesting of centers/schools within district or cohort/professional learning community (PLC). This study also asked teachers to respond to nine items regarding their perceptions of the professional development they received that year, as well as five items addressing their relationship with and perceptions of their coach/instructor. Teachers generally found the professional development models to be valuable and had positive perceptions of their coach/instructor, all with averages above 4 on a Likert scale of 5 ranging from strongly disagree (1) to strongly agree (5). Additionally, consultants were asked to “Think about all the teachers you worked with this year as a part of (professional development model). Decide which one you believe showed the most improvement in terms of teacher-child interactions, using the CLASS-related framework.” They were then asked to

answer a series of questions related to the practices and philosophies endorsed by the (professional development model). This was repeated for the teacher the consultant believed showed the least amount of improvement. In this study, all three professional development models showed significant improvements in Instructional Support following participation in CLASS-based professional development. As in 2014-2015, teachers in the two models with coaching (PLC-C and MMCI w/C) also showed significant improvements in Emotional Support and Classroom Organization. Since this was largely a replication study of the prior 2014-2015 study, confidence is now higher that changes in the scores of the Instructional Support domain are a result of receiving the professional development. Coaches generally reported that teachers who improved the most were the ones who were most committed to change and open to feedback, and that those who showed the least improvement were less committed to or interested in improvement (Early, LaForett, & Kraus, 2017).

A three-year study (2011-12, 2012-13, 2013-14) was conducted to evaluate the impact of My Teaching Partner and MMCI on teacher-child interactions among Georgia DECAL teachers who were at least in their second year. Across the three years, the final sample included 486 teachers in 336 schools/centers. Teachers were asked to respond to nine items regarding their perceptions of the professional development they had received that year, as well as to respond to five items about the role and relationship they had with their coach/instructor. In this study, the 10 workshops of MMCI were delivered over five training days spread across five months. The study found that there were no differences between MTP and MMCI teachers at the end of the study on any three of the CLASS domains. MMCI was shown to be an effective means of increasing Emotional and Instructional Support compared with control-group teachers, and their scores in the area of Classroom Organization were higher than control-group teachers but the

difference was not significant. Teachers who took part in MMCI had greater knowledge of effective teacher-child interactions after participation than their peers did in MTP or in control groups. Teachers who participated in MMCI rated their relationships with their instructors as positive, but somewhat less positive than those reported by MTP teachers. Emotional Support increased in the MTP group, although there were no improvements in other areas. One important note about the study design was that much of the curriculum of MMCI had been tested previously (Hamre et al., 2012), but this format represented a significant change in that the content was delivered over five full-day sessions instead of ten shorter sessions. The authors stated that this format was more feasible for DECAL and would likely be more feasible for other early childhood agencies. Further, the study noted that there was correlational evidence that some groups of teachers benefited more from the professional development models than the others. Teachers with fewer years of experience demonstrated more dramatic growth in areas like Emotional Support and Classroom Organization. Additionally, teachers in the MMCI group demonstrated more improvements in the Instructional Support domain when the instructor delivering MMCI content had more years of experience as a pre-K consultant. The authors hypothesized that this could have been due to the instructors being able to support their teachers and provide more real-world examples. The study was also able to consider nesting within schools and centers, but did not consider nesting within coaches or provide information about coach-level implementation.

### **Treatment Integrity**

As Berman and McLaughlin observed (1976, p. 349) observed, “the bridge between a promising idea and its impact on students is implementation, however, “innovations are seldom implemented as planned.” Teacher coaching can be viewed as an intervention with a proximal

outcome of improving teacher effectiveness and improved student outcomes at a more distal level. Similar to all interventions, there is a need for objective specification of its components towards valid measurement and its enhancement. As coaches may be an appropriate space for intervening to improve both teacher and student outcomes, it is crucial to identify the critical components of coaching interventions as well as the size of contribution of each to teacher effectiveness in the classroom. It is additionally important to consider TI, which has been defined as the degree to which an intervention is implemented as planned (Gresham et al., 1993).

The history of the consideration of TI goes back to diffusion of innovation theory (Rogers, 2003), which provides a way of understanding the process by which new ideas are put into practice. Most of the focus was initially on program adoption in the 1960s and 1970s and emphasized the importance of rigorous evaluation and validation in demonstration projects. The basic assumption of the model is that consumers are generally passive: they would value results from research studies and base their decisions on these results, and that programs would be implemented the way the developers intended it. In the mid-1970s, authors called some of these assumptions into question, noting that characteristics of individual organizations had a powerful influence over whether or not a given program would be adopted and the extent to which it would be implemented with fidelity (Dusenbury, 2003). One of the early studies calling these assumptions into question was what came to be known as “The Rand report,” (Berman & McLaughlin, 1976) which noted a consistent lack of fidelity in the implementation of programs in schools. They noted three patterns of implementation in novel educational programs: 1. Cooptation or adapting the program without any changes in organizational behavior, 2. Mutual adaptation, where the program is adapted at the same time as the organization is changing, and 3. Non-implementation and non-adoption, in which neither happened. Though critics have noted

several questions about the conclusions of the Rand report, it was one of the first systemic examinations of fidelity in dissemination of innovative programs. Around the same time period, other research (Rogers, 1977) found that “local adopters” were reinventing or changing innovations to meet their own needs. This led to a more active view of consumers in the dissemination process. By the late 1980s, the perspective on fidelity was divided between those who would argue for close adherence to program methods and intent (i.e., strict adherence), versus a more moderate position that allowed for reinvention and flexibility to meet individual needs of consumers (i.e., adaptation; Dusenbury, 2003).

There are several reasons that changes in teacher behavior do not generalize beyond face-to-face meetings with the school consultant, which include the erroneous assumption of an empirical-rational approach, a naïve “train- and-hope” model of generalization, and a lack of understanding on the part of the consultant of all of the contingencies under which teachers operate (Erchul & Martens, 2010). Research across many fields of prevention research has shown that the “train-and-hope” model, or simply providing a training and hoping that participants walk away ready to implement the skills presented (Fixsen, Naoom, Blase, & Friedman, 2005; Stokes & Baer, 1977), is not an effective way to effect behavior change or get positive intervention outcomes. Just as receiving an intervention is more than sitting through one professional development session, TI is more than a simple checklist of component delivery. TI is a multidimensional construct. Modern conceptualizations of treatment integrity can help guide the operationalization and measurement procedures of teacher coaching interventions by highlighting key domains to assess. Power et al. (2005) propose a framework of those dimensions and strategies. In their model, they propose examining both the content and process dimensions of integrity. The dimensions of adherence and exposure/dosage fall under content

dimensions, and thus measure how much of the intervention is delivered. The quality and participant responsiveness dimensions fall under the process dimensions, and thus measure how well the intervention is delivered. Modern conceptualizations of TI can help guide the operationalization and measurement procedures of teacher coaching interventions by highlighting key domains to assess.

Dane and Schneider (1998) define the aforementioned four distinct dimensions of TI: (1) adherence or fidelity, which is the extent to which the intervention components are delivered in a manner that corresponds to the original design, (2) exposure or dosage, which reflects how much of the intervention was delivered or received, (3) quality of delivery, or how well program components were conducted, and (4) participant responsiveness or engagement, which reflects the degree to which participants were paying attention and involved in the intervention.

Dusenbury et al (2003) described a fifth dimension of program differentiation, which is the inclusion of unique components of the program. This fifth dimension is related to the fit of the program and its use with the intended audience and relates to treatment acceptability. It also sometimes is described as encompassing the degree of difference experienced by intervention recipient when compared to treatment as usual. Implementation researchers distinguish between quantity and quality: quantity reflects how much of the content was implemented, and quality reflects how well the intended program was delivered (i.e., the quality of the intervention delivery process; Durlak & DuPre, 2008; Power et al., 2005). Just as previous research has identified variation in the quantitative levels of professional development that are associated with changes in teacher and student outcomes (Darling-Hammond et al., 2009), it is additionally important to identify how this content has been delivered in those hours of professional development settings. Measurement of these quality aspects, then, is also of critical importance.

There are varying definitions and dimensions that researchers believe to be relevant to the quality of implementation. Gibbons and Coulter (2016) identify seven elements of fidelity of interventions: Need is well defined, program specificity, interventionist engagement, training and support, exposure and duration, student engagement, and adherence. As many ways as is possible to identify components or dimensions of TI, there are strategies for supporting implementation in those areas. Sanetti and Collier-Meek (2018) identify 6 implementation support strategies: intervention planning, direct training, participant modeling and role play, self-monitoring, motivational interviewing, and performance feedback. In general, according to Upright, Long, and LaSalle (in press) implementation support strategies tend to fall into two categories: ongoing supports that are provided to teachers/implementers on a continual basis until a determined criterion is met (i.e., performance feedback), or time-limited supports that are designed to be delivered within a pre-constrained period (i.e., commitment emphasis or action and coping planning). However, teachers differ in their needed level of support following intervention training (Sanetti, Collier-Meek, Long, Byron, & Kratochwill, 2015), and there is little consensus on which activities are considered essential to the success of the intervention (Becker, Bradshaw, Domitrovich and Ialongo, 2013).

Durlak and DuPre (2008) conducted a review of studies that collected data on dimensions of TI and their relation to intervention outcomes. In comparison to content dimensions of TI, most notably adherence, process dimensions have been much less measured and studied. This is unfortunate as process dimensions, like quality and rapport, have preliminary evidence demonstrating the importance of their relationship to intervention outcomes. Therefore, measuring process dimensions may be of additional value. For example, Resnicow et al. (1998) examined the predictive validity of both content and process dimensions on intervention

effectiveness through their study of a school-based nutrition intervention designed to increase health knowledge as well as fruit and vegetable intake. They examined three measures of curriculum implementation (classroom observations, teacher self-report questionnaire, and post-implementation interview with the teacher) as well as an observer-rated measure of rapport between the students and teachers. They found student-teacher rapport to be significantly associated with an increase in health knowledge, and this was significant above and beyond the other more traditional fidelity measures implemented. The authors posit that this may be due to rapport being a more general indicator of classroom environment and teaching style rather than the other fidelity measures, which only aim to assess teacher performance on a specific session and may therefore be more stringent indicators of teacher efficacy. This may be evidence of a differential impact of TI dimensions: in this study, process variables like rapport appear to have been more influential than content variables like adherence and exposure to intervention components.

It is clear from the available research that the content dimensions have been researched extensively, while process dimensions have received less attention. Further, adherence has been the most prominent in the literature and has shown a consistent significant relationship with intervention outcomes, but process dimensions, though not often measured, may be affecting intervention success concurrently. For the purposes of this study, we aim to examine the impact of these process dimensions on teacher effectiveness. We will be able to hold variables related to the content dimensions constant, like adherence and exposure (measured by videos and coach report), allowing us to more fully examine the impact of the process variables. Power et al. (2005) considered process dimensions as the two dimensions of Quality and Participant Responsiveness. Quality, then, was defined as how well the interventionist delivered the

program, or how the process unfolded over the course of the intervention. Participant Responsiveness was operationalized as the level of participants' engagement in the intervention (Power et al., 2005). For the purposes of this study, we conceptualize process dimensions as containing three dimensions: Quality (perceptions of coach competency), Engagement (ability to actively engage teachers), and Relationship/Rapport (quality of relationship between coach/instructor and teacher, or consultant and consultee).

### **Summary and Statement of the Problem**

It is widely known that the quality of the teacher in the classroom is one of the most important determinants of positive student outcomes. There is wide variance in the amount of experience and training teachers enter the classroom with, and then it is often left to the school or the district to help them improve their practice. While there is abundant research about best practices in professional development, there is still a wide implementation gap at the level of the teacher and his or her coach.

In this area of TI research, variation in implementation is attributed to content variables, like adherence or dosage, or process variables, like quality and engagement. This study addressed these process variables while controlling for content variables, to determine which attributes of the teacher-coach relationship have the most impact on teacher effectiveness.

The primary aim of the present study was to extend the literature on coaching and teacher effectiveness by examining which aspects of a coaching intervention may be the active ingredients that lead to greater improvements in teacher effectiveness. Specifically, this study examined the process dimensions of TI as they relate to a coaching intervention with a sample of teachers in public school districts throughout Louisiana. That is, this study examined if the quality of the coach is related to teacher effectiveness, including both skill in the content area as

well as engagement of participants. Also, this study further explored aspects of the teacher-coach relationship and determine if this relationship is associated with teacher effectiveness. Secondary aims of this study were to (a) replicate findings regarding the efficacy of the MMCI program and (b) examine the influence of multiple dimensions of TI alone and in combination, with particular focus on the process dimensions given the dearth of research in this area.

Primary research questions are as follows:

1. Does the MMCI coaching intervention result in changes in teacher effectiveness?
2. How do the process dimensions of treatment integrity (quality, engagement, and rapport) impact teacher effectiveness?

It was hypothesized that teachers who participate in the MMCI coaching intervention would show gains in teacher effectiveness scores and that findings from previous studies would be replicated, further strengthening support for the coaching program. Additionally, it was hypothesized that coaches with higher levels of quality, engagement and ratings of rapport would have teachers with greater improvements in teacher effectiveness.

## METHODS

### Participants and Design

All public school districts or lead agencies within the state of Louisiana (i.e., local public systems and charter schools) were asked to participate in a pilot coaching program by the Louisiana Department of Education (LA DOE) aimed at enhancing Pre-K and K-2 teachers' effectiveness. During the time of the study, Louisiana consisted of 181 lead agencies. Of those lead agencies, 152 included schools teaching students at the Pre-K and/or K-2 grade levels. Overall, a total of 18 lead agencies or parishes were selected as part of the pilot project by the LA DOE. Per report, these lead agencies reflected a sample of convenience based on expressed interest or willingness to participate in the state supported pilot project. The estimated response rate of the lead agencies is 12 percent (Louisiana Department of Education, 2016).

Participating lead agencies or parishes solicited school participation to use a group format coaching model developed by Teachstone, MMCI. In total, approximately 40 coaches working with 370 teachers throughout the 18 lead agency community networks and parishes agreed to participate. This represents the population of coaches and teachers available for recruitment for the present study. Through the assistance of the LA DOE and Teachstone, coaches and teachers were recruited from this state pilot project sample. Eligibility criteria for coaches for this dissertation study included (a) have received training to implement MMCI by Teachstone as part of the state pilot program and (b) were serving as currently active coaches. For teachers to be eligible for this study, teachers had to be (a) currently teaching, (b) participants of the MMCI pilot program, and (c) receiving teaching support from a coach who was also enrolled in the state pilot project. No other inclusion criteria were used to determine eligibility for coaches and teachers of this study.

As a result of researcher recruitment efforts, eighteen coaches and 103 teachers (including 43 Pre-K and 60 K-2) met *all* eligibility criteria for this study. Study participants stemmed from a total of 4 lead agencies. Of the 103 teachers meeting all eligibility criteria, 101 were able to be matched to teacher effectiveness observations both prior to and following the completion of the MMCI training. However, after reviewing teacher attendance data for the MMCI training sessions, an additional teacher had to be dropped from the study dataset because the teacher had attended less than half of the group coaching sessions due to maternity leave (i.e., 4 of 10). Thus, the final overall teacher sample included 100 teachers. All teachers were female and had an average age of 40 years old ( $SD = 10.53$ , range 22-65). These teachers, in sum, served 1,977 students, with each teacher having an average of 19 students ( $SD = 7.76$ ). Teachers worked with a total of 18 coaches, of which 2 were male and 16 were female (see Tables 1 and 2 for detailed sample demographic information). To answer primary study research questions, the overall sample was limited further to include (a) only those coaches for which there was reliable data regarding the fidelity of the MMCI sessions they led and (b) only those teachers who had complete survey data, both teacher effectiveness scores (prior to and following the MMCI training), and coaches with Teachstone (developer) supplied MMCI fidelity data. These additional restrictions, coupled with an unexpected study disruption (see below), resulted in a total of 17 coaches and 67 teachers that could be used in analyses to answer the primary (or a priori) research questions.

To add further contextual complexity, lead agency and parish leaders noted that they found out during the MMCI state pilot that the LA DOE would be requiring them to use a new and different teacher evaluation system (other than the CLASS) for the K-2 teachers during the

next school year. Thus, the incentive and pressure to participate in the state pilot was significantly undermined, which also reduced the final, usable sample for this study.

As the researcher had to operate within the existing structure of the LA state pilot project, a more optimal experimental or quasi-experimental study design, which would include a control group, could not be applied. Thus, the researcher conducted a pre-post study and included the collection of data on several additional variables that might also be associated with the primary study outcome, teacher effectiveness, so that they might be controlled for.

### **Group Coaching Intervention: Making the Most of Classroom Interactions**

MMCI is an interactive professional development experience for teachers led by a Teachstone-trained coach (or instructor) who resides within the teachers' educational setting. Developed by researchers at the University of Virginia (Early et al., 2014), this group coaching program is comprised of a total of 10, two-hour sessions led by the coach in-person with a team of teachers. The 10 sessions are organized into three phases corresponding to broad domains of effective teaching practice: Emotional Support, Classroom Organization, and Instructional Support. The primary aims of MMCI are to help teachers identify and describe effective classroom interactions, learn ways to interact intentionally to maximize students' learning, and gain access to resources aligned with the *Classroom Assessment Scoring System* (CLASS; Pianta, La Paro et al., 2008; Pianta, Karen et al., 2008) upon which many teachers are evaluated.

#### **Coach training and support**

As part of the state pilot project, all MMCI coaches received training from Teachstone MMCI specialists to support them in their role. Primary aims of the coach training included to (a) deepen their knowledge of the CLASS and ability to guide teachers in the application of teaching practices consistent with the measure, (b) build capacity within their educational setting

to support improvements in teacher effectiveness in the classroom, and (c) develop their skills in training and facilitation of teacher growth, especially with respect to CLASS content and concepts. All coaches received a total of five full days of training prior to initiating MMCI sessions with teachers. The training followed a know-see-do format (i.e., *know* what effective teacher interactions are and why they matter, *see* effective teacher interactions to build self-awareness, and *practice* classroom observations or coaching strategies to build desired behaviors). The first two days of training consisted of the CLASS Observation Training and focused on teaching coaches how to reliably code classrooms and become Certified CLASS observers. The subsequent three days of training consisted of the MMCI Instructor Training. This training focused on increasing CLASS knowledge and practice leading others to understand effective teacher interactions.

