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Technology in Teacher Education:
A Useful Servant or a Dangerous Master?

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In his Nobel lecture, Christian Lange (1921) declared technology to be "a useful servant but a dangerous master" (n.p.). A teacher, among other things, Lange could only have imagined how technology has come to serve and/or master education today, nearly 100 years later. By definition, technology--the application of scientific knowledge for practical purposes--is advantageous, so it is understandable that we are called to infuse technology within our work as teacher educators (Gronseth et al., 2010; Laffey, 2004). Although technology's nuanced benefits and challenges often derive from evolving innovations, technology courses in teacher education programs tend to focus more on how to use technology, specifically "to support curricular goals," and less on the myriad benefits technology can provide, especially in terms of meeting the needs of diverse learners (Gronseth et al., 2010, p. 33). Alrubail (2018) cites one such benefit: using "the same tools of technology that young people are already using" can foster more empathy in the classroom (n.p.). In addition, "tech-based tools like apps, software and videos" can "foster critical thinking and creativity" (Alrubail, 2018, n.p.). The potential of educational technology is great, but it is important for teachers and teacher educators to understand how to leverage technology in productive ways (Alrubail, 2018), beyond a standalone course in a teacher preparation program (Gronseth et al., 2010). Indeed, Laffey (2004) finds pre-service teachers often "resist seeing technology as a part of their relationship with children" (p. 375), suggesting we should consider "more fully" the possibilities for technology in teacher education (Gronseth et al., 2010, p. 33).

Heeding that call, for this themed issue, we invited contributors to speak to the integration of technology in teaching and teacher education. In our call for papers, we asked authors to address a host of questions, including "How are teacher education programs

using technology in innovative ways (e.g. online education, distance supervision, etc.)? What are some best practices for the use of technology in K-12 classrooms? How can technology serve as a research tool for students, pre-service and in-service teachers, and teacher educators?" The authors in this issue ably answered this call, building on the educational technology scholarship described above.

To begin, Craigory Nieman, with writing support from Yvonne Franco, describes an innovative use of technology in "Improving Assessment in Outdoor Physical Education: A Teacher Inquiry Study." While physical education and technology are not typically thought of as interwoven, Nieman was motivated to use technology to mitigate the time and space constraints of his outdoor P.E. class. Technology not only provided a solution to limitations on assessment for Nieman's classes but also increased his awareness of student learning, as he shares, "The ability to determine which students were accomplishing the objectives, and those students who were not, empowered me to hold myself accountable for my students' learning" (p. 18).

Similarly, in "Capturing the Work: Creating a Framework for Virtual Teaching Pedagogy through the Examination of K-8 Virtual Educator Practice," Christina Seamster and Michelle Vaughan address the importance of technology as it relates to assessment and teacher effectiveness for virtual school teachers. The authors highlight how virtual educators "consistently have the means to make data-based decisions for their students" (p. 33). Echoing the prior article's stance on accountability, Seamster and Vaughan confirm how technology contributes to educators' data-driven decisions by providing an abundance of readily available and easily accessible data. Their article devotes much-needed attention to "the instructional practices employed by virtual teachers," in particular, "*how* they are using technology" (p. 26).

Next, Alyson Adams, Jason Schipper, and Philip Poekert describe the benefits of virtual graduate programs in their article, "Job-Embedded Graduate Programs for In-Service Teachers: Redesigning for Measurable Success in the 21st Century." These technology-centered graduate programs often enroll non-traditional students, such that "having a master's program with online components seems most appealing to continuing educators who cannot leave their jobs to return to full time study" (p. 59). Embracing this truth, the authors encourage readers to envision and enable high-quality online graduate education.

Moving away from the benefits of technology described in the first three articles of this issue of the *FATE Journal*, Sara Tours, Ithel Jones, and Oguzcan Cig report on kindergarten teachers' beliefs and practices in their article, "Kindergarten Teachers' Developmentally Appropriate Practices and Beliefs." This quantitative study examines kindergarten teachers' developmentally appropriate beliefs and practices concerning the current status of the kindergarten curriculum. Despite innovative technology reforms, the authors conclude, "little has changed with regard to teachers' beliefs" (p. 76). This leads us to reflect on the actual practices of educational technology, despite its many benefits, bringing us full circle to the beginning call for teacher educators and the necessity for effectively using technology in our educator preparation programs.