During delivery of the MMCI program across the 2016-2017 school year, coaches also received technical assistance and support. Specifically, Teachstone MMCI specialists were available as needed via email and two-three times per month for issues related to implementation, debriefing and planning via group calls (approximately one hour in duration). MMCI specialists also provided each coach with feedback on their MMCI delivery based on videos of sessions they led. This feedback was supplied once during each of the three MMCI phases one-on-one verbally and in writing. MMCI specialists are extensively trained to provide coaches with video feedback and scoring. MMCI specialists are first trained to deliver the three-day MMCI Instructor Training and then receive additional training in video reviewing, scoring, and feedback where they are certified as reliable coach raters through rigorous reliability testing. The MMCI specialists rate the coaches on three core evaluation (or implementation) criteria on a 5-point Likert-type scale (1 = *not observed*, 2 = *ineffective*, 3 = *developing effectiveness* [practice

observed inconsistently with limited depth and quality], 4 = *effective*, 5 = *highly effective* [practice observed consistently with depth and quality]): Demonstrates and Develops CLASS Content Knowledge, Provides Effective Feedback, and Provides an Organized Learning Experience. There are a total of 9 individual components across these three evaluation criteria (see Appendix A). These components provide additional valuations of both process and content dimensions of treatment integrity to MMCI. The MMCI specialists also provide comments for context supporting each score or rating and often include evidence from the reviewed session videos.

To become certified through Teachstone to deliver MMCI trainings in the future without need for supervision, coaches had to submit a total of three videos for rating and review by MMCI specialists. Gaining this certification means that Teachstone has verified the coach as qualified or fully proficient in the effective delivery of MMCI independently and as designed. All coaches submitted one video for each of the three phases of MMCI (i.e., Phase 1: Emotional Support, Phase 2: Classroom Organization, and Phase 3: Instructional Support), including a one and a half hour video from Phase 1 (session 2, 3, or 4), a one hour video from Phase 2 (session 5, 6, or 7), and a one hour video from Phase 3 (session 8, 9, or 10). All three videos are considered a cohesive unit documenting coach progress toward certification. Coaches had to achieve a minimum criterion score (average) on components of the three evaluation criteria. Each phase has a different minimum average. To achieve certification, the coach must have a minimum average of 3 during Phase 1, 3.5 during Phase 2, and 4 during Phase 3. A total of 13 coaches out of the overall study sample (76.5%) attained certification by the conclusion of the project.

## MMCI Series

All MMCI sessions are designed to be highly interactive and include watching videos of effective teaching from real classrooms and discussing effective interactions in videos and the educational settings in which teachers work. Coaches led 10 MMCI sessions to teams of teachers assigned to them. Similar to the coach training, these sessions followed the know-see-do format (i.e., *know* what effective teacher interactions are and why they matter, *see* and identify effective teacher interactions to build self-awareness, and *practice* strategies and integrate behaviors related to intentional teacher-child interactions). MMCI delivery was standardized such that all coaches used Teachstone created and supplied materials to deliver the teacher team taught program, including MMCI Instructor Guides, iPods with the Teachstone App, DVDs with scripted PowerPoint presentations and video examples, and access to a library of online exemplary classroom videos. In addition to materials for coaches, Teachstone also supplied participating teachers with MMCI Participant Guides, CLASS Dimensions Guides, and access to the library of online exemplary classroom videos.

All MMCI sessions followed an outline and detailed pacing guide that complemented the scripted PowerPoint presentation with video examples. The introduction session supplied teachers with the primary aims (or objectives) of the MMCI program, presented an overview of what would be covered in each of the ten sessions, and provided didactic instruction on the following topics (paced across 90-minutes): effective interactions help children grow, CLASS lens and language, the CLASS framework, the CLASS domains, and learning between sessions. Sessions two through 10 followed the same outline and pacing guide, including an introduction (5 minutes), review (20 minutes), teaching of content and concepts (i.e., know; 30 minutes), viewing and discussion of videos of real classrooms (i.e., see; 50 minutes), and application

portion during which skills were integrated and homework was assigned (i.e., do; 15 minutes). A list of program sessions is provided below.

1. Introduction
2. Positive Climate and Negative Climate
3. Teacher Sensitivity
4. Regard for Student Perspectives
5. Behavior Management
6. Productivity
7. Instructional Learning Formats
8. Concept Development
9. Quality of Feedback
10. Language Modeling

The three domains of teaching effectiveness taught through MMCI correspond with the three phases when delivering the program (i.e., Emotional Support, Classroom Organization, and Instructional Support). That is, each domain is taught in the outlined sequence. Emotional Support refers to what teachers do to provide social and emotional supports to students that promote all aspects of their development. Classroom Organization refers to what teachers do to manage children's behavior, time, and attention in the classroom. Instructional Support refers to what teachers do to maximize students' cognitive and language development (Pianta, La Paro et al., 2008; Pianta, Karen et al., 2008). These three domains are comprised of 10 distinct *dimensions* that capture the different aspects of each domain. For example, there are four dimensions within the domain of Emotional Support (Positive Climate, Negative Climate, Teacher Sensitivity, and Regard for Student Perspectives). The dimensions are comprised of multiple *indicators* that define the categories of behaviors that represent the dimension. As one

example, the dimension of Positive Climate consists of four indicators, including Relationships, Positive Affect, Positive Communication, and Respect. Finally, *behavioral markers* provide specific interactions and behaviors that define each indicator (e.g., matched affect and social conversation are both behavioral markers of the Relationships indicator). The CLASS Dimensions Guide provides detailed information about indicators and behavioral markers for each of the 10 dimensions by the three broad domains (see Appendix B for a detailed overview).

## **Measures**

### **Demographic information**

**Teacher.** Demographic information was collected on participating teachers' including age, sex, race/ethnicity, highest level of education, type of educational certification and training, grade level taught, and years of teaching experience. To learn more about teachers' classrooms, basic classroom information was gathered on the number of students taught, estimated percentage of students eligible for free or reduced lunch, estimated percentage of male students and the racial/ethnic makeup of the class.

**Coach.** Demographic information was collected on participating coaches' including age, sex, race/ethnicity, highest level of education, type of educational certification and training, current professional title and roles, years of teaching experience, and years of coaching experience. Additionally, basic information was gathered on the number of teachers each coach instructs per academic year and the number of schools in which they coach.

### **Treatment integrity: Content Variables.**

**Adherence.** As described above, the MMCI specialists provided evaluation (or implementation) ratings for all of the coaches based on review of videos from 30 percent of the sessions they led (3 out of 10). Coaches were rated on a 5-point scale on the three core

evaluation criteria: Demonstrates and Develops CLASS Content Knowledge, Provides Effective Feedback, and Provides an Organized Learning Experience (see Appendix A). There were nine components within these three criteria; thus, the mean of the components comprising a criterion represented the score for that criterion. Of the nine, one component assessed the coaches' ability to deliver the presentation as intended ("Presents PowerPoint presentation and videos as indicated in the MMCI Instructor Guide"), while the other eight components assessed aspects of quality of delivery (see below for more detail). This single component (or item) reflected the purest measure of adherence as traditionally operationalized in the literature. Scores on this item were averaged across the three submitted videos to provide an estimate of coach adherence to the MMCI program.

***Dosage.*** As a measure of the dosage or amount of the coaching intervention that teachers received, coaches were asked to provide teacher attendance records for each MMCI session. Dosage was measured by attendance at each session. Attendance at each session was generally mandatory for the participating teachers; thus, nearly all teachers were reported as present for all 10 sessions.

**Treatment integrity: Process Variables.**

***Quality of delivery.*** As described above, the MMCI specialists rated the coaches on a 5-point scale for three core evaluation: Demonstrates and Develops CLASS Content Knowledge, Provides Effective Feedback, and Provides an Organized Learning Experience (see Appendix A). Of the nine components within the three criteria, eight components (or items) assessed aspects of quality of delivery. The mean of the components comprising a criterion represented the score for that criterion. For example, the items asked MMCI specialists to rate coaches on how well they understood the material, whether they were able to provide clear examples,

whether they helped participants make specific behavioral observations, if they provided feedback, and if they demonstrated an appropriate ability to be directive and maintain focus of discussion on training content. These eight item scores were averaged over the three time points to create a composite Teachstone rating of quality of delivery that could be directly compared to the teachers' ratings of their coach by the three other treatment integrity process measures described immediately below.

**Quality of coach.** Teachers were asked to complete the Consultant Evaluation Form (CEF; Erchul, 1987) to assess the skill and competency of their coach. The role of the coach was conceptualized as one of a school-based consultant to improve teacher practice, and the CEF has been widely used throughout the consultation literature to estimate consultee perceptions of their consultant's effectiveness (Hughes & DeForest, 1993; Sheridan, Eagle, Cowan, & Mickelson, 2001). The CEF is a 12-item measure, rated on a 7-point Likert scale, which requires teachers to rate statements describing their coach from *strongly disagree* (1) to *strongly agree* (7). Previous data obtained on the CEF reveals that it has strong internal consistency reliability ( $\alpha = .94$ ) and content validity (Erchul, 1987).

**Engagement.** Teachers were asked to rate their own teaching engagement as a result of their participation in the MMCI program. That is, the degree to which participation in MMCI sessions resulted in enhanced motivation and engagement in work performance. Teaching engagement was assessed using a slightly adapted version of a job engagement scale developed by Rich, Lepine, and Crawford (2010). For example, an item that says, "I am proud of my job," was adapted to read as, "As a result of the MMCI program, I am proud of my job." Rich et al. measured job engagement based on Kahn's work engagement theory (1990) which operationalizes the construct as being comprised of physical, cognitive, and emotional

engagement. The job engagement scale has a total of 18-items on a 5-point Likert scale (1 = *strongly disagree* to 5 = *strongly agree*). It has strong internal consistency reliability ( $\alpha = .95$ ) and evidence of construct validity. For example, across two separate samples (i.e., nursing facility employees and firefighters), factor analyses confirmed strong factor loadings ( $\geq .60$ ) for each item on the hypothesized factor, representing physical, cognitive, or emotional engagement aspects of the higher-order construct. Results from CFAs revealed support for the structure of the job engagement scale as consisting of three first-order factors that in turn load on a second-order factor. Additionally, the job engagement scale was shown to be moderately positively associated with value congruence with one's organization, perceived organizational support, worker task performance, and organizational citizenship behavior ( $r$  range = .35 - .45).

**Rapport.** Therapeutic alliance constitutes a major variable in explaining the outcome of a treatment. Similarly, it is hypothesized that the coach-teacher alliance will constitute an important variable in explaining improvements in teacher effectiveness. Therefore, teachers were asked to complete a slightly adapted version of the short form of the Working Alliance Inventory (WAI; Horvath & Greenberg, 1989). For example, the item, "What I am doing in therapy gives me new ways of looking at my problem," was adapted to read as, "What I am doing in the MMCI sessions gives me new ways of looking at the problems in my classroom." The short form of the WAI is 12-items on a 5-point Likert scale (1 = *seldom* to 5 = *always*) and was designed to include items that reflect three dimensions of the working relationship: goals, tasks, and bond (Elvins & Green, 2008). Elvins and Green (2008) conducted an empirical review of the conceptualization and measurement of therapeutic alliance, and found the WAI, Vanderbilt Scales (VTAS) and California Scales (CALPAS) to be the most successful at measuring key constructs of alliance and handling high inter-correlations on items across personal and task

alliance. Martin, Garske and Davis (2000) conducted a meta-analysis of substantive alliance studies in the adult clinical psychology literature, and found that the WAI was used most often ( $n = 22$ ), followed by CALPAS ( $n = 16$ ), and Penn ( $n = 12$ ). The WAI has been adapted for use in many different therapeutic modalities, has obtained good internal consistency reliability ( $\alpha = .93$ ), and is a well-triangulated measure that has strong, extensive validity evidence (Elvins & Green, 2008).

### **Covariates**

In addition to data gathered via primary study measures, data on teacher stress and self-efficacy were also gathered. These data were obtained as previous research suggests that both variables are common, significant contributors to teacher performance beyond known teacher demographic variables (Pas, Bradshaw, & Hershfeldt, 2012; Tschannen-Moran, Hoy, & Hoy, 1998; Tsouloupas, Carson, Matthews, Grawitch, & Barber, 2010).

**Stress.** The educator version of the Maslach Burnout Inventory (MBI; Maslach et al., 1997) was used to assess teacher stress. The MBI is a widely used 22-item self-report scale that assesses how frequently teachers experience feelings of burnout. Each item is measured on a 7-point Likert scale (1 = *strongly disagree* to 7 = *strongly agree*). The MBI is comprised of three subscales: Emotional Exhaustion, Depersonalization, and Personal Accomplishment. This study used the Emotional Exhaustion subscale consisting of 9 total items. The internal consistency reliability of the Emotional Exhaustion subscale is .90. Example items include “I feel emotionally drained from my work” and “I feel I am working too hard on my job.”

**Self-efficacy.** Teacher self-efficacy will be measured using the Teachers’ Sense of Efficacy Scale (TSES; Tschannen-Moran & Hoy, 2001). The short version of the TSES is comprised of 12 items, combining to form three subscales: Efficacy in Student Engagement,

Efficacy in Instructional Strategies, and Efficacy in Classroom Management. Teachers answer questions that assess, “how much can you do” on a 9-point Likert scale ranging from 1 (*nothing*) to 9 (*a great deal*). Internal consistency reliability for the TSES is .90 (Tschannen-Moran & Hoy, 2001). The TSES has been found to be significantly positively associated with other measures of teacher self-efficacy ( $r$  range = .18 to .53) and significantly negatively associated with work alienation ( $r = -.31$ ).

### **Outcome variable: Teacher Effectiveness**

Prior to and following the MMCI coaching program, teacher effectiveness was assessed using the *Classroom Assessment Scoring System* (CLASS; Pianta, La Paro et al., 2008; Pianta, Karen et al., 2008) by LA DOE contracted Certified CLASS observers. The CLASS is a standardized direct observation instrument. To become a Certified CLASS observer, requires completion of a two-day, 16-hour long training and successful completion of reliability testing (stated in general terms, demonstrate  $\geq 80$  percent agreement of all codes with master codes on five consecutive observation videos of real classrooms). Additionally, to maintain the certification Teachstone requires all observers to update their reliability testing annually. The CLASS was developed to measure the nature and extent of effective teacher classroom interactions between themselves and their students. It is comprised of three broad domains of classroom practice: Emotional Support, Classroom Organization, and Instructional Support. Each domain is comprised of multiple dimensions that are rated on a 7-point Likert scale and provide extensive descriptions for ranking classroom teacher practices as falling within the low- (1, 2), middle- (3, 4, 5), and high-range (6, 7). The Emotional Support domain includes the dimensions of Positive Climate, Negative Climate, Teacher Sensitivity, and Regard for Student Perspectives. The Classroom Organization domain includes the dimensions of Behavior Management,

Productivity, and Instructional Learning Formats. The Instructional Support domain includes the dimensions of Concept Development, Quality of Feedback, and Language Modeling. The domains and dimensions vary slightly depending on the age of the students, but these domains and dimensions are used in both the Pre-K and K-3 CLASS rubrics and are applicable to this study.

The CLASS requires observers to derive one score for each dimension per observation cycle, ranging from 1 (*minimally characteristic*) to 7 (*highly characteristic*). Scores for each dimension are based on the degree to which certain behaviors that reflect indicators of each dimension are displayed in the classroom during the cycle. Each cycle is 20-minutes in duration and is followed by a 10-minute period for recording scores. During observation cycles, the observer watches teacher classroom interactions attentively, paying attention to the range, frequency, intention, and tone of interpersonal and individual behavior during the cycle. The full CLASS observation is at least 2 hours long and requires a minimum of four complete cycles (up to six) to compute dimension scores. The overall score for each dimension reflects the average across the four to six cycles. Domain scores are computed by averaging the relevant overall dimension scores. The CLASS is a reliable and valid measure of teacher effectiveness. Internal consistency reliabilities for CLASS dimensions range from .76 to .90 and there is evidence of face, construct, criterion, and predictive validity (Pianta, Karen et al., 2008). Typically, interrater agreement (within 1) on CLASS dimensions ranges from 79 to 94 percent (Pianta, Karen et al., 2008). For the purposes of this study, the CLASS scores were examined independently for each domain (Emotional Support, Classroom Organization, Instructional Support), and an overall weighted average of the domain scores was computed.

## **Procedures**

### **Recruitment**

The LA state pilot project was ongoing during the 2016-2017 school year. Lead agencies or parishes included in the pilot project were invited to participate in this dissertation study through the assistance of the LA DOE and Teachstone following the Fall 2016 teacher effectiveness observations. These observations were reported to be delayed due to widespread state flooding. Lead agency or parish administrators, as well as principals of each participating school, were contacted via telephone and email up to four times to maximize the study sample. If administrators expressed interest in and agreed to study participation, their teachers and coaches (in the state pilot project; i.e., Pre-K and K-2) were contacted to determine their interest in also participating in the dissertation study. As an incentive for participating, coaches each received a gift card in the amount of five dollars. Teachers were rewarded with an event for their teachers in the pilot. Following completion of survey collection and receipt of CLASS scores, each LEA received gift cards for a pizza party for participating teachers.

### **Data Collection**

Prior to data collection, approval from Louisiana State University's Institutional Review Board was obtained. Administrators (lead agency and school) were provided with a consent form permitting the solicitation and participation of their teachers and coaches. Teachers and coaches were provided with an informed consent form, which outlined the voluntary nature of the dissertation study, study procedures and activities, their rights as research participants, and the potential benefits and risks of study participation. Only teachers and coaches who provided informed consent were allowed to participate and had their 2016-2017 teacher effectiveness observation data (CLASS scores) accessed from the LA DOE.

Study data were gathered in three waves through multiple sources (LA DOE, Teachstone, coaches, and teachers). Wave one consisted of the Fall 2016 data collection of the CLASS scores (largely taking place from October to December). Wave two consisted of recruitment of dissertation study participants and collection of survey data. Either in-person or online, depending on administrator preference, the researcher provided a brief overview of the study and reviewed the consent script with teachers and coaches. Prior to administration of the study measures, interested participants were screened based on the aforementioned eligibility criteria. Eligible participants reviewed study instructions, filled out a demographic questionnaire, and then completed study measures either via paper-and-pencil or a secure survey software program. For all teacher participants, following completion of the demographic questionnaire, administration of study measures followed a random order. The random ordering of measures was used to help reduce the potential influence of an ordering effect. Finally, wave three consisted of the Spring 2017 data collection of the CLASS scores and occurred only after teachers had completed the MMCI program (largely taking place from late March to early May). Identifying information gathered from teachers and coaches was used to link to their data provided by the LA DOE (i.e., teachers CLASS scores) and Teachstone (coaches MMCI implementation data). More specifically, teacher questionnaire data was linked to their teaching effectiveness scores as measured by the CLASS and their attendance records for each coaching session. Again, teacher effectiveness data was gathered at two time points by Certified CLASS observers contracted the LA DOE, once prior to commencement of the MMCI coaching program and a second time following conclusion of the program towards the end of the school year. Coaching questionnaire data was linked to the data of teachers they instructed, as well as

information provided by Teachstone about MMCI program implementation and their achievement of certification as a coach.