Closing out this issue of the *FATE Journal*, Sacha Cartagena reviewed the book *High-Leverage Practices in Special Education*, which introduces "22 teaching practices" by way of "their foundations in research" (p. 87). In the overall positive review, Cartagena describes the benefits and implications. We invite readers to check out this highly recommended text and to consider how high-leverage practices and technology in teacher education might work in concert to benefit learners.

Each of these pieces contributes to our understanding of innovative practices in teacher education. Thus, we hope this issue of the *FATE Journal*, by highlighting numerous uses of educational technology that can enrich the educational experiences of students, teachers, and teacher educators alike, can in some way counteract "weaknesses in the support for technology" sometimes detectable among teachers and teacher educators (Laffey, 2004, p. 375). We applaud Seamster and Vaughan's aim to promote "further discussion about virtual teacher pedagogy" (p. 31), and we hope the *FATE Journal* can continue to serve as a site for such scholarly dialogue. Indeed, as Nieman's article reminds us, "With new technologies emerging constantly, teacher preparation programs need to be up to date" (p. 19). Because technology access and use in PK-12 schools is highly context-dependent (Laffey, 2004), and because there is a delicate balance between "useful servant" and "dangerous master," we hope to continue this conversation in the next themed issue, centered on the partnerships that support pre- and in-service teachers, not just in the implementation of technology, but in all of their efforts to educate all learners.

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Improving Assessment in Outdoor Physical Education: A Teacher Inquiry Study

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Abstract

Assessment is an imperative, but often absent, endeavor in physical education. In public schools located in warmer climates, physical education classes are often located outside, as the buildings are devoid of gymnasiums. Teachers of outdoor physical education are met with spatial, time, and technological constraints that hinder opportunities for traditional assessment typically associated with indoor physical education. There has been an accountability push on the local, state, and national levels to make assessment an integral part of physical education; however, application to outdoor physical education contexts has yet to be addressed (Mercier & Doolittle, 2013). This teacher inquiry research study investigates a physical education teacher's implementation of assessment strategies in the outdoor setting through two apps and a modified pencil and paper assessment. Strategies investigated include: *Plickers*, *Trash It*, and *Coach's Eye*.

Introduction

As teacher accountability continues to be emphasized and implemented throughout the United States, it is becoming more evident that the roll-out-the-ball approach to physical education is a way of the past. Long gone are the days of dress and participation being the sole determining factors of grades in physical education. There has been a shift to using assessment in physical education to provide students, teachers, administrators, parents, and the community at large with valuable information to highlight important objectives, including what students are learning and how well they are doing at mastering the content (Bott & Mitchell, 2015). This shift to assessment is also being used to demonstrate the worth and quality of a program (Bott & Mitchell, 2015). Assessment, therefore, is becoming the lifeblood that drives a physical education program to its zenith.

Despite the idea that it is best practice for assessment to be incorporated into physical education, physical educators have been reluctant to implement assessment within their curriculum (Constantinou, 2017). Furthermore, technology to help assess students has been largely absent from many physical education classes (Eberline & Richards, 2013). Physical educators often feel technology takes away from their students' activity time, lack funding for technology, struggle or fail to display a need for such equipment, or lack exposure to such technology (Constantinou, 2017; Eberline & Richards, 2013; Krause & Sanchez, 2014). Given these constraints, I[*] sought strategies I could implement with minimal technology and without greatly impacting physical activity time. Moreover, as a second-year teacher transitioning from teaching in Ohio to Florida, I experienced a change in assessment norms. In Ohio, multiple assessments for physical education are built into the curriculum throughout the year and reported to the state of Ohio for the district report card. In Florida, however, assessment in physical education is incorporated only into end-of-course assessments for each district. In the new context, I worried my students and I would not be fully served by a single assessment at the end of the year.

When the school year started, I quickly realized informing myself of student needs through assessment would be more difficult than I had previously thought and would require methods I had not learned in my teacher preparation program. There were numerous

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[*] In this article, first-person pronouns refer to the first author, who carried out the study. The co-author contributed to the design of the study and the drafting and revision of the manuscript.

reasons for this, including: 1) the challenging behaviors at my school were more extreme than I had expected; 2) any paper I carried outside would likely be blown away by the wind; 3) I could not leave anything outside since the physical education court was also used as a public park; 4) I had access to only one iPad and one computer with no Wi-Fi or Internet; and 5) class time was limited to 30 minutes, and typically less than that, given that teachers consistently dropped off students late because of the distance from their classrooms to the physical education court. These challenges led me to determine that I needed to find ways to incorporate assessment that would be appropriate to the spatial, technological, and time constraints with which I was presented.

Context

Physical education is offered to my inner city, K-5 students, for 30 minutes once every three days. I teach 511 students among five kindergarten classes, four first-grade classes, four second-grade classes, six third-grade classes, three fourth-grade classes, and three fifth-grade classes. Classes take place under a covered court at a fenced-in public park adjoining the school. The school is deemed a turnaround school by the state of Florida due to its history of repeatedly underperforming and receiving Title I funds. The majority population is Black and Hispanic, and consists of a large Exceptional Student Education (ESE) and English Language Learner (ELL) demographic.

Literature Review

Assessment is defined as "the variety of methods to grade, evaluate, and rank students' knowledge" (Constantinou, 2017, p.3). While assessments have been traditionally included in core subjects, they have not always made their way into the physical education setting. Despite an increased call for accountability, many physical education teachers continue to avoid assessment of their students (Docheff, 2010; Mercier & Doolittle, 2013). There are a number of reasons for this, including: lack of time to administer assessments, inability to assess while maintaining a fun environment, overcrowded classes, scheduling conflicts, extensive record keeping, lack of planning time, and difficulty deciding what areas to assess (Bott & Mitchell, 2015; Cave & Dohoney, 2009; Krause, O'Neil, & Dauenhauer, 2017; Mercier & Doolittle, 2013).

Research has shown that despite the many challenges with assessment in the physical education setting, assessment is achievable and important to incorporate (Bott & Mitchell, 2015; Cave & Dohoney, 2009; Krause et al., 2017; Mercier & Doolittle, 2013).

Assessment allows physical education teachers to gain knowledge of students' psychomotor, cognitive, and affective growth (Docheff, 2010). In addition, assessment allows physical education teachers to "confirm when students have reached lesson objectives and unit goals and will inform instructional decisions surrounding the pacing and sequencing of learning experiences" (Bott & Mitchell, 2015, p. 26). Furthermore, assessment allows physical education teachers to show accountability for their programs and offer evidence that resources allocated to respective programs are not being wasted (Mercier & Doolittle, 2013). If assessments are bypassed, students typically show less willingness to complete a task since the instruction loses meaning (Cave & Dohoney, 2009). When there is less willingness to complete a task, negative behaviors increase. These are characterized by a lack of sustained and directed behavior with relation to academic achievement within the educational setting (Long, Monoi, Harper, Knoblauch, & Murphy, 2007). Displaying the importance of a physical education program can help prevent it from ending up on the chopping block (Lambert, 2016).

Given the importance of assessment in physical education, there are a few simple ways assessment can be incorporated into a physical education setting without detracting from activity time. With improvements in technology, collecting data has become easier than ever, which creates the opportunity to facilitate more effective instruction. One example of an easy-to-incorporate assessment involves a classroom response system (CRS) called *Plickers*. Classroom response systems poll students and offer immediate feedback in response to a question asked by the teacher (Krause et al., 2017). *Plickers* is a free app available through Apple and Android. An app is a "simple computer program that can be downloaded onto a cellular device or tablet, and allows users to access software on demand" (Krause & Sanchez, 2014, p. 4). This app, once downloaded, can be used when not connected to Wi-Fi and does not require one-to-one technology or shared devices (Krause et al., 2017). Data recorded via the app are stored on the device until it can be synced upon being reconnected to the Internet. This app allows teachers to pose multiple-choice questions to assess the students' knowledge of content, motivations, values, and perceptions toward classroom-specific social interaction (Krause et al., 2017). Class rosters must be entered into the app, and the app assigns a card to each student. When this is completed, questions can be added, and the assessment process can be incorporated in class. Students' answers to questions show up in the app, and a record of responses from

each individual student is kept, allowing a teacher to track students' progress. *Plickers* is a formative assessment tool that can be effective for displaying student learning when incorporated into physical education.

Krause and Sanchez (2014) advocate for the use of video and the *Coach's Eye* app to incorporate assessment in physical education. This app is used to record students' skill performances. A video of a student doing an activity can be viewed in slow motion, reverse, or frame-by-frame, and the teacher can provide feedback through comments. Once finished, users can "send the video and feedback information, such as drawings or recorded verbal comments, via email directly to the student or teacher. Recipients can then view their performances later on their personal computer or other device" (Krause & Sanchez, 2014, p. 5). Students can review and refine their skills using the tool, while the teacher can use it as an assessment to determine student performance levels in the psychomotor domain (Krause & Sanchez, 2014). The use of video in general can be very powerful as students are able to view their performances to see the skill elements they are performing correctly and the skill elements that require improvement (Eberline & Richards, 2013). As a formative or summative assessment tool, this is very effective when incorporated into physical education.