## RESULTS

### Data Reduction and Preliminary Analyses

All statistical analyses were conducted with IBM SPSS Statistics 23 and R statistical environment (R Core Team, 2016). As a first step, data were cleaned and variables were transformed to “tidy” the dataset. Subsequently, preliminary analyses were conducted to explore the descriptive qualities of the data, which included inspecting visual and statistical summaries of all variables to detect outliers or aberrant data points or missing values. There were several challenges with missing data. As outlined earlier, a total of 103 teacher surveys who met all study eligibility criteria could be matched to their CLASS scores, but due to attendance, maternity leaves, and some incomplete CLASS data, only 100 subjects had both completed measures and CLASS scores. A total of 18 coaches met all eligibility criteria for the study and of these 17 sought certification as a Certified MMCI Instructor through Teachstone, meaning that these coaches submitted all of the required videos for reliable data to be supplied about their MMCI implementation. After limiting our sample to only those teachers who had complete surveys, CLASS data, and had coaches who had Teachstone-rated videos, the final sample to be used for the primary study research questions included 17 coaches and 67 teachers.

### Descriptive Statistics

Table 1. Demographic Information of Teachers

Category	Frequency	Percent
Student Race (majority)		
Black or African American	31	46.27
Multiracial	2	2.99
Native American	4	5.97
White	30	44.78
Grade-Level of Students		
Pre-K	24	35.82
Early Elementary	41	61.19
Late Elementary	1	1.49

(table cont'd)

Category	Frequency	Percent
Mixed Age Groups	1	1.49
Teacher Race/Ethnicity		
Black or African American	9	13.43
Multiracial	1	1.49
Native American	4	5.97
White	53	79.11
Teacher Education Level		
High School	2	2.99
Associate's Degree	1	1.49
B.A./B.S.	48	71.64
Masters Plus Credits	4	5.97
Masters/Specialist	11	16.42
Missing	1	1.49
Teacher Certification Type		
Alternative	21	31.34
Traditional	36	53.73
Missing	10	14.93

Note: ( $n = 67$ )

Table 2. Demographic Information of Coaches

Category	Frequency	Percent
Age of Students		
Pre-K	7	41.17
Early Elementary	4	23.53
Late Elementary	1	5.88
Mixed Age Groups	4	23.53
Missing	1	5.88
Coach Race/Ethnicity		
Black or African American	2	11.76
White	15	88.23
Coach Education Level		
B.A./B.S.	6	35.28
Masters Plus Credits	2	11.76
Masters/Specialist	8	47.06
Doctorate	1	5.88

Note: ( $n = 17$ )

Table 3. Descriptive Statistics of Main Study Variables.

Variable	Mean	Standard Deviation	Maximum	Minimum
Teacher Age	41.11	10.64	65.00	22.00
Adherence Score	4.89	0.20	5.00	4.33

(table cont'd)

Variable	Mean	Standard Deviation	Maximum	Minimum
Teachstone Quality Score	4.41	0.18	4.83	4.04
Weighted Average – Pre	5.23	0.82	6.64	2.24
Weighted Average – Post	5.35	0.77	6.85	3.26
Emotional Support (ES)– Pre	5.99	0.70	7.00	3.94
Emotional Support (ES) - Post	6.15	0.67	7.00	4.13
Classroom Organization (CO) – Pre	5.50	1.13	7.00	0.00
Classroom Organization (CO) – Post	5.59	1.21	7.00	0.00
Instructional Support (IS) – Pre	4.02	0.98	7.00	2.33
Instructional Support (IS) – Post	4.40	1.31	7.00	2.17
Teacher Stress Score	1.79	1.22	4.67	0.00
Teacher Self-Efficacy Score	7.81	0.93	9.00	5.00
Teacher Rating of Coach Rapport	4.17	1.03	5.00	0.00
Teacher Rating of Coach Quality	6.29	1.56	7.00	0.00
Teacher Rating of Engagement	4.29	1.07	5.00	0.00
Dosage	9.99	0.12	10.00	9.00

On average, scores on each domain of the CLASS rubric (Emotional Support, Classroom Organization, and Instructional Support) were higher following the training than prior to the teachers receiving MMCI, as seen in Table 3. The weighted CLASS average score similarly improved over the course of the school year. Additionally, coaches' scores on the adherence variable according to their Teachstone evaluation were generally higher than their scores on the other items on the rubric. Teachers generally rated their coaches as being high quality (competent), that their MMCI training motivated their work performance, and that they had a good working alliance with their coach. On average, teachers indicated that they experienced burnout symptoms between "a few times a year or less" and "once a month or less," however some teachers indicated they experienced these symptoms between "once a week" and "a few times a week." The teachers' sense of self-efficacy generally indicated that they felt like they had control over the outcomes in their classroom. See Table 7 for a correlation matrix of variables.

Four outcome variables considered in this study. The CLASS rubric provides scores for each of the three dimensions: Emotional Support, Classroom Organization, and Instructional Support. These were each considered separately, in consideration of prior research that indicated professional development and teacher training programs have more successfully influenced one domain (Emotional Support) in comparison to the others (Classroom Organization and Instructional Support) (Early, Maxwell, Ponder & Pan, 2017). Each domain score is comprised of ratings on 3 or 4 individual dimensions. A fully scored class rubric would indicate scores on a total of 10 dimensions. Additionally, an overall CLASS metric was calculated based on the three domain scores. Specifically, a weighted average was computed, which calculated an average score for each domain and then averaged those scores across the three domains. It should be noted that the component of “Negative Climate” is reverse coded so as to make the score comparable to scores on other components. See Appendix B for more information on CLASS domains and dimensions.

### **Research Question 1: Impact of MMCI Program on Teacher Effectiveness**

The first research question (RQ) of the study was to identify if MMCI had an impact on teacher effectiveness scores. Because of the hierarchical structure of the data, where teachers were nested within coaches, multilevel modeling (MLM) procedures were utilized. Using MLM to analyze these data offered several advantages over traditional multiple regression approaches, including the ability to calculate teacher-level variance separately from the variance at the coach level, as well as to appropriately adjust for problematic patterns in the dataset (e.g., unequal sample sizes within coaches, non-independence of pre-MMCI and post-MMCI teacher effectiveness ratings [i.e., CLASS scores]) and allow for greater estimate accuracy (Raudenbush & Bryk, 2002; Finch, Bolin, & Kelley, 2014; Huta, 2014). Using this method, data from two

time points (a pre- and a post-intervention [MMCI] score, level 1) was nested within each teacher (level 2), and each teacher was nested within each coach (level 3). Based on theoretical understandings of past scores impacting future performance, this model allowed us to enter “time” as a variable instead of having to control for pre-intervention CLASS scores.

Hox (2010) proposed a model of MLM whereby model terms are progressively added, tested for significant model fit contribution, and subsequently retained or removed based on the result of chi-squared deviance tests. This procedure involved three modeling stages for each outcome of interest, or method of calculation of change in teacher effectiveness. All MLM analyses were conducted in R with the nlme, lme4, and lmerTest packages (Pinheiro, Bates, DebRoy, Sarkar, & R Core Team, 2016).

The first stage tested the *random intercept model*, or *null model*, which included only the outcome variable without predictors while allowing the model intercepts to vary randomly across the contextual or cluster variable. This model is useful for obtaining estimates of the residual and intercept variance when only the clustering of teachers and coaches is considered. This model produced an estimate of how much variability there is between average scores on the outcome variable across teachers in the population as indicated by the magnitude of the intraclass correlation (ICC). Model two tested the random slopes model where the “time” variable was included as a fixed effect. This is considered to be an unconditional (time only) model specification. Model three tested the random slopes model with the addition of both the “time” and “adherence” variables. This was a conditional model with the addition of a new predictor. This allowed us to see improvement in model fit when allowing the model slopes between the predictor variable and the outcome to vary randomly.

Model 1:

$$Score_{ijk} = \beta_0 + v_k + u_{jk} + e_{ijk}$$

$$v_k \sim N(0, \sigma_v^2)$$

$$u_{jk} \sim N(0, \sigma_u^2)$$

$$e_{ijk} \sim N(0, \sigma_e^2)$$

Model 2:

$$Score_{ijk} = \beta_0 + \beta_1 time_{ijk} + v_k + u_{jk} + e_{ijk}$$

$$v_k \sim N(0, \sigma_v^2)$$

$$u_{jk} \sim N(0, \sigma_u^2)$$

$$e_{ijk} \sim N(0, \sigma_e^2)$$

Model 3:

$$Score_{ijk} = \beta_0 + \beta_1 time_{ijk} + \beta_2 adherence_k + v_k + u_{jk} + e_{ijk}$$

$$v_k \sim N(0, \sigma_v^2)$$

$$u_{jk} \sim N(0, \sigma_u^2)$$

$$e_{ijk} \sim N(0, \sigma_e^2)$$

Where  $Score_{ijk}$  is the teacher's score for each domain of the CLASS rubric,  $\beta_0$  is the intercept, and  $\beta_1 time_{ijk}$  is the Level 1 predictor with associated slope coefficient. The Level-2 predictor and slope coefficient are represented as  $\beta_2 adherence_k$ , and  $e_{ijk}$  is the between-time variance,  $u_{jk}$  is the between-teacher variance, and  $v_k$  is the between-coach variance.

There is no agreed upon single indicator used to determine the strength of fit for multilevel models. One of the more commonly suggested approaches involves interpreting a variety of fit indices to inspect relative changes in overall fit at each modeling stage and identify the best fitting explanatory model (Hox, 2010; Finch et al., 2014). Further, one reason for “model-building” is to reduce the possibility of model misspecification. As each level of analysis is correlated, misspecification of the residuals matrix at Level 1 can propagate to the teacher (Level 2) and coach (Level 3) levels. Additionally, according to Peugh (2010) although the fixed effect parameter estimates for predictor variables added at Level 2 and Level 3 are unbiased, Type 1 or Type 2 errors for the significance tests of those predictor variables can occur due to biased standard error estimates resulting from a misspecified residual covariance matrix at Level 1. A model-building approach tends to ensure only those random effect estimates essential to answering the research question are included in the MLM. A maximum likelihood estimation approach was selected for these MLM analyses. This allows for examination with a chi-square deviance test to determine if the magnitude of change from a simpler model to a more complex model is statistically significant. However, it was only possible to conduct the chi-square deviance tests among datasets of the same size. Therefore, we could test model 1 and model 2 against each other, including all coaches and teachers that had complete CLASS score information. In order to test model 3, we had to limit the sample to only those teachers with complete CLASS data and whose coaches were evaluated by Teachstone throughout their delivery of the MMCI program. Both sets of analyses were done (Model 1 vs. Model 2, and Model 1 vs. Model 2 vs. Model 3), and the results were largely similar, as presented in the table below:

Table 4. RQ1: Model 1 vs. Model 2

Model	df	AIC	BIC	LL	$\chi^2$	p
Weighted Average						
Model 1	4	476	489.35	-234		
Model 2	5	475.84	492.52	-232.92	2.16	0.14
Emotional Support						
Model 1	4	396.93	410.28	-194.47		
Model 2	5	396.86	413.55	-193.43	2.07	0.15
Classroom Organization						
Model 1	4	602.73	616.08	-297.36		
Model 2	5	604.7	621.39	-297.35	0.02	0.88
Instructional Support						
Model 1	4	601.82	615.17	-296.91		
Model 2	5	599.4	616.09	-294.7	4.42	0.04*

Note. LL= Log Likelihood; \* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$

Table 5. RQ1: Model 1 vs. Model 2 vs. Model 3

Model	df	AIC	BIC	LL	$\chi^2$	p
Weighted Average						
Model 1	4	354.68	366.53	-173.34		
Model 2	5	354.22	369.04	-172.11	2.46	0.12
Model 3	6	356.19	373.96	-172.09	0.04	0.85
Emotional Support						
Model 1	4	275.85	287.71	-133.93		
Model 2	5	275.37	390.18	-132.69	2.49	0.12
Model 3	6	277.27	295.05	-132.63	0.10	0.75
Classroom Organization						
Model 1	4	451.14	462.99	-221.57		
Model 2	5	452.87	467.69	-221.44	0.26	0.61
Model 3	6	454.87	472.65	-221.44	0.00	0.95
Instructional Support						
Model 1	4	435.77	447.62	-213.89		
Model 2	5	433.55	448.36	-211.78	4.22	0.04*
Model 3	6	435.45	453.22	-211.72	0.10	0.75

Note. LL= Log Likelihood; \* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$

For the purposes of these analyses, Akaike information criterion (AIC) and Bayesian information criterion (BIC) fit indices were also inspected. These are similar to the log likelihood statistic in that smaller values indicate better fit relative to other models. However, AIC and BIC

fit indices tend to inflate the estimate when more model terms are added that do not make large contribution to model fit, which distinguishes them from log likelihood estimates. Of these two indices, BIC corrects the estimate more harshly than AIC.

Additionally, changes in the ICC and level-1 and level-2 pseudo  $R^2$  were compared across models. It should be noted that pseudo  $R^2$  statistics used here are not the same as the more traditional  $R^2$  estimates found in multiple regression. The  $R^2$  values calculated for this study more accurately reflect the estimated proportion of variance in the outcome variable accounted for by a given model at level-1 and level-2, respectively. Importantly, these values should only be considered approximations of explained variance, as random slopes included in the model may bias the estimates to a smaller degree (Snijders & Bosker, 1999). Nonetheless, these statistics can be useful for identifying patterns across models.

The formulas used to calculate  $R^2$  values follow the recommendations of Snijders and Bosker (1999). Calculation of level-1  $R^2$  values used the following formula:

$$R_1^2 = \frac{\sigma_1^2 + \tau_1^2}{\sigma_0^2 + \tau_0^2}$$

where  $\sigma_0^2$  and  $\sigma_1^2$  are the level-1 error residuals for the random intercept model and the comparison model, respectively. The terms  $\tau_0^2$  and  $\tau_1^2$  indicate the intercept variance estimates for the random intercept model and the comparison model, respectively.

Table 6. RQ1: R<sup>2</sup> and ICC

Model	Variable	Estimate	Standard Error	<i>df</i>	<i>t</i>	<i>p</i>	<i>R</i> <sup>2</sup>	<i>ICC</i>
Weighted Average								
Model 2	Time Only	0.20	0.13	120.45	1.62	0.11	0.02	0.18
Model 3	Time	0.20	0.13	120.42	1.62	0.11	0.02	0.18
	Adherence	0.03	0.51	22.96	0.06	0.96		
Emotional Support								
Model 2	Time Only	0.15	0.10	121.48	1.55	0.12	0.01	0.29
Model 3	Time	0.15	0.11	121.48	1.55	0.12	0.01	0.29
	Adherence	-0.10	0.44	22.96	-0.22	0.82		
Classroom Organization								
Model 2	Time Only	0.08	0.18	121.06	0.47	0.64	0.00	0.19
Model 3	Time	0.08	0.18	121.03	0.47	0.64	0.01	0.19
	Adherence	0.34	0.71	21.71	0.47	0.64		
Instructional Support								
Model 2	Time Only	0.37	0.16	119.27	2.37	0.02**	0.02	0.40
Model 3	Time	0.37	0.16	119.34	2.37	0.02**	0.04	0.40
	Adherence	-0.18	0.85	19.42	-0.21	0.84		

Note. \**p* < .05. \*\**p* < .01. \*\*\**p* < .001

Based on the estimates and results of the model, there were no significant changes in Weighted Average (overall), Emotional Support, or Classroom Organization scores after receiving the MMCI program, although scores generally improved. However, in the area of Instructional Support, scores improved by 0.37 points after receiving the MMCI program (significant at the  $p < 0.05$  level). However, the independent contribution of adherence to teachers' Instructional Support scores was non-significant.

Analysis of the Intra-Class Correlations indicate that coach, time and adherence had differing impacts on the variability of the estimates on each of the four outcomes. For example, these variables had some impact on the overall Weighted Average outcome and Classroom Organization domain (range of 17-19% of the variability in the estimates was accounted for by coach, time and adherence). On the outcome of Emotional Support, the effect of coach, time, and adherence fell around 28%. However, on the Instructional Support domain, contextual factors related to the coach accounted for 40% of the variability in the estimates. Considering the coach, time, and adherence accounted for such a high percentage of the variability in the estimates, this was associated with a statistically significant increase in the Instructional Support scores.

## **RQ2: Influence of Process Dimensions of TI to MMCI Program on Teacher Effectiveness**

Process dimensions of TI were collected from teacher ratings of their coach during the MMCI training (Coach Rapport, Coach Quality, and Coach Engagement), along with Teachstone ratings of the coach for their certification (Adherence and Teachstone Rating of Quality). In order to determine if these process dimensions were significantly associated with other teacher variables and to determine if they should be included in the final models, Pearson correlations were calculated.