According to Docheff (2010), trash assessment is another strategy for incorporating assessment in physical education. In trash assessment, students provide teachers with brief, anonymous notes about the day's lesson on small pieces of paper. Students pick up a slip of paper, complete the task, and deposit it in a small container. The teacher can use this to address standards, students' feelings, class climate, student self-evaluation, peer-evaluation, the teacher, and assessment. By adding student names to the back of the papers, teachers can also assign grades to student responses. The assessment itself does not involve technology, but the data can be recorded in spreadsheets to be translated into tables and graphs to help stakeholders understand the impact of a quality physical education program (Eberline & Richards, 2013). This can be used as a formative assessment when incorporated into physical education.

In addition to providing students, teachers, administrators, parents with valuable information about course content, objectives, and performance, these three assessments can also be used to convince key stakeholders of the merits of a physical education program (Docheff, 2010; Eberline & Richards, 2013; Krause and Sanchez, 2014; Krause et al., 2017).

Purpose

Previous experiences serving as a physical education teacher in Ohio and as an undergraduate student made evident to me that assessment was necessary to create and maintain a high-quality physical education program. When moving to Florida, I transitioned from teaching in a gymnasium to being outdoors, while also adjusting to a different set of physical education teaching standards. From the beginning of my school year in the new context, I quickly realized assessment would not be as easy to incorporate as I had previously experienced.

I tested using pencil-and-paper assessments, peer assessments, and exit slips, but each was ineffective due to the outdoor setting, time constraints, behaviors of my students, or technological limitations. I needed something to inform my teaching practice. This perceived challenge led me to the research questions guiding this study. I wondered, *given my time, spatial, and technological constraints, how can I, as a physical education teacher, assess student learning in the outdoor physical education setting?* And *how will students react to having assessment integrated in physical education?*

Through my research, I hoped to determine assessment strategies that could be applied to my outdoor physical education setting. This is important to me as a teacher for multiple reasons. Assessments provide accountability for physical education programs and the physical education profession. This, in turn, is important to my students, as it ensures structured opportunities for them to showcase their learning in the psychomotor, cognitive, and affective domains. Most importantly, this study has informed my practice by introducing me to assessment strategies to track and record my students' progress, as well as to better meet their needs. Individuals interested in this study will include physical education teachers seeking strategies for assessment, physical education teacher education programs that are looking to incorporate technology in teacher preparation, as well as teachers experiencing similar challenges when incorporating assessment.

Procedures

The following sections describe the methods, techniques, and data sources that guided my teacher inquiry research study of assessment in outdoor physical education.

Strategy 1: *Plickers*

Existing scholarship inspired me to incorporate a classroom response system (CRS) as a way to assess my students (Krause et al., 2017), and I selected *Plickers*. Students were invited to grab their *Plickers* card, which was associated with their self-space number in class, from a metal pole located on the sideline of the PE court. The cards were attached to the metal pole through a magnetic strip on the back; cards were also laminated in case of rain. Students read the question I had written on a whiteboard and oriented their card in order to display one of four different answers they believed was correct. I scanned their answers using my iPad in conjunction with the Plickers app. Once scanned, students would return their card to the metal pole. The students' answers would show up in my app and automatically be graded. This was used at the end of each of my fourth and fifth grade classes on four separate days (24 total class periods) to gain insight into students' knowledge of the lesson presented that day.

I employed this strategy at the end of class on the days it was implemented since it allowed my students a moment to cool down prior to returning to their regular classrooms. Doing this at the end of class also gave us an opportunity to discuss the answer as I walked students to their classroom. I chose to use this method because I saw a need for assessment but did not want to deal with extensive record keeping or papers blowing away.

Strategy 2: *Trash It*

Another strategy I applied was an assessment tool called *Trash It* (Docheff, 2010). I distributed a note card and pen to each student, who went to an assigned self-space number. Given a question, students wrote their answers and place their cards in a trash can used for the sole purpose of collecting responses. Depending on the question, I gained insight into standards, feelings, class climate, self-evaluation, and teacher evaluation (Docheff, 2010). The strategy also allowed me to assess my students quickly without sacrificing a significant amount of activity time. At the end of the day, I graded student answers and entered them into a spreadsheet, by which I was able to determine data trends through the creation of graphs. I chose this method because of the need for assessment, and I wanted to see if there were a way to incorporate pencil-paper assessments without papers blowing away. Trash It was applied six separate times at the end of each of my fourth and fifth grade classes (36 total class periods) to assess my students on knowledge presented that day. I also used it as a tool to review what we had done in previous classes.

Strategy 3: *Coach's Eye*

Per Krause and Sanchez's (2014) recommendation, I implemented the app called *Coach's Eye* to observe students' movement skills and patterns. After reviewing students' performance, I was able to: 1) provide corrective feedback to students by showing them their videos in slow motion, in reverse, and frame-by-frame, and 2) determine and assess student performance levels. When used as an assessment, I applied a self-created rubric that broke down individual skills into the critical elements of that skill. I broke down each skill into four critical elements. A student received one point for exhibiting each critical. This assessment allowed me to gain insight and assess the psychomotor domain of my students.

I chose this strategy since it was an assessment that I, the teacher, could completely control. Students did not have to fill out any paperwork, and it did not take away from student activity time. This was also an assessment that could be looked at after class to apply a rubric and subsequently, a grade. *Coach's Eye* was applied four separate times in each of my fourth and fifth grade classes (24 total class periods) to record students' skill performance.

Data Collection and Analysis

Qualitative data were collected over the course of a two-month period using field notes, teacher reflections, and student artifacts to inform strategy effectiveness. I collected field notes on a sheet of paper attached to my clipboard during the implementation of each strategy. I noted the time it took to carry out the assessment, direct quotations from students, what was going well, what was not going well, and other observations. Teacher reflections completed at the end of the school day provided me with the opportunity to record my beliefs about what went well, what did not go well, and what, if anything, I thought could be modified to improve the assessment. Modifications were implemented the next class and monitored to determine their effectiveness. Student artifacts provided me with specific insight into my students' success based upon their ability to perform the skills or answer the questions asked.

Three different methods of data collection served to triangulate the data, thus confirming or refuting potential findings, as well as providing greater insight (Creswell & Poth, 2018). In addition, I had classmates in my graduate program, two fellow teachers at my school, and three fifth-grade students that participated in the study member check my

findings in relation to my data to support credibility and trustworthiness of findings in this study (Lincoln & Guba, 1985).

As I sifted through my data and analyzed the information, themes surfaced to inform my use of assessments. I coded field notes and teacher reflections for insights about how I assessed student learning in the outdoor setting and student reactions to assessment in physical education. I highlighted positives regarding the assessment in green, negatives regarding the assessment in yellow, and quotes from students in blue. Positives and negatives were determined through looking at the field notes and teacher reflections for statements in regard to the time, spatial, and technological considerations, as well as student reactions and quotes. Jotting memos to myself was also an important part of the process for determining themes. As I read and reread my data, I wrote short phrases, ideas, and concepts in the margins to categorize and synthesize my data (Creswell & Poth, 2018). Categories were further merged to identify patterns and themes.

To analyze student artifacts, I determined their score on each assessment. For *Coach's Eye* and *Trash It*, this was determined through a rubric. For *Plickers*, this was determined students' being given a 1 or 0 for whether or not they answered the question correctly. This information was entered into a spreadsheet, which allowed me to see how the overall class did, as well as each individual student. This information was then converted into a graph, in an effort to locate themes and trends among my students.

Findings

My analysis resulted in four major themes, which I describe below. These themes are also summarized regarding positives and negatives of each assessment in the Appendix.

Modification Improved the Assessments

As I began my study with research-based strategies, field notes indicated there were challenges with the direct incorporation of these assessments. In accordance with the literature, initial challenges included students' reluctance to be assessed in physical education for the first time in their academic careers. Three separate fifth graders protested, "I didn't know we got grades in PE," "Just fail me," and "We actually get grades? Oh no." This reluctance, I later learned, was due in part to the physical education teacher who had taught at the school for ten years prior to my arrival who had not incorporated assessment. There were also increased calls for teacher accountability from the state and school administration due to our turnaround status. One student stated, "We have to do tests in here, too? We do

them all the time." A teacher stated, "They [students] spend so much time taking tests that it takes away our ability to truly teach. We teach for the test." Moreover, there were logistical challenges related to the outdoor environment. When I initially incorporated the *Trash It* assessment, the wind blew over the trash can, and the students did not have a good writing surface. My use of teacher reflections led me to generate ideas for how to improve this. When I placed a few bean bags in the bottom of the trash can, it no longer blew over, and the assessment was able to be collected all in one place. I also incorporated the use of miniature clipboards with pens attached to them. This reduced the time it took for students to be assessed, as well as provided a surface for the students to write on. The students responded well to the incorporation of the miniature clipboards, as evidenced by this student response: "I really like these clipboards. They are so much better than the ground."