Table 7. Correlation Matrix

Variables	1	2	3	4	5	6	7	8	9	10
1. Teacher Education Level	-									
2. Teacher Age	0.17	-								
3. Adherence	0.13	0.16	-							
4. Teachstone Quality Rating	0.03	0.20	0.53***	-						
5. ES – Pre Score	0.15	0.13	-0.06	-0.28*	-					
6. ES – Post Score	0.18	0.12	0	-0.24*	0.76***	-				
7. CO – Pre Score	0.08	0.08	0.07	-0.09	0.53***	0.53***	-			
8. CO – Post Score	0.13	0.12	0.07	-0.10	0.51***	0.67***	0.88***	-		
9. IS– Pre Score	-0.03	-0.04	0.01	0.07	0.33**	0.31**	0.53***	0.51***	-	
10. IS – Post Score	0.11	-0.03	0.08	0.07	0.39***	0.56***	0.45***	0.56***	0.72***	-
11. Weighted – Pre Score	0.24	0.04	0.07	-0.07	0.12	0.17	0.27*	0.3**	0.07	0.1
12. Weighted– Post Score	0.25*	0.11	0.09	-0.07	0.08	0.19	0.15	0.23	0	0.14
13. Teacher Burnout	-0.11	-0.11	0.15	0.16	-0.29*	-0.24*	-0.16	-0.13	-0.1	-0.03
14. Teacher Self-Efficacy	0.1	0.23	0.01	-0.08	0.27*	0.27*	0.06	0.12	0.01	0.17
15. Coach Rapport	0.01	0.1	0.18	0.05	0.27*	0.13	0.08	0.04	0.07	0.06
16. Coach Quality	-0.1	-0.13	0.1	0.09	0.05	0.01	0.08	0	0.16	0.02
17. Coach Engagement	0	-0.03	0.14	-0.04	0.01	-0.03	-0.06	-0.1	0.02	-0.07
18. Teacher Attendance	0.05	-0.04	-0.07	-0.09	-0.02	-0.16	-0.01	-0.14	-0.1	-0.2

(table cont'd)

Note. ES = Emotional Support, CO = Classroom Organization, IS = Instructional Support; Pearson correlation coefficient effect size interpretation:  $r > .10$  = small,  $r > .30$  = medium,  $r > .50$  = large (Cohen, 1992); \* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$

	11	12	13	14	15	16	17	18
11. Weighted Average – Pre Score	-							
12. Weighted Average – Post Score	0.56***	-						
13. Teacher Burnout Score	-0.13	-0.06	-					
14. Teacher Self-Efficacy Score	0.02	0.03	-0.42*	-				
15. Coach Rapport	-0.06	-0.15	-0.23	0.37*	-			
16. Coach Quality	-0.13	-0.28*	-0.04	0.16	0.74**	-		
17. Coach Engagement	-0.22	-0.14	-0.15	0.31*	0.75**	0.58*	-	
18. Teacher Attendance	-0.14	-0.13	-0.07	-0.1	0.02	-0.05	0.15	-

Note. ES = Emotional Support, CO = Classroom Organization, IS = Instructional Support; Pearson correlation coefficient effect size interpretation:  $r > .10$  = small,  $r > .30$  = medium,  $r > .50$  = large (Cohen, 1992); \* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$

Correlations among all dimensions and methods of calculating changes in teacher effectiveness with the process dimensions of TI related to teacher ratings of their coach are found in Table 7. Due to small-to-moderate and significant correlations between teacher-related variables like burnout and self-efficacy with pre- and post-MMCI scores on the Emotional Support domain of the CLASS rubric, and given the prior research on these factors influencing teacher effectiveness, these variables were included in subsequent models. All teacher ratings of the coaches were examined separately to determine their impact on the outcomes of interest (i.e., CLASS scores).

As described above, in order to become certified through Teachstone to deliver MMCI trainings in the future, provisional instructors had to submit three videos for rating and review by MMCI specialists. There are a total of 9 individual components within the three criterion, which provide additional valuations of both process and content dimensions of treatment integrity at three separate time points (see Appendix A). One item strictly identified how well the coach adhered to the program (“Presents PowerPoint presentation and videos as indicated in the MMCI Instructor Guide”) while the other 8 components rated the quality of the coach’s delivery (i.e., “Demonstrates clear understanding of the material,” or “Helps participants connect their observations to the appropriate CLASS dimension and indicator”). Because these data were available, we were able to assess if the teachers’ perceptions of coach quality were related at all to Teachstone’s perceptions of coach quality (referred to as quality of delivery to differentiate the two variables). The correlation matrix reflecting these associations is presented in Table 7.

The second research question of the study was to determine if process dimensions of treatment integrity (quality, engagement, and rapport) impacted teacher effectiveness. Because of the hierarchical structure of the data, where teachers were nested within coaches, multilevel

modeling (MLM) procedures were utilized. Using MLM to analyze these data offered several advantages over traditional multiple regression approaches, including the ability to calculate teacher-level variance separately from the variance at the coach level, as well as to appropriately adjust for problematic patterns in the dataset (e.g., unequal sample sizes within coaches, non-independence of pre-MMCI and post-MMCI teacher effectiveness ratings) and allow for greater estimate accuracy (Raudenbush & Bryk, 2002; Finch et al., 2014; Huta, 2014).

As described earlier, Hox (2010) proposed a model of MLM whereby model terms are progressively added, tested for significant model fit contribution, and subsequently retained or removed based on the result of chi-squared deviance tests. This procedure involved two modeling stages for each outcome of interest, or method of calculation of change in teacher effectiveness. All MLM analyses were conducted in R with the nlme package (Pinheiro et al., 2016).

The first model used to answer this research question is the same as Model 3 described above. The model included time, in order to estimate the change in the outcome variable before and after the intervention, and the adherence variable provided by Teachstone, indicating how well the coaches adhered to the PowerPoint presentations provided in the MMCI program. Just as in Research Question 1, coaches were considered a Level 3 variable, teachers a Level 2 variable, and time a Level 1 variable, which resulted in a 3-level model. This model produced an estimate of how much variability there is between scores on the outcome variable across coaches in the population as indicated by the magnitude of the intraclass correlation (ICC).

Models 4 and 5 tested the models where teacher-related variables and ratings of coach qualities were added in two separate models to the null model with adherence. After considering time and adherence, teacher burnout and teacher self-efficacy were added to the model in Model

4. Model 5 included time, adherence, teacher burnout, teacher self-efficacy and teacher ratings of the coach on quality, rapport, and engagement predictors. Model 6 included time, adherence, teacher burnout, teacher self-efficacy, and the other ratings from Teachstone on other aspects of Coach Quality, which was calculated as an average of the other eight items on the Teachstone rating summary other than the item that asked about adherence (See Appendix A). This predictor was conceptualized as Teachstone's rating of coach quality and measured as a Level-3 variable, which could then be compared directly to the teachers' ratings of their coach by comparing model fits.

To determine this, the following models were specified:

Model 3:

$$Score_{ijk} = \beta_0 + \beta_1 time_{ijk} + \beta_2 adherence_k + v_k + u_{jk} + e_{ijk}$$

$$v_k \sim N(0, \sigma_v^2)$$

$$u_{jk} \sim N(0, \sigma_u^2)$$

$$e_{ijk} \sim N(0, \sigma_e^2)$$

Model 4:

$$Score_{ijk} = \beta_0 + \beta_1 time_{ijk} + \beta_2 adherence_k + \beta_3 burnout_{jk} + \beta_3 self - efficacy_{jk} + v_k + u_{jk} + e_{ijk}$$

$$v_k \sim N(0, \sigma_v^2)$$

$$u_{jk} \sim N(0, \sigma_u^2)$$

$$e_{ijk} \sim N(0, \sigma_e^2)$$

Model 5:

$$Score_{ijk} = \beta_0 + \beta_1 time_{ijk} + \beta_2 adherence_k + \beta_3 burnout_{jk} + \beta_3 self - efficacy_{jk} + \beta_4 rapport_{jk} + \beta_5 quality_{jk} + \beta_6 engagement_{jk} + v_k + u_{jk} + e_{ijk}$$

$$v_k \sim N(0, \sigma_v^2)$$

$$u_{jk} \sim N(0, \sigma_u^2)$$

$$e_{ijk} \sim N(0, \sigma_e^2)$$

Model 6:

$$\begin{aligned} \text{Score}_{ijk} = & \beta_0 + \beta_1 \text{time}_{ijk} + \beta_2 \text{adherence}_k + \beta_3 \text{burnout}_{jk} + \beta_3 \text{self} - \text{efficacy}_{jk} \\ & + \beta_4 \text{Teachstone} - \text{rating}_k + v_k + u_{jk} + e_{ijk} \end{aligned}$$

$$v_k \sim N(0, \sigma_v^2)$$

$$u_{jk} \sim N(0, \sigma_u^2)$$

$$e_{ijk} \sim N(0, \sigma_e^2)$$

Where  $\text{Score}_{ijk}$  is the score for each domain of the CLASS rubric,  $\beta_0$  is the intercept,  $\beta_1 \text{time}_{ijk}$  is the Level 1 predictor with associated slope coefficient.  $e_{ijk}$  is the between-time variance,  $u_{jk}$  is the between-teacher variance, and  $v_k$  is the between-coach variance. The variables of burnout and self-efficacy as well as teacher ratings of coach rapport, coach quality, and engagement were all measured as Level 2 variables. Adherence and Teachstone-ratings of coach quality were measured as Level 3 variables.

As described above, there is no agreed upon single indicator used to determine the strength of fit for multilevel models. The commonly suggested approach involves interpretation of a variety of fit indices to inspect relative changes in overall fit at each modeling stage and identify the best fitting explanatory model (Hox, 2010; Finch et al., 2014). AIC and BIC fit indices were also inspected in this study. These are similar to the log likelihood statistic in that smaller values indicate better fit relative to other models. Conversely, these statistics are distinguished from the log likelihood estimates in that they inflate the estimate when model

terms are included that do not make sufficiently large contributions to model fit. Of these two indices, BIC corrects the estimate more harshly than AIC. The estimates and comparisons of the three models for each outcome variable are presented in Table 8.

Table 8. RQ2: Model 4 vs. Model 5 vs. Model 6

ANOVA	<i>df</i>	AIC	BIC	LL	$\chi^2$	<i>p</i>
Weighted Average						
Model 4	8	321.83	344.89	-152.91		
Model 5	11	323.61	355.32	-150.8	3.77	0.15
Model 6	9	323.38	349.32	-152.69	0.45	0.50
Emotional Support						
Model 4	8	250.23	273.3	-117.12		
Model 5	11	248.03	279.74	-113.01	5.65	0.06*
Model 6	9	249.68	275.63	-115.84	2.55	0.11
Classroom Organization						
Model 4	8	414.15	437.21	-199.07		
Model 5	11	416.59	448.3	-197.29	2.58	0.28
Model 6	9	415.17	441.12	-198.59	0.97	0.32
Instructional Support						
Model 4	8	393.21	416.27	-188.6		
Model 5	11	395.86	427.57	-186.93	3.33	0.19
Model 6	9	395.18	421.13	-188.59	0.03	0.87

Note. LL = Log Likelihood; \* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ ; Model 4 included Time, Adherence, Burnout, Self-Efficacy; Model 5 included Time, Adherence, Burnout, Self-Efficacy, and Teacher Ratings of Coach; Model 6 included Time, Adherence, Teacher Ratings of Coach, and Teachstone Quality Rating

Based on the results of the fit comparisons, adding teacher ratings of coach quality significantly improved the fit for the model of the scores on the Emotional Support dimension at the 0.10 level. Although there were slight differences between AIC and BIC scores between models for each of the other outcomes, none were statistically significant. Further analysis of predictor variable contribution to the model is presented for each outcome variable in Tables 9, 10, and 11.

Additionally, changes in the ICC and Level-1 and Level-2 pseudo  $R^2$  were compared across models. It should be noted that pseudo  $R^2$  statistics used here are not the same as the more traditional  $R^2$  estimates found in multiple regression. The  $R^2$  values calculated for this study more accurately reflect the estimated proportion of variance in the outcome variable accounted for by a given model at Level-1 and Level-2, respectively. Importantly, these values should only be considered approximations of explained variance, as random slopes included in the model may bias the estimates to a smaller degree (Snijders & Bosker, 1999). Nonetheless, these statistics can be useful for identifying patterns across models.

The formulas used to calculate  $R^2$  values were identical to those used to answer the first research question, and used the following formula:

$$R_1^2 = \frac{\sigma_1^2 + \tau_1^2}{\sigma_0^2 + \tau_0^2}$$

where  $\sigma_0^2$  and  $\sigma_1^2$  are the Level-1 error residuals for the random intercept model and the comparison model, respectively. The terms  $\tau_0^2$  and  $\tau_1^2$  indicate the intercept variance estimates for the random intercept model and the comparison model, respectively.

Table 9. Emotional Support R<sup>2</sup> and ICC

Model and Variable	Estimate	Standard Error	df	t	p	R <sup>2</sup>	ICC
Model 3						0.13	0.29
Time	0.15	0.10	121.48	1.55	0.12		
Adherence	-0.10	0.44	22.96	-0.23	0.82		
Model 4						0.08	0.31
Time	0.15	0.09	116.17	1.61	0.11		
Adherence	-0.12	0.45	22.84	-0.26	0.80		
Teacher Burnout	-0.03	0.05	132	-0.48	0.64		
Teacher Self Efficacy	0.17	0.06	125.41	2.82	0.01**		
Model 5						0.15	0.30
Time	0.15	0.09	115.56	1.66	0.10		
Adherence	-0.20	0.43	22.82	-0.46	0.65		
Teacher Burnout	0.01	0.05	131.69	0.13	0.90		
Teacher Self Efficacy	0.15	0.06	124.49	2.51	0.01*		
Coach Rapport	0.31	0.11	119.87	2.86	0.01**		
Coach Quality	-0.07	0.05	128.6	-1.39	0.17		
Coach Engagement	-0.19	0.09	107.83	-2.21	0.03*		
Model 6						0.14	0.27
Time	0.15	0.09	116.14	1.61	0.11		
Adherence	0.34	0.50	21.15	0.68	0.50		
Teacher Burnout	-0.03	0.05	131.69	-0.55	0.58		
Teacher Self-Efficacy	0.16	0.06	125.68	2.73	0.01**		
Teachstone Quality Rating	-0.96	0.58	18.43	-1.66	0.11		

Note. \* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$

Table 10. Classroom Organization R<sup>2</sup> and ICC

Model and Variable	Estimate	Standard Error	df	t	p	R <sup>2</sup>	ICC
Model 3						0.00	0.19
Time	0.08	0.18	121.03	0.47	0.64		
Adherence	0.34	0.71	21.71	0.47	0.64		
Model 4						0.03	0.12
Time	0.10	0.18	116.58	0.54	0.59		
Adherence	0.41	0.77	21.69	0.54	0.60		
Teacher Burnout	-0.04	0.10	129.65	-0.40	0.69		
Teacher Self Efficacy	0.16	0.11	125.33	1.44	0.15		
Model 5						0.06	0.18
Time	0.10	0.18	115.59	0.54	0.59		
Adherence	0.46	0.73	17.44	0.64	0.53		
Teacher Burnout	-0.01	0.10	127.41	-0.11	0.91		
Teacher Self Efficacy	0.17	0.12	124.93	1.45	0.15		
Coach Rapport	0.18	0.20	109.42	0.93	0.36		
Coach Quality	0.07	0.10	124.56	0.71	0.48		
Coach Engagement	-0.26	0.16	95.09	-1.71	0.09		
Model 6						0.05	0.06
Time	0.10	0.18	115.52	0.53	0.60		
Adherence	0.85	0.86	22.93	0.99	0.33		
Teacher Burnout	-0.05	0.10	127.99	-0.50	0.62		
Teacher Self-Efficacy	0.16	0.11	124.79	1.40	0.17		
Teachstone Quality Rating	-0.93	0.88	13.57	-1.06	0.31		

Note. \* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$

Table 11. Instructional Support R<sup>2</sup> and ICC

Model and Variable	Estimate	Standard Error	df	t	p	R <sup>2</sup>	ICC
Model 3						0.03	0.40
Time	0.37	0.16	119.34	2.37	0.02*		
Adherence	-0.17	0.85	19.42	-0.21	0.84		
Model 4						0.04	0.41
Time	0.36	0.16	115.53	2.30	0.02*		
Adherence	-0.44	0.87	21.05	-0.51	0.62		
Teacher Burnout	0.01	0.09	131.06	0.06	0.95		
Teacher Self Efficacy	0.11	0.10	123.44	1.05	0.30		
Model 5						0.05	0.43
Time	0.36	0.16	114.10	2.34	0.02*		
Adherence	-0.36	0.89	19.62	-0.40	0.69		
Teacher Burnout	0.01	0.09	131.28	0.15	0.88		
Teacher Self Efficacy	0.12	0.10	121.26	1.16	0.25		
Coach Rapport	0.10	0.19	128.48	0.54	0.59		
Coach Quality	0.09	0.09	125.47	1.01	0.32		
Coach Engagement	-0.21	0.15	121.27	-1.37	0.17		
Model 6						0.04	0.41
Time	0.36	0.16	115.47	2.30	0.02*		
Adherence	-0.53	1.04	19.72	-0.51	0.62		
Teacher Burnout	0.01	0.09	131.08	0.06	0.95		
Teacher Self-Efficacy	0.11	0.10	123.02	1.06	0.29		
Teachstone Quality Rating	0.19	1.22	17.79	0.16	0.88		

Note. \* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$

Table 12. Weighted CLASS Score R<sup>2</sup> and ICC

Model and Variable	Estimate	Standard Error	df	t	p	R <sup>2</sup>	ICC
Model 3						0.02	0.18
Time	0.20	0.12	120.42	1.62	0.11		
Adherence	0.03	0.51	22.96	0.06	0.96		
Model 4						0.05	0.18
Time	0.20	0.13	115.12	1.62	0.11		
Adherence	-0.05	0.54	23.32	-0.09	0.93		
Teacher Burnout	-0.03	0.07	130.27	-0.38	0.70		
Teacher Self Efficacy	0.14	0.08	123.90	1.80	0.07		
Model 5						0.08	0.24
Time	0.20	0.12	114.47	1.65	0.10		
Adherence	-0.01	0.53	22.37	-0.02	0.99		
Teacher Burnout	0.00	0.07	129.72	-0.02	0.98		
Teacher Self Efficacy	0.15	0.08	125.45	1.82	0.07		
Coach Rapport	0.18	0.14	111.77	1.26	0.21		
Coach Quality	0.03	0.07	129.67	0.49	0.62		
Coach Engagement	-0.21	0.11	97.23	-1.89	0.06		
Model 6						0.06	0.16
Time	0.20	0.13	114.76	1.62	0.11		
Adherence	0.17	0.62	21.01	0.28	0.78		
Teacher Burnout	-0.03	0.07	129.98	-0.39	0.70		
Teacher Self-Efficacy	0.14	0.08	123.45	1.76	0.08		
Teachstone Quality Rating	-0.46	0.69	12.86	-0.68	0.51		

Note. \* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$

Based on the results of these fit comparisons, teacher-related variables like self-efficacy and the coaches' ability to build rapport were significantly associated with positive increases in teachers' scores on the Emotional Support domain. On the emotional support domain, higher teacher ratings of the coach's ability to build rapport (or a working alliance) were significantly associated with a 0.3 point increase in the teacher's score following receipt of the intervention, when adherence, teacher burnout, and teacher self-efficacy were included in the model along with other teacher ratings of their coaches. On the Instructional Support domain, scores significantly improved by approximately 0.36 points for each model tested, regardless of what teacher-related variables were present in the model, none of which were significant. None of the variables were significant at the  $\alpha=0.05$  level in any of the models in the Classroom Organization domain. Higher teacher ratings of their job engagement as a result of the MMCI program was associated with a decrease in CLASS scores across domains, and this decrease was significant at the  $\alpha=0.05$  level in the domain of Emotional Support, and at the  $\alpha=0.10$  level in the Classroom Organization domain and for the overall weighted CLASS score. The results for the overall CLASS score (weighted average) were attenuated, with no variables in any of the models meeting significance at the  $\alpha=0.05$  level. Additional ratings of coach quality by Teachstone were not significant predictors of changes in CLASS scores on any domain.

It is interesting to note that the adherence variable alone was associated with different effects in different domains. Although none of these results were significant, adherence was associated with an increase in Classroom Organization scores and a decrease in Instructional Support scores across models. Analysis of the Intra-Class Correlations indicate that the process dimensions of TI had differing impacts on the variability of the estimates on each of the four outcomes. For example, these variables appeared to have a smaller impact on the Classroom

Organization outcome (range of 6-18% of the variability in the estimates was accounted for by different ratings of treatment integrity). On the other outcomes of Emotional Support or Instructional Support, the effect of the different ratings of the process dimensions ranged from 27-43%. On the overall weighted average, the effect of process dimensions of TI ranged from 16-24%.

As in the models previously fit for the first research question, it appears as if in this pilot study, CLASS scores generally improved following receipt of the intervention. However, depending on what other variables included in the model, process dimensions of treatment integrity have at times a positive, neutral, or negative impact on teacher effectiveness scores but generally speaking, the impact is not significant.

### **Exploratory Analyses**

It is widely understood that implementation challenges are commonplace when systems attempt to adopt new innovations (Fixsen et al., 2005; Forman et al., 2013; Long et al., 2016). Consistent with research, the challenges of implementing something new were made evident in the present project. Therefore, this study gained supplemental data on the implementation barriers teachers and coaches perceived encountering during the MMCI state pilot project. These data are exploratory and gathered in an attempt to provide further context to aid in hypothesis generation and interpretation of study results, as well as to possibly inform study implications. Implementation barriers “can be defined as variables that obstruct efforts to implement an intervention, often reducing its impact” (Long et al., 2016, p. 3). Barriers encompass both the presence of variables that hinder implementation as well as the absence of variables that facilitate it.

According to Long et al. (2016), Sanetti and Kratochwill (2009) took information from previous reviews to streamline information about implementation barriers into 37 specific types

organized under four overarching categories. Each category was aligned to correspond to a level of an ecological framework including the external environment, organization, intervention, and implementer, which is consistent with the work of Feldstein and Glasgow (2008). At the external environment level, these barriers refer largely to the coordination among agencies and organizations, educational policy, legislation and external stakeholders, and generally reflect the context in which an intervention is conducted (Bosworth, Gingiss, Pothoff & Roberts-Gray, 1999). At the organization level, barriers center on leadership, climate, and resources available (Durlak & DuPre, 2008). Intervention-level barriers relate to the ease of implementation and the compatibility of the intervention as well as the characteristics of the intervention itself (Bosworth et al., 1999, Gresham 1989). At the implementer level, barriers center on buy-in, skill proficiency, and self-efficacy (Bosworth et al., 1999, Perepletchikova and Kazdin, 2005).

**Data collection.** After completing participation in MMCI, via survey, teachers were asked to report on the implementation barriers they encountered when trying to improve or change their teaching practices in response to what they had been taught. There were three parts to this brief survey. Part one provided an opportunity for teachers to endorse whether (*yes/no*) they had experienced a barrier from a list of the most common barriers reported/studied (cf. Long et al., 2016), including (a) *time/duration required to implement the practice(s)*; (b) *insufficient administrative/leadership support to implement the practice(s)*; (c) *inadequate staffing at my educational setting*; (d) *incompatibility (or inappropriateness) of the practice(s) with my existing practices, classroom, or students*; (e) *insufficient skill or confidence to carry out the practice(s)*; (f) *materials/resources required to implement the practice(s) were insufficient or unattainable*; (g) *insufficient planning time, technical assistance, or support to implement the practice(s)*; (h) *insufficient buy-in for the practice(s)*; and (i) *lack of responsiveness or cooperation from students in my classroom to implement practice(s)*. Part two asked teachers to list any additional or other

implementation barriers they experienced that were not on the provided list. To do so, they were given a space to write in a free response. Finally, in part three, teachers were asked to list the most common barriers they encountered in a free response for 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> most common barriers.

Coaches were also asked to report on implementation barriers. Their survey was similar to that of the survey for teacher participants, except that coaches were asked to report about their confidence in their ability to help teachers overcome specific barriers. (1 = *not at all sure* to 7 = *entirely sure*). Coaches were additionally asked to list the most common barriers they encountered in a free response for 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> most common barriers.

In order to obtain the most comprehensive view of barriers experienced during MMCI implementation, the top three barriers listed by both teachers and coaches were compared. In this way, it is possible to be more confident that the barriers are confirmed by multiple parties as opposed to simply being perceived by an individual. When examining all reported barriers across all surveys completed, a total of 73 teachers reported 137 barriers, and 22 coaches reported a total of 45 barriers. In order to categorize the top-reported barriers, free responses were assigned codes. According to Long et al. (2016), there are two broad approaches to coding qualitative data: emergent and a priori. Emergent coding requires a preliminary examination of the data form which categories emerge. A prior coding has assigned categories based on theory or relevant research findings and are present prior to examining data. For the purposes of these exploratory analyses, a two-step approach was used. First, all free-response barriers that were aligned with a category of barriers that had been supplied to the teachers were assigned a single code. For example, the free response, “lack of time” was assigned the specific barrier code for time/duration required. Additional barriers that did not fit into any of the supplied categories were examined for emergent themes, and then assigned codes based on those themes. Additional

items that did not seem to fit into any category were coded as “miscellaneous,” for example, “parents.” Coding was then confirmed by an additional graduate student. Overall interrater agreement was found to be slightly below the recommended level (i.e., ~75%); thus, initial assigned codes were reviewed by an additional third party to gain consensus with the primary researcher about the appropriate code.

Table 13. Descriptive statistics of Barriers

Barrier	Teacher-Reported Barriers	Coach-Reported Barriers
Time/Duration required to implement the practice(s)	26 (18.98%)	10 (22.22%)
Insufficient need or buy-in for the practice(s)	17 (12.41%)	13 (28.89%)
Incompatibility (or inappropriateness) of the practice(s) with my existing practices, classroom setting, or students	22 (16.06%)	4 (8.89%)
Lack of responsiveness or cooperation from students in my classroom to implement the practice(s)	24 (17.52%)	2 (4.44%)
Insufficient skill or confidence to carry out the practice(s)	17 (12.41%)	7 (15.56%)
Materials/resources required to implement the practices were insufficient or too challenging to obtain	13 (9.49%)	3 (6.67%)
Insufficient administrative/leadership support to implement the practice(s)	7 (5.11%)	4 (8.89%)
Miscellaneous	6 (4.32%)	0 (0%)
Insufficient planning time, technical assistance, or support needed to implement the practice(s)	2 (5.11%)	2 (4.44%)
Inadequate staffing at my educational setting	3(2.19%)	0 (0%)

As seen in Table 13, teachers and coaches largely agreed on common barriers in implementing the MMCI program. The most common barriers as rated by teachers and coaches were time/duration required to implement the practice(s) and insufficient need or buy-in for the practices. It is no surprise that teachers are short on time, but it is interesting that teachers were

able to be self-reflective about how their own skill or confidence could have impacted the success of the program. Additionally, with low confidence and low buy-in, teachers and coaches could have been less likely to feel invested in the MMCI program, and therefore could have been less likely to actively participate in sessions. The lack of buy-in was also corroborated by parish leaders, who, as described earlier, reported that the LA DOE decided to move forward with a different evaluation tool and training program for the subsequent year. Interestingly, teachers were more likely to report barriers inside classrooms, like student behavior or appropriateness for student population, than were coaches. This could be due to the differing roles between teachers and coaches, and that coaches are more likely to understand and be fluent with best practices in teaching with skills that work across student populations.

## DISCUSSION

This study addressed the gap in the implementation literature around the impact of process dimensions of TI on intervention outcomes. Additionally, this study provides important information about coaching-related variables and how they impact changes in teacher effectiveness over the course of one school year. It was hypothesized that coaches who have higher ratings of competency and skill from their teachers will be able to more effectively deliver the intervention and their teachers, therefore, would show larger improvements in CLASS scores. Additionally, it was hypothesized that teachers who show more engagement in their work would be more receptive to feedback from the coaches, which would also translate to higher CLASS scores. Further, stronger coach-teacher alliances were hypothesized to translate into higher CLASS scores, specifically in the domain of Emotional Support, since this would have been modeled for these teachers.

By and large, the resulting teacher effectiveness scores following implementation of the MMCI program across 4 parishes in Louisiana were not significantly different from those scores received prior to starting the intervention. There were no significant changes in Weighted Average, Emotional Support, or Classroom Organization scores after receiving the MMCI program. However, in the area of Instructional Support, scores improved by 0.37 points after receiving the MMCI program (significant at the  $p < 0.05$  level). When adherence was included in the model, this growth remained the same (improved by 0.37 points after receiving the MMCI program significant at the  $p < 0.05$  level), with the independent contribution of adherence to teachers' Instructional Support scores nonsignificant. This is different from the results of prior research on the MMCI program, which indicated significant benefit to teacher participation in the MMCI program (Early et al., 2017).

Traditional methods of measuring TI have relied upon content dimensions like adherence and exposure/dosage. Recent conceptualizations have included process dimensions of TI that provide information on how well the intervention was delivered, including variables like quality of delivery, participant responsiveness or engagement, and the fit of the program to its intended audience. In this study, process dimensions were conceptualized as containing three dimensions: quality (teacher perceptions of coach competency), engagement (ability to actively engage teachers), and relationship/rapport (quality of relationship between coach/instructor and teacher, or consultant and consultee). Additionally, since coaches were seeking certification, data were available from Teachstone to determine if teachers' perceptions of coach quality were related to Teachstone's perceptions of coach quality. Upon examination of the process dimensions of TI on the Emotional Support domain, higher teacher ratings of the coach's ability to build rapport were significantly associated with a 0.3 point increase in the teacher's score following receipt of the intervention, when adherence, teacher burnout, and teacher self-efficacy were included in the model along with other teacher ratings of their coaches.

Higher scores of the teacher's engagement in their job following the MMCI program were associated with small decreases in CLASS scores across domains, although this relationship was only significant for scores on the Emotional Support domain. Ratings on this engagement scale were negatively correlated with teacher age, indicating older teachers were less likely to have higher ratings of engagement, although this correlation was not significant. As teacher age and experience have been shown to be significant predictors of teacher effectiveness (Harris & Sass, 2007), this could partially explain the directionality of these findings. Items on this measure were phrased, for example, "As a result of this program, I work with intensity on my job." When considering the barriers both teachers and coaches reported related to

administrative buy-in and general fit and acceptability of the MMCI program, these items may have been capturing teachers' feelings of the program rather than their feelings about their coach. This could explain the difference in direction of findings between rapport and engagement; it appears as if teachers experienced some benefit from the mentorship aspect of the coaching relationship, while the same was not true of their feelings about the program or professional development.

Additionally, Teachstone's ratings of the coach's quality of delivery of the MMCI program appeared to have no influence on any domain of CLASS scores, while the quality ratings as reported by teachers did in some ways. Teachstone's rubric did not include any ratings of rapport or relationship between the coach and the teachers, and instead just rated the quality of delivery during sessions. This is congruent with what has been seen in prior research in the area of professional development with teachers: pedagogical professional development is often ineffective (Jacob & Lefgren, 2004; Harris & Sass, 2007), and when professional development is effective, it is content-focused and highly practical for immediate implementation by the teacher, as is common in teacher training programs that include mentorship and coaching (Hargreaves, 1989). The mentorship and rapport aspects of the teacher-coach relationship appear to be important factors to include in analyses of the effectiveness of teacher professional development programs.

On the Emotional Support domain, higher teacher self-efficacy was significantly associated with an increase in scores across models: when adherence and burnout were included in the model, when process dimensions of TI were included in the model, and when Teachstone ratings of coach quality were included. Across each of the models for the four outcomes, higher teacher self-efficacy was associated with increases in CLASS scores, and higher ratings of

teacher burnout were associated with decreases in CLASS Scores, although these relationships were not significant. This direction of relationship is consistent with prior research on common contributors to teacher performance beyond traditional demographic variables (Pas, Bradshaw, & Hershfeldt, 2012; Tschannen-Moran, Hoy, & Hoy, 1998; Tsouloupas, Carson, Matthews, Grawitch, & Barber, 2010).

Further, analysis of the Intra-Class Correlations across models indicate that the process dimensions of TI had differing impacts on the variability of the estimates across each of the four outcomes. Process dimensions of TI appeared to have a smaller impact on the Classroom Organization outcome (range of 6-18% of the variability in the estimates was accounted for by different ratings of treatment integrity), while on the other outcomes of Emotional Support or Instructional Support, the effect of the different ratings of the process dimensions ranged from 27-43%. Taken together, it appears as if Classroom Organization, including dimensions of behavior management, productivity, and instructional learning formats was the least impacted by any of the variables measured and included in analyses for this study.

Providing coaching and professional development to teachers is common practice at schools across the country and has proven to be effective at times and under certain conditions. Measuring the impact of these interventions on teacher effectiveness is difficult, in part because measuring the impact of a teacher in their classroom is difficult in itself. Even with a reliable measure of teacher-child interactions like the CLASS rubric (Pianta, La Paro et al., 2008; Pianta, Karen et al., 2008), and with a professional development program designed to improve performance on the domains included in that rubric like the MMCI program, there are still implementation challenges that can impact outcomes. Understanding these barriers, as well as

the nuances of what makes professional development and coaching effective, could improve program design and professional development implementation in the future.

### **Limitations**

These findings must be interpreted with caution because the sample of parishes participating in the pilot project were selected based on site director interest, thus we cannot know if these findings would generalize to a broader sample of teachers. Additionally, the teachers were not assigned to any groups at random, and the study did not include a control group. Lastly, selection bias could have further impacted study results due to the large portion of teachers that had to be dropped from primary analyses due to missing information on the part of the teacher or their coach.

There are several additional possible explanations for why the MMCI program did not result in expected increases in CLASS scores. There were several implementation challenges that the researcher was made aware of following the pilot study, which is common when systems attempt to adopt new innovations (Fixsen et al., 2005; Forman et al., 2013; Long et al., 2016). Different parishes implemented the program differently; some parishes spaced them out while some provided multiple sessions on one professional development day. With these adaptations, it was often unclear how much time had passed between the last MMCI session and the final CLASS evaluation. This not only could have unevenly effected implementation of the MMCI program within classrooms, it could have attenuated results in some parishes depending on their specific adaptations. This likely had an impact on the ability of a proven program to demonstrate results. Unfortunately, this is not uncommon as programs are scaled up following initial success in early trials (Shields et al., 2001).

Further, while the pilot study was ongoing, the LA DOE announced that teachers would be evaluated using a different rubric the following school year. This could have negatively influenced the buy-in and reinforcement of the program by the coaches if they did not believe that working toward MMCI certification would be beneficial to them in the future or if they believed the skills and practices presented in MMCI were not ultimately going to be a priority for their teachers. As one example, the in-classroom coaching or mentoring that has traditionally been a part of evaluations of the MMCI program in the past, did not appear to take place in the LA pilot project. Thus, based on anecdotal information, teachers did not seem to be receiving or received very limited performance feedback on practices that they were being taught. We know from the research that in vivo practice with feedback is key to behavior change (Noell & Gansle, 2014). Additionally, teachers may not have placed as much emphasis or priority on incorporating or demonstrating the teaching behaviors aligned to the CLASS rubric (those learned in the MMCI program) if they believed their CLASS scores did not matter in evaluating their performance in the long term. In summary, these implementation barriers at the external environment and organizational level could have resulted in fatal flaws for the pilot.

The top two barriers reported by teachers and coaches were time to implement and insufficient need or buy-in for the practices. Although the MMCI program includes what are commonly agreed upon components of effective teaching and improvements in these areas might well be reflected on a rubric other than the CLASS rubric, time to implement and buy-in are two barriers that can be difficult to overcome, especially without intentionality to do so. As pointed out by Hargreaves and Dawe (1990), teachers are often reluctant to explore alternative teaching practices or approaches that challenge them beyond their present levels of performance as the desire for increased accountability has grown and teachers have felt more anxiety about their

own effectiveness. For these reasons, when decisions are made at the administrative level, buy-in and commitment from the top levels are incredibly important, with the knowledge that changing systems takes time. Just like research has proven that the “train-and-hope” model of generalization is not effective on an individual level (Erchul & Martens, 2010), implementation without significant time and organizational commitments would not be expected to be effective either. Without administrative buy-in for the MMCI system and the CLASS rubric, there would be few negative consequences, if any, to poor intervention implementation at the teacher or the coach level. With low administrative buy-in, teacher-buy in would in turn also be expected to be low, and therefore teachers would not want to dedicate time and energy to implement the new practices if they did not feel as if there would be a positive benefit to them.

### **Implications and Future Directions**

Further research should be devoted to clarifying the various aspects of interventions that make teacher professional development effective. Within this topic, ranges of adaptations should be specified for individual intervention components. For example, adaptations like the timing and spacing of sessions should be an important component to consider in the definition of an effective program so that district or parish leaders can make decisions accordingly knowing the capacity of their own systems. Additionally, findings from this study suggest that more research needs to be done to identify what components of professional development interventions result in desired changes and what are simply superfluous. Given limited resources in education, especially in high-need areas, it is critical that the resources allocated can be most efficiently and effectively dispersed. Educators should be able to have some degree of confidence that the resources and efforts expended will lead to improved teacher and student performance.

As this study has shown some evidence that teachers experience a benefit from the mentorship and relationship they build with their coach across a school year, more research is warranted on how those relationships are built and what aspects of that can be replicated across various models of professional development. Overwhelmingly, teachers reported that they respected their coach, they liked their coach, and they had a good working relationship with their coach. Teachers also agreed that their coach offered useful information and helped them problem-solve. More research should clarify if similar working relationships could be built over fewer sessions, if stronger relationships could be built over more sessions, and which would be more influential on outcomes (both teacher performance and retention). Additionally, research could determine the optimal number of teachers or participants to include in professional development sessions like these so that these relationships can be built and maintained to improve outcomes for both students and teachers.