With regard to *Coach's Eye*, there were also challenges with implementing the assessment as suggested in the research. The main issue, as indicated by my data, was the overwhelming amount of time it took to review the video footage of students to evaluate individual skill achievement. On average, it took 75 minutes per class to review. With two classes of video footage per day, I simply could not evaluate students efficiently and effectively. The realization is evident in my reflection notes, where I state, "This was very time consuming and needs to be simplified." Incorporating this consistently will be challenging, especially once extended beyond fourth and fifth grade. To improve this, I simplified the assessment to a single skill, which improved the time it took to examine skills and provide feedback. For instance, I focused solely on dribbling rather than passing, shooting, dribbling, and trapping. This reduction from four skills to one skill helped provide focus; it simplified the extensive record keeping, allowing me to assess students more efficiently and provide more specific feedback for improvement.

With *Plickers*, field notes and teacher reflections indicate proximity of students to the assessment tool was a concern. Students used *Plickers* cards to answer questions in their self-space spots, but an iPad loaded with the *Plickers* app needed to be within 10 feet of the student-held *Plickers* card to record the responses. A better process was necessary. Students were reorganized into a straight line, and I walked down the line to scan their cards. This recorded and scored the data immediately, thus decreasing the amount of time it took to complete the assessment.

Overall, strategy modifications improved the assessments by making them more effective for use in our outdoor physical education setting.

Data Drove Instruction

My research indicates at the start of this study I had a major misconception that my students comprehended everything I was teaching. Prior to incorporating these assessment strategies, I would ask questions of students throughout the lesson, which I thought would accomplish my goal of helping students understand the objectives. Students would answer questions throughout class, leading me to believe the answers of a few students were representative of the group. Student artifacts and field notes indicate this was not the case. Responses on my *Trash It* assessment ranged from individual students able to list all of the critical elements requested, to students writing, "People were talking while I was trying to hear you and that's why I don't know none of them," and "You didn't say them enough so I don't know." Likewise, student responses to the *Plickers* assessment demonstrated that for each question, there were on average six students out of eighteen unable to answer correctly. With each *Coach's Eye* assessment, only about 60% of students were able to accomplish the skills they were being taught. This led me to ask questions of myself. In my reflection journal, I noted "Am I doing enough to reinforce concepts that I am teaching? Am I providing enough time for students to sufficiently learn the skills I am presenting?"

Given this finding, I determined to spend more time with each concept. It was necessary to devote more teaching time so students would have fuller understanding. This influenced my lesson planning for the next class as well. Lessons began to consist of opportunities to reinforce the concepts students had not previously understood, along with the skills students were expected to be able to perform on that day.

Assessment Improves Accountability

When I began my journey to incorporate student assessment, I thought I would be met with long stares and resistance every step of the way, as this was a natural reaction of my students when introducing something foreign to them. When introducing my first assessment, I was met with student responses including, "You won't look at these," "Just fail me," "Is this actually for a grade?" and three eye rolls. Over time, however, I saw a change in my students. They became more attentive when I was incorporating assessment, and their off-task behavior decreased, according to my field notes. Students became more concerned about how well they were doing, asking, "How did I do?", "What's the answer?",

and "What can I do to get better?" Best of all, students actually enjoyed assessment. Their facial reactions when doing the assessments included more smiles, and their comments became generally more positive. For instance, the incorporation of *Plickers* and *Coach's Eye* elicited student reactions such as, "That's cool," "That was fun," "I want to film it," and "Can we do that again?" Students were actually expressing enjoyment and seeing value in assessment, and in fact, so was I.

The ability to determine which students were accomplishing the objectives and which students were not empowered me to hold myself accountable for my students' learning. I was able to design instruction based on trends visible in my student artifacts. In addition to this, I was able to make myself accountable to my administration. After incorporating my *Plickers* strategy, I spoke informally with my principal about the different strategies for assessment I had been incorporating. She was surprised and responded, "Is it working?" I took out my iPad and showed her the *Plickers* data I had just collected. A big smile came to her face and she said, "That's awesome! I'm really happy that it's working for you." This short interaction allowed me to demonstrate the value of the strategies and gave me great pride in what I had been incorporating in my curriculum.

Time Does Not Need to be a Constraint

The perceived issue of time as a constraint was a major mental hurdle for me in approaching this study. Seeing students for only 30 minutes every three days required that I be intentional in my approach and do everything in a meaningful way. To my surprise, I was able to incorporate *Coach's Eye* without detracting from any activity time because the assessment was done by the teacher, rather than the students. Likewise, the teacher analysis of the video took place after class. While *Plickers* took away from class time, its implementation never required more than 4 minutes to accomplish. In addition, it doubled as a natural closure to the lesson and provided meaningful data that helped to drive future instruction; this made for time well spent.

Trash It took the most class time to incorporate. The first time it was used took the most time—seven minutes. After a modification, the class time required was reduced to 5:23, on average. The amount of time varied based on the nature of the question being asked. For instance, inviting students to list four items took longer than having them recall one. Despite this, like *Plickers*, *Trash It* provided data that helped to drive instruction,

allowed me to ask different types of questions, and doubled as a closure at the end of my lesson. All three assessments were manageable and non-intrusive to my 30-minute class.

Implications

This teacher inquiry study allowed me to look at my teaching practice and curriculum through a different lens. As a result, I became a better teacher. Prior to this inquiry I would just assume my students were understanding and meeting their student learning objectives per my questions asked throughout lessons and during my closure. Unfortunately, as evidenced by this study, that was not the case. Now, I reflect more frequently on my teaching practices. For example, I examine my choice of activities and how I am disseminating information to my students in order to improve their understanding of content. I continue to use the assessment strategies incorporated in this study to plan for future instruction in ways that meet the needs of my students and my program.

This study also altered my view of assessment strategies advocated throughout my physical education preparation. Methods I learned in my teacher preparation program, such as traditional exit slips and paper-pencil tests, and those I had incorporated in classes at previous schools, were unsuccessful in my new outdoor context. The introduction of apps, such as *Plickers* and *Coach's Eye*, during teacher preparation would have made a major difference at the beginning of my school year. The introduction of apps in teacher preparation programs would have exposed me to assessment tools using technology and what can be done following data collection. With new technologies emerging constantly, teacher preparation programs need to be up to date and professionals need to be thinking about how they can use them to meet the needs of students. Teacher preparation programs also need to consider that "university students thrive on technology and mobile interaction and are often even more technology savvy than some faculty" (Krause et al., 2017, p. 36). Due to this, university students are tremendous assets when figuring out how to implement technology in a K-12 setting. Had I been exposed to technologies such as these as a student, I would have learned how to maintain accurate records on student performance across a variety of classes through the use of technology. Researching assessment strategies was the start to my finding solutions to the assessment needs that I had not obtained in teacher preparation. Further consideration of these strategies through reflection allowed me to modify proposed solutions to meet classes' individualized needs. I felt empowered by my ability to lead learners to be more accountable, as well as my ability to

become more accountable to myself and our program. I anticipate continuing to research strategies and incorporate them into our program to grow in understanding the different ways students can demonstrate their knowledge.

Experiencing this study's influence on my curriculum, teaching practice, and students has led me to think about my next inquiry. I now wonder about my students' challenging behavior and how improvement can be facilitated in physical education. Specifically, I wonder what positive behavior interventions I can apply in outdoor physical education to support the needs of students across multiple grade levels. I anticipate investigating this inquiry, as student behavior has become a major challenge at our school. Perhaps technology can help.

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Appendix

Assessment Positives and Negatives

Assessment	Positives	Negatives
Plickers	Obtain insight into cognitive and affective domains Obtain immediate feedback as app scores automatically Store students' answers offline and transfer online once reconnected to Internet Does not require Wi-Fi Does not require one-to-one technology Ensures integrity of assessment (students cannot see other students' answers due to unique QR code) Quick assessment when implemented Students more accountable Teacher more accountable	Time-consuming to enter in names and classes Have to be close in proximity to students to scan QR Codes Multiple-choice questions only
Trash It	Obtain insight into cognitive and affective domains Test more types of knowledge than multiple-choice questions Paper does not blow away Quick assessment to implement Students more accountable Teacher more accountable	Takes a lot of time to grade Students can see other students' answers Paper could still get wet if rains Pens and pencils may not work/break
Coach's Eye	Obtain insight into psychomotor domain Feedback provided to students through visuals and written comments Students can visually see their performance Can draw on video in app to emphasize positives and negatives Non-obtrusive to student activity time Students more accountable Teacher more accountable	Can take a lot of time to grade unless focused on one skill at a time

Capturing the Work:
Creating a Framework for Virtual Teaching Pedagogy through the Examination of K-8 Virtual Educator Practice

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Abstract

The purpose of this study was to identify current virtual school teacher practices from the perspectives of seasoned virtual educators. A survey gathered information on current virtual school practices (N=34) from K-8 virtual educators and identified virtual school teacher practices as well as common methods for implementing virtual school teacher practices. Findings from this study were used to create a framework for virtual school teaching practices focused on four identified areas of virtual teaching practice: using technology tools, evaluating student needs, collaboration, and providing individualized instruction to students. Implications for supporting virtual teachers, providing training and certification for virtual educators, and evaluation are shared.