In spite of the many null findings, this study improved upon previous research by including a sample of teachers and coaches who have worked together over multiple sessions of professional development, while controlling for the quantity of intervention received within the same statistical models to isolate components of the teacher-coach relationship that can improve outcomes in the classroom. This should guide future research toward developing ways to make the implementation of interventions for classrooms more efficient and effective.

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## APPENDIX A. TEACHSTONE INSTRUCTOR TRAINING RUBRIC

Criterion	Component	Score
Criterion One: Demonstrates and Develops CLASS Content Knowledge	Demonstrates clear understanding of the material	
	Anchors instruction in CLASS Dimensions Guide	
	Uses the language of the CLASS measure (domain, dimension, indicator)	
	Provides examples that are clear and directly related to the topic	
Criterion Two: Provides Effective Feedback	Helps participants make specific, behavioral observations by asking them to describe what they see (e.g., “What did you see the teacher do?” “How did the children respond?” rather than, “What did you think about this?”)	
	Helps participants connect their observations to the appropriate CLASS dimension and indicator	
	Provides feedback to participants that expands learning and understanding (e.g., scaffolding, follow-up questions, prompting thought processes)	
Criterion Three: Provides an Organized Learning Experience	Presents PowerPoint presentation and videos as indicated in the MMCI Instructor Guide	
	Demonstrates appropriate ability to be directive and maintain the focus of discussions on the training content	

## APPENDIX B. CLASS DOMAINS AND DIMENSIONS

Domain	Dimension
Emotional Support	<ul style="list-style-type: none"><li>• Positive Climate</li><li>• Negative Climate</li><li>• Teacher Sensitivity</li><li>• Regard for Student Perspectives</li></ul>
Classroom Organization	<ul style="list-style-type: none"><li>• Behavior Management</li><li>• Productivity</li><li>• Instructional Learning Formats</li></ul>
Instructional Support	<ul style="list-style-type: none"><li>• Concept Development</li><li>• Quality of Feedback</li><li>• Language Modeling</li></ul>

### Examples of Indicators

#### Positive Climate:

- Relationships
- Positive Affect
- Positive Communication
- Respect

#### Behavior Management

- Clear Behavior Expectations
- Proactive
- Redirection of Misbehavior
- Student Behavior

#### Concept Development

- Analysis and Reasoning
- Creating
- Integration
- Connections to the Real World

APPENDIX C. IRB FORM



ACTION ON EXEMPTION APPROVAL REQUEST

TO: Sarah Fletcher  
Psychology

FROM: Dennis Landin  
Chair, Institutional Review Board

DATE: April 4, 2017

RE: IRB# E10433

TITLE: Evaluating a Research-Based Professional Development Model to Support Teacher Effectiveness In the Classroom: Making the Most of Classroom Interactions

Institutional Review Board  
Dr. Dennis Landin, Chair  
130 David Boyd Hall  
Baton Rouge, LA 70803  
P: 225.578.8802  
F: 225.578.5983  
[irb@lsu.edu](mailto:irb@lsu.edu)  
[lsu.edu/research](http://lsu.edu/research)

New Protocol/Modification/Continuation: New Protocol

Review Date: 4/4/2017

Approved  Disapproved

Approval Date: 4/4/2017 Approval Expiration Date: 4/3/2020

Exemption Category/Paragraph: 1

Signed Consent Waived?: No

Re-review frequency: (three years unless otherwise stated)

LSU Proposal Number (if applicable):

Protocol Matches Scope of Work in Grant proposal: (if applicable)

By: Dennis Landin, Chairman 

PRINCIPAL INVESTIGATOR: PLEASE READ THE FOLLOWING –  
Continuing approval is CONDITIONAL on:

1. Adherence to the approved protocol, familiarity with, and adherence to the ethical standards of the Belmont Report, and LSU's Assurance of Compliance with DHHS regulations for the protection of human subjects\*
2. Prior approval of a change in protocol, including revision of the consent documents or an increase in the number of subjects over that approved.
3. Obtaining renewed approval (or submittal of a termination report), prior to the approval expiration date, upon request by the IRB office (irrespective of when the project actually begins); notification of project termination.
4. Retention of documentation of informed consent and study records for at least 3 years after the study ends.
5. Continuing attention to the physical and psychological well-being and informed consent of the individual participants, including notification of new information that might affect consent.
6. A prompt report to the IRB of any adverse event affecting a participant potentially arising from the study.
7. Notification of the IRB of a serious compliance failure.
8. SPECIAL NOTE: When emailing more than one recipient, make sure you use bcc. Approvals will automatically be closed by the IRB on the expiration date unless the PI requests a continuation.

\* All Investigators and support staff have access to copies of the Belmont Report, LSU's Assurance with DHHS, DHHS (45 CFR 46) and FDA regulations governing use of human subjects, and other relevant documents in print in this office or on our World Wide Web site at <http://www.lsu.edu/irb>

**ACTION ON EXEMPTION APPROVAL REQUEST**



Institutional Review Board  
Dr. Dennis Landin, Chair  
130 David Boyd Hall  
Baton Rouge, LA 70803  
P: 225.578.8692  
F: 225.578.5983  
[irb@lsu.edu](mailto:irb@lsu.edu)  
[lsu.edu/research](http://lsu.edu/research)

**TO:** Sarah Fletcher  
Psychology

**FROM:** Dennis Landin  
Chair, Institutional Review Board

**DATE:** April 7, 2017

**RE:** IRB# E10433

**TITLE:** Evaluating a Research-Based Professional Development Model to Support Teacher Effectiveness in the Classroom: Making the Most of Classroom Interactions

**New Protocol/Modification/Continuation:** Modification

**Brief Modification Description:** Allow participants to complete the measures online or in person.

**Review date:** 4/7/2017

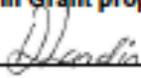
**Approved**  **Disapproved**

**Approval Date:** 4/7/2017 **Approval Expiration Date:** 4/3/2020

**Re-review frequency:** (three years unless otherwise stated)

**LSU Proposal Number** (if applicable):

**Protocol Matches Scope of Work in Grant proposal:** (if applicable)

**By:** Dennis Landin, Chairman 

**PRINCIPAL INVESTIGATOR: PLEASE READ THE FOLLOWING –**  
Continuing approval is **CONDITIONAL** on:

1. Adherence to the approved protocol, familiarity with, and adherence to the ethical standards of the Belmont Report, and LSU's Assurance of Compliance with DHHS regulations for the protection of human subjects\*
2. Prior approval of a change in protocol, including revision of the consent documents or an increase in the number of subjects over that approved.
3. Obtaining renewed approval (or submittal of a termination report), prior to the approval expiration date, upon request by the IRB office (irrespective of when the project actually begins); notification of project termination.
4. Retention of documentation of informed consent and study records for at least 3 years after the study ends.
5. Continuing attention to the physical and psychological well-being and informed consent of the individual participants including notification of new information that might affect consent.
6. A prompt report to the IRB of any adverse event affecting a participant potentially arising from the study.
7. Notification of the IRB of a serious compliance failure.
8. **SPECIAL NOTE: Make sure you use bcc when emailing more than one recipient. Approvals will automatically be closed by the IRB on the expiration date unless the PI requests a continuation.**

\*All investigators and support staff have access to copies of the Belmont Report, LSU's Assurance with DHHS, DHHS (45 CFR 46) and FDA regulations governing use of human subjects, and other relevant documents in print in this office or on our World Wide Web site at <http://www.lsu.edu/irb>

## APPENDIX D. ADMINISTRATOR CONSENT FORM

### Research Study Consent Form - Administrators

1. Study Title: Process Dimensions of Intervention Implementation: Evaluating the Quality of Professional Development Delivered to Teachers
2. Study Site: Louisiana Public Schools
3. Investigators: The co-principal investigators are Anna Long, Ph.D., and Sarah Fletcher, S.M. Dr. Long is available for questions about this study at [along@lsu.edu](mailto:along@lsu.edu) or XXX-XXX-XXXX. Sarah Fletcher is available at [sflet13@lsu.edu](mailto:sflet13@lsu.edu) or XXX-XXX-XXXX. Days and hours of availability to speak with the principal investigators are 8:30 AM – 4:30 PM Monday through Friday.
4. Purpose of the study: The main purposes of this study are twofold: (1) determine if Making the Most of Classroom Interactions (MMCI) results in changes in teacher effectiveness, and (2) determine if the treatment integrity dimensions of coach quality, engagement and rapport impact teacher effectiveness.
5. Subject Inclusion: Parishes must be using the Making the Most of Classroom Interactions program with select teachers and coaches in their parish.
6. Number of Subjects: Maximum of 15 parishes
7. Study Procedures: Following completion of informed consent, teachers and coaches will be asked to complete a questionnaire about their demographic information and provide identifying information. Identifying information gathered from teachers and coaches will be used to link to their data provided by the LA DOE and Teachstone. Coaches will also be asked to submit fidelity checklists for each coaching session they delivered. The videos of select coaching sessions will be used to check the reliability of coaches' reported session fidelity. Teachers will be asked to complete measures that provide information related to demographics, self-efficacy, stress and burnout, working alliance, work engagement, and ratings of the quality of their coach, which should take approximately 30 minutes. The teacher's CLASS scores will be provided to the investigators by the Louisiana Department of Education.
8. Benefits: Researchers will offer a summary of general findings to be provided upon study completion that could be used to inform future instructional supports and interventions. Upon study completion, coaches will each receive a gift card in the amount of five dollars. The site or parish with the highest proportion of teacher participation will be rewarded with an event for teachers in the pilot project.
9. Risks: Although risks to the study are minimal, coaches may experience low levels of anxiety as a result of providing their session videos to researchers or during completion of self-report measures. Every effort will be made to maintain the confidentiality of study records. With the exception of consent and demographic forms, all other study records will be stripped of identifiers and labeled with a code number by research project staff immediately following data collection. All hard copies of data will be stored in a locked file cabinet accessible only to the principal investigators and project staff. Electronic data will be stored on a password protected computer and on a secure server that is accessible only to the principal investigator and project staff. As an additional protection of coach confidentiality, no identifiable, individual coach information will be reported back

to Teachstone, the school or school administrators without the expressed written consent of the consent.

10. Right to refuse: Subjects may choose not to participate or to withdraw from the study at any time without penalty or loss of any benefit to which they might be otherwise be entitled.

11. Privacy: Results of the study may be published, but no names or identifying information will be included in the publication. Subject identity will remain confidential unless disclosure is required by law.

12. Signatures:

The study has been discussed with me and all questions have been answered. I may direct additional questions regarding study specifics to the investigators. If I have questions about subjects' rights or other concerns, I can contact Dr. Robert Mathews, Institutional Review Board, (225) 578-8692, [irb@lsu.edu](mailto:irb@lsu.edu), [www.lsu.edu/irb](http://www.lsu.edu/irb). I agree to participate in the study described above and acknowledge the investigators' obligation to provide me with a signed copy of this consent form.

Subject Signature: \_\_\_\_\_ Date: \_\_\_\_\_

## APPENDIX E. COACH CONSENT FORM

Evaluating a Professional Model to Support Teacher Effectiveness - Coach/Instructor Version

Q1.1 1. Study Title: Evaluating a Research-Based Professional Development Model to Support Teacher Effectiveness in the Classroom: Making the Most of Classroom Interactions

2. Study Site: Public School and Educational Settings in Louisiana  
3. Investigators: The co-principal investigators are Anna Long, Ph.D., and Sarah Fletcher, S.M. Dr. Long is available for questions about this study at [along@lsu.edu](mailto:along@lsu.edu) or XXX-XXX-XXXX. Sarah Fletcher is available at [sflet13@lsu.edu](mailto:sflet13@lsu.edu) or XXX-XXX-XXXX. Days and hours of availability to speak with the principal investigators are 8:30 AM – 4:30 PM Monday through Friday.

4. Purpose of the study: The main purposes of this study are twofold: (1) determine if Making the Most of Classroom Interactions (MMCI) program results in changes in teacher effectiveness, and (2) determine what aspects of the coaching/instruction are most helpful for improving teacher effectiveness.

5. Subject Inclusion: Coaches/instructors must (a) have received training and confirmation of readiness to implement MMCI by Teachstone, and (b) be currently active coaches/instructors.

6. Number of Subjects: Maximum of 40

7. Study Procedures: Following completion of informed consent, coaches/instructors will be asked to complete a demographic questionnaire and supply teacher attendance information for the MMCI sessions they led. Identifying information gathered from coaches will be used to link to the classroom observation data (i.e., CLASS scores) of the teachers they coached/instructed in 2016-2017. This classroom observation data will be supplied by the Louisiana Department of Education with each teacher's permission. Coaches/instructors will also be asked to complete brief fidelity checklists for each MMCI session they conducted and provide basic information about their experiences with the MMCI program, including common barriers. Teachstone will supply videos to the investigators of select MMCI sessions that will be used to check the reliability of self-reported session fidelity. It is estimated completion of study activities take approximately 25-30 minutes. No individual, identifying coach/instructor data gathered through this study can be provided to another party (outside of the LSU investigation team) without the expressed written consent of the coach/instructor.

Q1.2 8. Benefits: Upon study completion, coaches/instructors will each receive a gift card in the amount of five dollars. Researchers will offer a summary of state-level general findings to be provided upon study completion that could be used to inform future instructional supports and professional development activities.

9. Risks: Although risks to the study are minimal, coaches/instructors may experience low levels of anxiety as a result of provision of their session videos to researchers or during completion of self-report measures. Every effort will be made to maintain the confidentiality of coach/instructor study records. With the exception of consent and demographic forms, all other study records will be stripped of identifiers and labeled with a code number by research project staff immediately following data collection. All hard copies of data will be stored in a locked file

cabinet accessible only to the principal investigators and project staff. Electronic data will be stored on a password-protected computer and on a secure server that is accessible only to the principal investigator and project staff. As an additional protection of coach/instructor confidentiality, no identifiable, individual coach/instructor information gathered through this study will be reported back to Teachstone, Louisiana Department of Education, a school/educational setting, an administrator or any other party without the expressed written consent of the coach/instructor.

10. Right to refuse: Subjects may choose not to participate or to withdraw from the study at any time without penalty or loss of any benefit to which they might be otherwise be entitled.

11. Privacy: Results of the study may be published; however, results will be published at the group-level and no names or identifying information will be included. Subject identity will remain confidential unless disclosure is required by law.

12. Signatures:

The study has been discussed with me and all questions have been answered. I may direct additional questions regarding study specifics to the investigators. If I have questions about subjects' rights or other concerns, I can contact Dr. Dennis Landin, Institutional Review Board, (225) 578-8692, [irb@lsu.edu](mailto:irb@lsu.edu), [www.lsu.edu/irb](http://www.lsu.edu/irb). By clicking next, I agree to participate in the study described above and acknowledge the investigators' obligation to provide me with a copy of this consent script.

Q1.3 Please type your full name.

## APPENDIX F. TEACHER CONSENT FORM

Evaluating a Professional Development Model to Support Teacher Effectiveness - Teacher Version

Q1.1 1. Study Title: Evaluating a Research-Based Professional Development Model to Support Teacher Effectiveness in the Classroom: Making the Most of Classroom Interactions

2. Study Site: Public School and Educational Settings in Louisiana

3. Investigators: The co-principal investigators are Anna Long, Ph.D., and Sarah Fletcher, S.M. Dr. Long is available for questions about this study at [along@lsu.edu](mailto:along@lsu.edu) or XXX-XXX-XXXX. Sarah Fletcher is available at [sflet13@lsu.edu](mailto:sflet13@lsu.edu) or XXX-XXX-XXXX. Days and hours of availability to speak with the principal investigators are 8:30 AM – 4:30 PM Monday through Friday.

4. Purpose of the study: The main purposes of this study are twofold: (1) determine if Making the Most of Classroom Interactions (MMCI) program results in changes in teacher effectiveness, and (2) determine what aspects of the coaching/instruction are most helpful for improving teacher effectiveness.

5. Subject Inclusion: Teachers must be (a) currently teaching, (b) participants of the MMCI pilot program, and (c) be receiving teaching support from a coach/instructor who has enrolled in this study.

6. Number of Subjects: Maximum of 370

7. Study Procedures: Following completion of informed consent, teachers will be asked to complete measures that provide information related to demographics, basic classroom characteristics, teaching efficacy and stress, and ratings of their experience with or perception of their coach/instructor (e.g., working rapport, skill, ability to engage). Additionally, teachers will be asked about their experience participating in the MMCI program, including common barriers. It is estimated completion of study surveys will take approximately 25-30 minutes. Participating teachers' CLASS scores for 2016-2017 will be provided to the investigators by the Louisiana Department of Education. No individual, identifying teacher data gathered through this study can be provided to another party (outside of the LSU investigation team) without the expressed written consent of the teacher.

Q1.2 8. Benefits: Upon study completion, the site or parish with the highest proportion of teacher participation will be rewarded with an event for teachers in the pilot project. Additionally, teachers may have the opportunity to enter into a raffle for a small prize (e.g., \$5 gift card). Researchers will offer a summary of state-level general findings to be provided upon study completion that could be used to inform future instructional supports and professional development activities.

9. Risks: Although risks to the study are minimal, teachers may experience low levels of anxiety as a result of providing their CLASS scores to researchers or during completion of self-report measures. Every effort will be made to maintain the confidentiality of teacher study records. With the exception of teacher consent and demographic forms, all other study records will be stripped of identifiers and labeled with a code number by research project staff immediately following data collection. All hard copies of data will be stored in a locked file cabinet accessible only to the principal investigators and project staff. Electronic data will be stored on a password protected computer and on a secure server that is accessible only to the principal investigator and project staff. As an additional protection of teacher confidentiality, no identifiable, individual teacher information gathered through this study may be reported back to Teachstone, Louisiana Department of Education, a school/educational setting, an administrator or any other party without the expressed written consent of the teacher.

10. Right to refuse: Subjects may choose not to participate or to withdraw from the study at any time without penalty or loss of any benefit to which they might otherwise be entitled.

11. Privacy: Results of the study may be published; however, results will be published at the group-level and no names or identifying information will be included. Subject identity will remain confidential unless disclosure is required by law.

12. Signatures:

The study has been discussed with me and all questions have been answered. I may direct additional questions regarding study specifics to the investigators. If I have questions about subjects' rights or other concerns, I can contact Dr. Dennis Landin, Institutional Review Board, (225) 578-8692, [irb@lsu.edu](mailto:irb@lsu.edu), [www.lsu.edu/irb](http://www.lsu.edu/irb). By clicking next, I agree to participate in the study described above and acknowledge the investigators' obligation to provide me with a copy of this consent script.

Q1.3 Please type your full name.

## APPENDIX G. TEACHER MEASURES AND SURVEY

Q1.9 Teacher Information

Q1.10 What is your age?

Q1.11 Please indicate your gender.

Q1.12 What is your race/ethnicity?

- White (1)
- Black/African American (2)
- Asian (3)
- Native Hawaiian/Pacific Islander (4)
- Latino/Hispanic (5)
- Native American/American Indian (6)
- Other (7) \_\_\_\_\_
- Multiracial (please specify) (8) \_\_\_\_\_

Q1.13 What is the highest level of education you have completed? (select one)

- High School/GED (1)
- Associate's (2)
- B.A./B.S. (3)
- Masters/Specialist (4)
- Masters plus \_\_\_ credits (5) \_\_\_\_\_
- Doctorate (e.g., Ph.D., J.D.) (6)

Q1.14 Are you a student teacher (i.e., pre-service teacher currently completing your teaching degree) or an in-service teacher (i.e., teacher currently employed in the teaching profession?) (select one)

- Student Teacher (1)
- In-service Teacher (2)

Q1.15 If "Student teacher," how many months have you been student teaching?

Q1.16 If "In-service teacher," did you gain your teacher certification through a traditional or alternative teacher preparation program?

- Traditional (e.g., Bachelor's in Education) (1)
- Alternative (e.g., Teach for America) (2)

Q1.17 Please select the grade level that most reflects the grade you currently teach? (select one)

- Pre-School (Pre-K) (1)
- Early Elementary School (K-2) (2)
- Late Elementary School (3-6) (3)
- Mixed (Spans across grade levels) (4)

Q1.18 What is the name of your MMCI instructor/coach?

Q1.19 What is the name of the school where you teach?

Q68 Which MMCI Sessions did you attend?

- Session 1 (1)
- Session 2 (2)
- Session 3 (3)
- Session 4 (4)
- Session 5 (5)
- Session 6 (6)
- Session 7 (7)
- Session 8 (8)
- Session 9 (9)
- Session 10 (10)

Q2.1 This questionnaire is designed to help us gain a better understanding of the kinds of things that create difficulties for teachers in their school activities. Please indicate your opinion about each of the statements below. Your answers are confidential.

Q2.2 How much can you do?

	Nothing (1)	(2)	Very Little (3)	(4)	Some Influence (5)	(6)	Quite a Bit (7)	(8)	A Great Deal (9)
How much can you do to get through to the most difficult students? (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>				
How much can you do to help your students think critically? (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>				
How much can you do to control disruptive behavior in the classroom? (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>				
How much can you do to motivate students who show low interest in school work? (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>				
To what extent can you make your expectations clear about student behavior? (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>				

How much can you do to get students to believe that they can do well in school work? (6)	<input type="radio"/>								
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Q2.3 This questionnaire is designed to help us gain a better understanding of the kinds of things that create difficulties for teachers in their school activities. Please indicate your opinion about each of the statements below. Your answers are confidential.

Q2.4 How much can you do?

	Nothing (1)	(2)	Very Little (3)	(4)	Some Influence (5)	(6)	Quite a Bit (7)	(8)	A Great Deal (9)
How well can you respond to difficult questions from your students? (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>				
How well can you establish routines to keep activities running smoothly? (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>				
How much can you do to help your students value learning? (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>				
How much can you gauge student comprehension of what you have taught? (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>				
To what extent can you craft good questions for your students? (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>				
How much can you do to foster student creativity? (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>				

Q2.5 This questionnaire is designed to help us gain a better understanding of the kinds of things that create difficulties for teachers in their school activities. Please indicate your opinion about each of the statements below. Your answers are confidential.

Q2.6 How much can you do?

	Nothing (1)	(2)	Very Little (3)	(4)	Some Influence (5)	(6)	Quite a Bit (7)	(8)	A Great Deal (9)
How much can you do to get children to follow classroom rules? (1)	<input type="radio"/>								
How much can you do to improve the understanding of a student who is failing? (2)	<input type="radio"/>								
How much can you do to calm a student who is disruptive or noisy? (3)	<input type="radio"/>								
How well can you establish a classroom management system with each group of students? (4)	<input type="radio"/>								
How much can you do to adjust your lessons to the proper level for individual students? (5)	<input type="radio"/>								
How much can you use a variety of assessment strategies? (6)	<input type="radio"/>								

Q2.7 This questionnaire is designed to help us gain a better understanding of the kinds of things that create difficulties for teachers in their school activities. Please indicate your opinion about each of the statements below. Your answers are confidential.

Q2.8 How much can you do?

	Nothing (1)	(2)	Very Little (3)	(4)	Some Influence (5)	(6)	Quite a Bit (7)	(8)	A Great Deal (9)
How well can you keep a few problem students from ruining an entire lesson? (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>				
To what extent can you provide an alternative explanation or example when students are confused? (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>				
How well can you respond to defiant students? (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>				
How much can you assist families in helping their children do well in school? (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>				
How well can you implement alternative strategies in your classroom? (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>				

How well can you provide appropriate challenges for very capable students? (6)	<input type="radio"/>								
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Q3.1 The purpose of this survey is to discover how staff members view their job, and their reactions to their work.

	Never (1)	A few times a year or less (2)	Once a month or less (3)	A few times a month (4)	Once a week (5)	A few times a week (6)	Everyday (7)
I feel emotionally drained from my work. (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel used up at the end of the workday. (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel fatigued when I get up in the morning and have to face another day on the job. (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I can easily understand how my students feel about things. (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel I treat some students as if they were impersonal objects. (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Working with people all day is really a strain for me. (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I deal very effectively with the problems of my students. (7)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q3.2 The purpose of this survey is to discover how staff members view their job, and their reactions to their work.

	Never (1)	A few times a year or less (2)	Once a month or less (3)	A few times a month (4)	Once a week (5)	A few times a week (6)	Everyday (7)
I feel burned out from my work. (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel I'm positively influencing other people's lives through my work. (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I've become more callous toward people since I took this job. (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I worry that this job is hardening me emotionally. (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel very energetic. (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel frustrated at my job. (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel I'm working too hard on my job. (7)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I don't really care what happens to some students. (8)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q3.3 The purpose of this survey is to discover how staff members view their job, and their reactions to their work.

	Never (1)	A few times a year or less (2)	Once a month or less (3)	A few times a month (4)	Once a week (5)	A few times a week (6)	Everyday (7)
Working with people directly puts too much stress on me. (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I can easily create a relaxed atmosphere with my students. (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel exhilarated after working closely with my students. (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I have accomplished many worthwhile things in this job. (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel like I'm at the end of my rope. (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
In my work, I deal with emotional problems very calmly. (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel students blame me for some of their problems. (7)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q4.1 Below is a list of statements and questions about experiences people might have with their coach or instructor. Some items refer directly to your coach with an underlined space -- as you read the sentences, mentally insert the name of your coach/instructor in place of \_\_\_\_\_ in the

text. Think about your experience in the MMCI sessions, and decide which category best describes your own experience.

Q4.2 As a result of these sessions, I am clearer as to how I might be able to make changes in my classroom.

- Seldom (1)
- Sometimes (2)
- Fairly Often (3)
- Very Often (4)
- Always (5)

Q4.3 What I am doing in MMCI gives me new ways of looking at problems in my classroom.

- Always (1)
- Very Often (2)
- Fairly Often (3)
- Sometimes (4)
- Seldom (5)

Q4.4 I believe \_\_\_ likes me.

- Seldom (1)
- Sometimes (2)
- Fairly Often (3)
- Very Often (4)
- Always (5)

Q4.5 \_\_\_ and I collaborate on setting goals for my classroom

- Seldom (1)
- Sometimes (2)
- Fairly Often (3)
- Very Often (4)
- Always (5)

Q4.6 \_\_\_ and I respect each other.

- Always (1)
- Very Often (2)
- Fairly Often (3)
- Sometimes (4)
- Seldom (5)

Q4.7 \_\_\_ and I are working towards mutually agreed upon goals for my classroom.

- Always (1)
- Very Often (2)
- Fairly Often (3)
- Sometimes (4)
- Seldom (5)

Q4.8 Below is a list of statements and questions about experiences people might have with their coach or instructor. Some items refer directly to your coach with an underlined space -- as you read the sentences, mentally insert the name of your coach/instructor in place of \_\_\_\_\_ in the text. Think about your experience in the MMCI sessions, and decide which category best describes your own experience.

Q4.9 I feel that \_\_\_ appreciates me.

- Seldom (1)
- Sometimes (2)
- Fairly Often (3)
- Very Often (4)
- Always (5)

Q4.10 \_\_\_ and I agree on what is important for me to work on.

- Always (1)
- Very Often (2)
- Fairly Often (3)
- Sometimes (4)
- Seldom (5)

Q4.11 I feel \_\_\_ cares about me even when I do things that he/she does not approve of.

- Seldom (1)
- Sometimes (2)
- Fairly Often (3)
- Very Often (4)
- Always (5)

Q4.12 I feel that the things I do in the MMCI sessions will help me to accomplish the changes that I want in my classroom.

- Always (1)
- Very Often (2)
- Fairly Often (3)
- Sometimes (4)
- Seldom (5)

Q4.13 \_\_\_ and I have established a good understanding of the kind of things that would be good for me.

- Always (1)
- Very Often (2)
- Fairly Often (3)
- Sometimes (4)
- Seldom (5)

Q4.14 I believe the way we are working with my problem is correct.

- Seldom (1)
- Sometimes (2)
- Fairly Often (3)
- Very Often (4)
- Always (5)

Q5.1 Please rate your agreement with each of the following statements as they pertain to the MMCI program.

	Strongly agree (1)	Agree (2)	Somewhat agree (3)	Neither agree nor disagree (4)	Somewhat disagree (5)	Disagree (6)	Strongly disagree (7)
The instructor was generally helpful. (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The instructor offered useful information. (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The instructor's ideas as to the primary goals of schools were similar to my own ideas. (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The instructor helped me find alternative solutions to problems. (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The instructor was a good listener. (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The instructor helped me identify useful resources. (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q5.2 Please rate your agreement with each of the following statements.

	Strongly agree (1)	Agree (2)	Somewhat agree (3)	Neither agree nor disagree (4)	Somewhat disagree (5)	Disagree (6)	Strongly disagree (7)
The instructor fit well into my school's environment (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The instructor encouraged me to consider a number of points of view. (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The instructor viewed his or her role as a collaborator rather than as an expert. (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The instructor helped me find ways to apply the content of our discussions to specific pupil or classroom situations. (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

<p>The instructor was able to offer assistance without completely "taking over" the management of the problem. (5)</p> <p>I would like to work with this instructor again, assuming that other instructors were available. (6)</p>	○	○	○	○	○	○	○
	○	○	○	○	○	○	○

Q6.1 Please rate your agreement with each item as it pertains to the MMCI program.

	Strongly disagree (1)	Somewhat disagree (2)	Neither agree nor disagree (3)	Somewhat agree (4)	Strongly agree (5)
As a result of this program, I work with intensity on my job. (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
As a result of this program, I exert my full effort to my job. (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
As a result of this program, I devote a lot of energy to my job. (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
As a result of this program, I try my hardest to perform well on my job. (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
As a result of this program, I strive as hard as I can to complete my job. (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
As a result of this program, I exert a lot of energy on my job. (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
As a result of this program, I am enthusiastic in my job. (7)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
As a result of this program, I feel energetic at my job. (8)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q6.2 Please rate your agreement with each item as it pertains to the MMCI program.

	Strongly disagree (1)	Somewhat disagree (2)	Neither agree nor disagree (3)	Somewhat agree (4)	Strongly agree (5)
As a result of this program, I am proud of my job. (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
As a result of this program, I feel positive about my job. (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
As a result of this program, I am excited about my job. (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
As a result of this program, at work, my mind is focused on my job. (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
As a result of this program, at work, I pay a lot of attention to my job. (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
As a result of this program, at work, I am absorbed by my job. (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
As a result of this program, at work, I concentrate on my job. (7)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
As a result of this program, at work, I devote a lot of attention to my job. (8)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q7.1 Directions: Please think about any barriers you encountered when trying to improve or change your teaching practices based on what was taught during the Making the Most of Classroom Interactions (MMCI) program. Implementation barriers are defined as variables that obstruct efforts to implement new practices. Barriers can reduce one's ability to initiate or sustain implementation by impeding or increasing the difficulty of carrying out a planned action.

Q7.2 Below is a list of common barriers teachers report experiencing when they attempt to implement new interventions or practices in their classrooms. Please check "Yes/No" regarding whether you encountered the listed barrier as you attempted to implement practices taught via the MMCI program. Then, rate how difficult it is for you to overcome each barrier in the absence of additional/supplemental support (e.g., administrative support, technical assistance, coaching).

Q7.3 Please select the appropriate response that reflects how difficult each barrier was to overcome, if encountered.

	N/A - Did not encounter (1)	Very Easy (2)	Easy (3)	Slightly Easy (4)	Neutral (5)	Slightly Difficult (6)	Difficult (7)	Very Difficult (8)
Time/duration required to implement the practice(s) (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Insufficient administrative/leadership support to implement the practice(s) (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Inadequate staffing at my educational setting (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Incompatibility (or inappropriateness) of the practice(s) with my existing practices, classroom, setting, or students (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Insufficient skill or confidence to carry out the practice(s) (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Materials/resources required to implement the practice(s) were insufficient or too challenging to obtain (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Insufficient planning time, technical assistance, or support to implement the practice(s) (7)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Insufficient need or buy-in for the practice(s) (e.g., no need to implement as unlikely to improve student outcomes) (8)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lack of responsiveness or cooperation from students in my classroom to implement the practice(s) (9)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q7.4 In the spaces below, please list any additional barriers (beyond those previously listed) that you encountered when attempting to implement practices taught via the MMCI program. Then, rate how difficult it is for you to overcome each barrier in the absence of additional/supplemental support (e.g., administrative support, technical assistance, coaching).

Q7.5 Additional Barrier 1:

Q7.6 How difficult was Barrier 1 to overcome?

- Very easy (1)
- Easy (2)
- Slightly Easy (3)
- Neutral (4)
- Slightly difficult (5)
- Difficult (6)
- Very Difficult (7)

Q7.7 Additional Barrier 2:

Q7.8 How difficult was Barrier 2 to overcome?

- Very easy (1)
- Easy (2)
- Slightly Easy (3)
- Neutral (4)
- Slightly difficult (5)
- Difficult (6)
- Very Difficult (7)

Q7.9 Additional Barrier 3:

Q7.10 How difficult was Barrier 3 to overcome?

- Very easy (1)
- Easy (2)
- Slightly Easy (3)
- Neutral (4)
- Slightly difficult (5)
- Difficult (6)
- Very Difficult (7)

Q7.11 Finally, list the top three most common barriers you encountered when attempting to implement practices taught via the MMCI program in order of most to least common. You may include any barriers previously listed in the survey or listed by you immediately above.

Q7.12 Most common barrier:

Q7.13 2nd most common barrier:

Q7.14 3rd most common barrier:

## APPENDIX H. COACH MEASURES AND SURVEY

Q1.4 Coach Information

Q1.5 What is your age?

Q1.6 Please indicate your gender.

Q1.7 What is your race/ethnicity?

- White (1)
- Black/African American (2)
- Asian (3)
- Native Hawaiian/Pacific Islander (4)
- Latino/Hispanic (5)
- Native American/American Indian (6)
- Other (7) \_\_\_\_\_
- Multiracial (please specify) (8) \_\_\_\_\_

Q1.8 What is the highest level of education you have completed? (select one)

- High School/GED (1)
- Associate's (2)
- B.A./B.S. (3)
- Masters/Specialist (4)
- Masters plus \_\_\_ credits (5) \_\_\_\_\_
- Doctorate (e.g., Ph.D., J.D.) (6)

Q1.9 Are you a teacher currently employed in the teaching profession? (select one)

- In-service teacher (1)
- Coach/Instructor (2)
- Both in-service teacher and coach/instructor (3)

Q1.10 If "in-service teacher", how many years of teaching experience do you have?

Q1.11 If "In-service teacher," did you gain your teacher certification through a traditional or alternative teacher preparation program?

- Traditional (e.g., Bachelor's in Education) (1)
- Alternative (e.g., Teach for America) (2)

Q1.12 Please select the grade level that most reflects the grade you currently work with? (select one)

- Pre-School (Pre-K) (1)
- Early Elementary School (K-2) (2)
- Late Elementary School (3-6) (3)
- Mixed (Spans across grade levels) (4)

Q1.13 What is your current professional title?

Q1.14 How many teachers do you coach/instruct per academic year?

Q1.15 In how many schools do you coach/instruct per academic year?

Q1.16 How many years have you been a coach/instructor?

Q2.1 MMCI Session 1

Q2.2 What was the date of Session 1?

Q2.3 For each session component listed below, please check "yes" or "no" to indicate if it was covered when MMCI sessions were taught.

	Yes (1)	No (2)
Participants were welcomed to the session (1)	<input type="radio"/>	<input type="radio"/>
The session objectives were introduced (2)	<input type="radio"/>	<input type="radio"/>
Instruction was provided for each of the three domains (3)	<input type="radio"/>	<input type="radio"/>
Participants were encouraged to identify and define teacher-child interactions observed in each of the three domain-specific classroom videos (4)	<input type="radio"/>	<input type="radio"/>
Participants were informed about homework assignments (5)	<input type="radio"/>	<input type="radio"/>
Power Point slides and myTeachstone videos were prepped and ready to present at the start of the training, ensuring all participants could see and hear the training content. (6)	<input type="radio"/>	<input type="radio"/>

Q3.1 MMCI Session 2

Q3.2 What was the date of Session 2?

Q3.3 For each session component listed below, please check "yes" or "no" to indicate if it was covered when MMCI sessions were taught.

	Yes (1)	No (2)
Participants were welcomed to the session. (1)	<input type="radio"/>	<input type="radio"/>
The session objectives were introduced (2)	<input type="radio"/>	<input type="radio"/>
The previous session's dimension was reviewed, including video review (3)	<input type="radio"/>	<input type="radio"/>
Instruction was provided for each indicator in the dimension of focus (4)	<input type="radio"/>	<input type="radio"/>
Participants were encouraged to identify and define behavioral markers in indicator examples provided in the PowerPoint (5)	<input type="radio"/>	<input type="radio"/>
Participants were encouraged to identify and define teacher-child interactions observed in classroom videos (6)	<input type="radio"/>	<input type="radio"/>
Participants were provided opportunities to reflect upon and plan for classroom application (7)	<input type="radio"/>	<input type="radio"/>
Participants were informed about homework assignments (8)	<input type="radio"/>	<input type="radio"/>
PowerPoint slides and myTeachstone videos were prepped and ready to present at the start of the training, ensuring all participants could see and hear the training content (9)	<input type="radio"/>	<input type="radio"/>

Q4.1 MMCI Session 3

Q4.2 What was the date of Session 3?

Q4.3 For each session component listed below, please check "yes" or "no" to indicate if it was covered when MMCI sessions were taught.

	Yes (1)	No (2)
Participants were welcomed to the session. (1)	<input type="radio"/>	<input type="radio"/>
The session objectives were introduced (2)	<input type="radio"/>	<input type="radio"/>
The previous session's dimension was reviewed, including video review (3)	<input type="radio"/>	<input type="radio"/>
Instruction was provided for each indicator in the dimension of focus (4)	<input type="radio"/>	<input type="radio"/>
Participants were encouraged to identify and define behavioral markers in indicator examples provided in the PowerPoint (5)	<input type="radio"/>	<input type="radio"/>
Participants were encouraged to identify and define teacher-child interactions observed in classroom videos (6)	<input type="radio"/>	<input type="radio"/>
Participants were provided opportunities to reflect upon and plan for classroom application (7)	<input type="radio"/>	<input type="radio"/>
Participants were informed about homework assignments (8)	<input type="radio"/>	<input type="radio"/>
PowerPoint slides and myTeachstone videos were prepped and ready to present at the start of the training, ensuring all participants could see and hear the training content (9)	<input type="radio"/>	<input type="radio"/>

Q5.1 MMCI Session 4

Q5.2 What was the date of Session 4?

Q5.3 For each session component listed below, please check "yes" or "no" to indicate if it was covered when MMCI sessions were taught.

	Yes (1)	No (2)
Participants were welcomed to the session. (1)	<input type="radio"/>	<input type="radio"/>
The session objectives were introduced (2)	<input type="radio"/>	<input type="radio"/>
The previous session's dimension was reviewed, including video review (3)	<input type="radio"/>	<input type="radio"/>
Instruction was provided for each indicator in the dimension of focus (4)	<input type="radio"/>	<input type="radio"/>
Participants were encouraged to identify and define behavioral markers in indicator examples provided in the PowerPoint (5)	<input type="radio"/>	<input type="radio"/>
Participants were encouraged to identify and define teacher-child interactions observed in classroom videos (6)	<input type="radio"/>	<input type="radio"/>
Participants were provided opportunities to reflect upon and plan for classroom application (7)	<input type="radio"/>	<input type="radio"/>
Participants were informed about homework assignments (8)	<input type="radio"/>	<input type="radio"/>
PowerPoint slides and myTeachstone videos were prepped and ready to present at the start of the training, ensuring all participants could see and hear the training content (9)	<input type="radio"/>	<input type="radio"/>

Q6.1 MMCI Session 5

Q6.2 What was the date of Session 5?

Q6.3 For each session component listed below, please check "yes" or "no" to indicate if it was covered when MMCI sessions were taught.

	Yes (1)	No (2)
Participants were welcomed to the session. (1)	<input type="radio"/>	<input type="radio"/>
The session objectives were introduced (2)	<input type="radio"/>	<input type="radio"/>
The previous session's dimension was reviewed, including video review (3)	<input type="radio"/>	<input type="radio"/>
Instruction was provided for each indicator in the dimension of focus (4)	<input type="radio"/>	<input type="radio"/>
Participants were encouraged to identify and define behavioral markers in indicator examples provided in the PowerPoint (5)	<input type="radio"/>	<input type="radio"/>
Participants were encouraged to identify and define teacher-child interactions observed in classroom videos (6)	<input type="radio"/>	<input type="radio"/>
Participants were provided opportunities to reflect upon and plan for classroom application (7)	<input type="radio"/>	<input type="radio"/>
Participants were informed about homework assignments (8)	<input type="radio"/>	<input type="radio"/>
PowerPoint slides and myTeachstone videos were prepped and ready to present at the start of the training, ensuring all participants could see and hear the training content (9)	<input type="radio"/>	<input type="radio"/>

Q7.1 MMCI Session 6

Q7.2 What was the date of Session 6?

Q7.3 For each session component listed below, please check "yes" or "no" to indicate if it was covered when MMCI sessions were taught.

	Yes (1)	No (2)
Participants were welcomed to the session. (1)	<input type="radio"/>	<input type="radio"/>
The session objectives were introduced (2)	<input type="radio"/>	<input type="radio"/>
The previous session's dimension was reviewed, including video review (3)	<input type="radio"/>	<input type="radio"/>
Instruction was provided for each indicator in the dimension of focus (4)	<input type="radio"/>	<input type="radio"/>
Participants were encouraged to identify and define behavioral markers in indicator examples provided in the PowerPoint (5)	<input type="radio"/>	<input type="radio"/>
Participants were encouraged to identify and define teacher-child interactions observed in classroom videos (6)	<input type="radio"/>	<input type="radio"/>
Participants were provided opportunities to reflect upon and plan for classroom application (7)	<input type="radio"/>	<input type="radio"/>
Participants were informed about homework assignments (8)	<input type="radio"/>	<input type="radio"/>
PowerPoint slides and myTeachstone videos were prepped and ready to present at the start of the training, ensuring all participants could see and hear the training content (9)	<input type="radio"/>	<input type="radio"/>

Q8.1 MMCI Session 7

Q8.2 What was the date of Session 7?

Q8.3 For each session component listed below, please check "yes" or "no" to indicate if it was covered when MMCI sessions were taught.

	Yes (1)	No (2)
Participants were welcomed to the session. (1)	<input type="radio"/>	<input type="radio"/>
The session objectives were introduced (2)	<input type="radio"/>	<input type="radio"/>
The previous session's dimension was reviewed, including video review (3)	<input type="radio"/>	<input type="radio"/>
Instruction was provided for each indicator in the dimension of focus (4)	<input type="radio"/>	<input type="radio"/>
Participants were encouraged to identify and define behavioral markers in indicator examples provided in the PowerPoint (5)	<input type="radio"/>	<input type="radio"/>
Participants were encouraged to identify and define teacher-child interactions observed in classroom videos (6)	<input type="radio"/>	<input type="radio"/>
Participants were provided opportunities to reflect upon and plan for classroom application (7)	<input type="radio"/>	<input type="radio"/>
Participants were informed about homework assignments (8)	<input type="radio"/>	<input type="radio"/>
PowerPoint slides and myTeachstone videos were prepped and ready to present at the start of the training, ensuring all participants could see and hear the training content (9)	<input type="radio"/>	<input type="radio"/>

Q9.1 MMCI Session 8

Q9.2 What was the date of Session 8?

Q9.3 For each session component listed below, please check "yes" or "no" to indicate if it was covered when MMCI sessions were taught.

	Yes (1)	No (2)
Participants were welcomed to the session. (1)	<input type="radio"/>	<input type="radio"/>
The session objectives were introduced (2)	<input type="radio"/>	<input type="radio"/>
The previous session's dimension was reviewed, including video review (3)	<input type="radio"/>	<input type="radio"/>
Instruction was provided for each indicator in the dimension of focus (4)	<input type="radio"/>	<input type="radio"/>
Participants were encouraged to identify and define behavioral markers in indicator examples provided in the PowerPoint (5)	<input type="radio"/>	<input type="radio"/>
Participants were encouraged to identify and define teacher-child interactions observed in classroom videos (6)	<input type="radio"/>	<input type="radio"/>
Participants were provided opportunities to reflect upon and plan for classroom application (7)	<input type="radio"/>	<input type="radio"/>
Participants were informed about homework assignments (8)	<input type="radio"/>	<input type="radio"/>
PowerPoint slides and myTeachstone videos were prepped and ready to present at the start of the training, ensuring all participants could see and hear the training content (9)	<input type="radio"/>	<input type="radio"/>

Q10.1 MMCI Session 9

Q10.2 What was the date of Session 9?

Q10.3 For each session component listed below, please check "yes" or "no" to indicate if it was covered when MMCI sessions were taught.

	Yes (1)	No (2)
Participants were welcomed to the session. (1)	<input type="radio"/>	<input type="radio"/>
The session objectives were introduced (2)	<input type="radio"/>	<input type="radio"/>
The previous session's dimension was reviewed, including video review (3)	<input type="radio"/>	<input type="radio"/>
Instruction was provided for each indicator in the dimension of focus (4)	<input type="radio"/>	<input type="radio"/>
Participants were encouraged to identify and define behavioral markers in indicator examples provided in the PowerPoint (5)	<input type="radio"/>	<input type="radio"/>
Participants were encouraged to identify and define teacher-child interactions observed in classroom videos (6)	<input type="radio"/>	<input type="radio"/>
Participants were provided opportunities to reflect upon and plan for classroom application (7)	<input type="radio"/>	<input type="radio"/>
Participants were informed about homework assignments (8)	<input type="radio"/>	<input type="radio"/>
PowerPoint slides and myTeachstone videos were prepped and ready to present at the start of the training, ensuring all participants could see and hear the training content (9)	<input type="radio"/>	<input type="radio"/>

Q11.1 MMCI Session 10

Q11.2 What was the date of Session 10?

Q11.3 For each session component listed below, please check "yes" or "no" to indicate if it was covered when MMCI sessions were taught.

	Yes (1)	No (2)
Participants were welcomed to the session. (1)	<input type="radio"/>	<input type="radio"/>
The session objectives were introduced (2)	<input type="radio"/>	<input type="radio"/>
The previous session's dimension was reviewed, including video review (3)	<input type="radio"/>	<input type="radio"/>
Instruction was provided for each indicator in the dimension of focus (4)	<input type="radio"/>	<input type="radio"/>
Participants were encouraged to identify and define behavioral markers in indicator examples provided in the PowerPoint (5)	<input type="radio"/>	<input type="radio"/>
Participants were encouraged to identify and define teacher-child interactions observed in classroom videos (6)	<input type="radio"/>	<input type="radio"/>
Participants were provided opportunities to reflect upon and plan for classroom application (7)	<input type="radio"/>	<input type="radio"/>
Participants were informed about homework assignments (8)	<input type="radio"/>	<input type="radio"/>
PowerPoint slides and myTeachstone videos were prepped and ready to present at the start of the training, ensuring all participants could see and hear the training content (9)	<input type="radio"/>	<input type="radio"/>

Q12.1 Please provide attendance data for each of the teachers that participated in your MMCI sessions. Please fill in their name and check off which sessions they attended. Please note: there may be more spaces available than teachers in your session.

Q12.2 Name of Teacher 1:

Q12.3 Teacher 1 Attendance:

- Session 1 (1)
- Session 2 (2)
- Session 3 (3)
- Session 4 (4)
- Session 5 (5)
- Session 6 (6)
- Session 7 (7)
- Session 8 (8)
- Session 9 (9)
- Session 10 (10)

Q12.4 Name of Teacher 2:

Q12.5 Teacher 2 Attendance:

- Session 1 (1)
- Session 2 (2)
- Session 3 (3)
- Session 4 (4)
- Session 5 (5)
- Session 6 (6)
- Session 7 (7)
- Session 8 (8)
- Session 9 (9)
- Session 10 (10)

Q12.6 Name of Teacher 3:

Q12.7 Teacher 3 Attendance:

- Session 1 (1)
- Session 2 (2)
- Session 3 (3)
- Session 4 (4)
- Session 5 (5)
- Session 6 (6)
- Session 7 (7)
- Session 8 (8)
- Session 9 (9)
- Session 10 (10)

Q12.8 Name of Teacher 4:

Q12.9 Teacher 4 Attendance:

- Session 1 (1)
- Session 2 (2)
- Session 3 (3)
- Session 4 (4)
- Session 5 (5)
- Session 6 (6)
- Session 7 (7)
- Session 8 (8)
- Session 9 (9)
- Session 10 (10)

Q12.10 Name of Teacher 5:

Q12.11 Teacher 5 Attendance:

- Session 1 (1)
- Session 2 (2)
- Session 3 (3)
- Session 4 (4)
- Session 5 (5)
- Session 6 (6)
- Session 7 (7)
- Session 8 (8)
- Session 9 (9)
- Session 10 (10)

Q12.12 Name of Teacher 6:

Q12.13 Teacher 6 Attendance:

- Session 1 (1)
- Session 2 (2)
- Session 3 (3)
- Session 4 (4)
- Session 5 (5)
- Session 6 (6)
- Session 7 (7)
- Session 8 (8)
- Session 9 (9)
- Session 10 (10)

Q12.14 Name of Teacher 7:

Q12.15 Teacher 7 Attendance:

- Session 1 (1)
- Session 2 (2)
- Session 3 (3)
- Session 4 (4)
- Session 5 (5)
- Session 6 (6)
- Session 7 (7)
- Session 8 (8)
- Session 9 (9)
- Session 10 (10)

Q12.16 Name of Teacher 8:

Q12.17 Teacher 8 Attendance:

- Session 1 (1)
- Session 2 (2)
- Session 3 (3)
- Session 4 (4)
- Session 5 (5)
- Session 6 (6)
- Session 7 (7)
- Session 8 (8)
- Session 9 (9)
- Session 10 (10)

Q12.18 Name of Teacher 9:

Q12.19 Teacher 9 Attendance:

- Session 1 (1)
- Session 2 (2)
- Session 3 (3)
- Session 4 (4)
- Session 5 (5)
- Session 6 (6)
- Session 7 (7)
- Session 8 (8)
- Session 9 (9)
- Session 10 (10)

Q12.20 Name of Teacher 10:

Q12.21 Teacher 10 Attendance:

- Session 1 (1)
- Session 2 (2)
- Session 3 (3)
- Session 4 (4)
- Session 5 (5)
- Session 6 (6)
- Session 7 (7)
- Session 8 (8)
- Session 9 (9)
- Session 10 (10)

Q12.22 Name of Teacher 11:

Q12.23 Teacher 11 Attendance:

- Session 1 (1)
- Session 2 (2)
- Session 3 (3)
- Session 4 (4)
- Session 5 (5)
- Session 6 (6)
- Session 7 (7)
- Session 8 (8)
- Session 9 (9)
- Session 10 (10)

Q12.24 Name of Teacher 12:

Q12.25 Teacher 12 Attendance:

- Session 1 (1)
- Session 2 (2)
- Session 3 (3)
- Session 4 (4)
- Session 5 (5)
- Session 6 (6)
- Session 7 (7)
- Session 8 (8)
- Session 9 (9)
- Session 10 (10)

Q12.26 Name of Teacher 13:

Q12.27 Teacher 13 Attendance:

- Session 1 (1)
- Session 2 (2)
- Session 3 (3)
- Session 4 (4)
- Session 5 (5)
- Session 6 (6)
- Session 7 (7)
- Session 8 (8)
- Session 9 (9)
- Session 10 (10)

Q12.28 Name of Teacher 14:

Q12.29 Teacher 14 Attendance:

- Session 1 (1)
- Session 2 (2)
- Session 3 (3)
- Session 4 (4)
- Session 5 (5)
- Session 6 (6)
- Session 7 (7)
- Session 8 (8)
- Session 9 (9)
- Session 10 (10)

Q12.30 Name of Teacher 15:

Q12.31 Teacher 15 Attendance:

- Session 1 (1)
- Session 2 (2)
- Session 3 (3)
- Session 4 (4)
- Session 5 (5)
- Session 6 (6)
- Session 7 (7)
- Session 8 (8)
- Session 9 (9)
- Session 10 (10)

Q12.32 Please provide any additional information related to attendance.

Q13.1 Directions: Please think about any barriers your teachers encountered when trying to improve or change their teaching practices based on what you taught them via the Making the Most of Classroom Interactions (MMCI) program. Implementation barriers are defined as variables that obstruct efforts to implement new practices, often reducing teacher effectiveness. Barriers can reduce one's ability to initiate or sustain implementation by impeding or increasing the difficulty of carrying out a planned action.

Q13.2 Below is a list of common barriers teachers report experiencing when they attempt to implement new interventions or practices in their classrooms. Please rate how confident you are that you could successfully support a teacher to overcome each barrier if she/he encountered it when attempting to implement practices you taught via the MMCI program.

Q13.3 How sure (or confident) are you in your ability to support teachers with the barrier?

	Not at all sure (1)	Mostly Unsure (2)	Somewhat Unsure (3)	Neutral (4)	Somewhat Sure (5)	Mostly Sure (6)	Entirely Sure (7)
Time/duration required to implement the practice(s) (1)	<input type="radio"/>						
Insufficient administrative/leadership support to implement the practice(s) (2)	<input type="radio"/>						
Inadequate staffing at my educational setting (3)	<input type="radio"/>						
Incompatibility (or inappropriateness) of the practice(s) with my existing practices, classroom, setting, or students (4)	<input type="radio"/>						
Insufficient skill or confidence to carry out the practice(s) (5)	<input type="radio"/>						
Materials/resources required to implement the practice(s) (6)	<input type="radio"/>						
Insufficient planning time, technical assistance, or support to implement the practice(s) (7)	<input type="radio"/>						
Insufficient need or buy-in for the practice(s) (e.g., no need to implement as unlikely to improve student outcomes) (8)	<input type="radio"/>						
Lack of responsiveness or cooperation from students in my classroom to implement the practice(s) (9)	<input type="radio"/>						

Q13.4 Finally, list the top three most common barriers your teachers encountered when attempting to implement practices you taught them via the MMCI program in order of most to least common. Please report any barriers you commonly observed or assisted teachers with. This may include barriers previously listed in the survey above.

Q13.5 Most common barrier:

Q13.6 2nd most common barrier:

Q13.7 3rd most common barrier:

## VITA

Sarah Petters Fletcher, a native of Newport News, Virginia, received her Bachelor of the Arts from Tulane University in 2006 with majors in French and International Development. She received her Master of Science from Harvard School of Public Health in Population and International Health in 2008. She worked for the Centers for Disease Control and Prevention in the Department of HIV/AIDS Prevention prior to starting her teaching career in Atlanta, Georgia. She taught in public urban charter schools for 5 years in both Atlanta and New Orleans before beginning her study of school psychology at Louisiana State University, advised by Dr. Anna Long. She is currently completing her APA-accredited doctoral internship at the Louisiana School Psychology Internship Consortium in New Orleans, Louisiana, where she lives with her husband and daughter. Sarah is currently expecting her second child and plans to graduate with her Ph.D. in August 2019. She will continue to work in public schools in New Orleans, where she is a certified school psychologist and plans to become a licensed psychologist.