Introduction

Since No Child Left Behind's (2002) implementation in 2001, states across the U.S. have been held accountable by the U.S. Department of Education to improve teacher quality. According to Susan Patrick (2012), President and CEO of the International Association for K-12 Online Learning (iNACOL), there were 50,000 students enrolled in K-12 virtual schools in the year 2000, and by 2011, enrollment in K-12 online educational programs reached 4 million students. Today, those millions of students are engaging in virtual education in a myriad of ways: taking online courses that are supplemental to their regular classroom instruction, taking all of their core courses online, and engaging in blended models in schools combining face-to-face and online instruction (Evergreen Education Group, 2015). With the number of virtual school educators growing in response to these numbers, it is imperative to understand the nuances of virtual school pedagogy, so we can adjust training, support, and evaluation of these practices.

Guided by the following research questions, this study identified virtual school teacher practices from the perspective of current full-time K-8 virtual school teachers as well as common methods for implementing virtual school teacher practices:

1. What are the common practices among virtual school teachers as described by full-time K-8 virtual school teachers?
2. From the perspective of full-time K-8 virtual school teachers, how are current online standards, recommendations, and practices implemented in their online classrooms?

Through developing an understanding of the types of instructional practices used in a virtual environment, we can begin to identify the type of support and development virtual teachers need. The results of this study also inform a framework for virtual school pedagogy discussed later in this article that seeks to capture the foundational practices reported by current virtual school teachers.

For the purpose of this study, the virtual environment is defined as an instructional setting in which the student and teacher are connected through a technology medium without access to a physical classroom and no instruction occurs in-person. Technology tools used to connect teachers and students may include a phone, video conferencing software, a learning management system, and/or e-mail. In contrast, the face-to-face environment is otherwise known as a traditional classroom setting in a bricks-and-mortar building where teachers and students meet in-person for daily instruction. Though face-to-

face students and teachers may interact through technology at times, technology is used as an additional communication tool and is not the primary source of interaction between teacher and student.

Review of Related Literature

This review examines and synthesizes the current national standards and recommendations for online learning and explores recent studies that aim to measure K-12 virtual teaching. Currently, there is not a separate set of standards or certifications universally required to teach in a K-12 virtual classroom (Dipietro, 2010). It is likely that some virtual schools have developed their own individual teacher training systems, but without a solid understanding of the differences between virtual pedagogy and face-to-face teaching, virtual teachers may not be exposed to some of the specific best practices in their medium. There are many aspects of teaching that are comparable in face-to-face and virtual teaching; however, "teacher best practices are somewhat more difficult to put into action universally because the modes of delivery are fundamentally different" (Corry, Ianacone, & Stella, 2014, p. 593). The purpose of this study is not to identify virtual teacher practice for purposes of evaluation, but to add to the ongoing conversation around the differences in practice between face-to-face and virtual classrooms by listening to those currently teaching in virtual classrooms.

National Standards and Recommendations for Online Learning

The International Association for K-12 Online Learning (iNACOL), the National Education Association (NEA), the Southern Regional Education Board (SREB), and the International Society for Technology in Education (ISTE) have developed standards and recommendations pertaining to best practices in online education (Rice, 2012). According to Rice, each organization recognizes a need for virtual school teachers to be proficient in basic technology skills including word processing, managing a Learning Management System (LMS), and using communication tools. Furthermore, the organizations agree that teachers must hold certification in their state and content areas. For example, the SREB (2003) recommends, "the teacher meets the core professional-teaching standards established by state licensing agency." The National Standards for Quality Online Teaching also support the idea of certification: Standard A, "The online teacher knows and understands the subject area and age group they are teaching," is an indicator for effective online instructors (International Association for K-12 Online Learning, 2011, p. 5).

There are some common characteristics generated from each organization's standards and recommendations of best online teaching practices. We can see an emphasis on proficiency in technology skills as well as demonstrated command of the content via a teaching certification. While these may be key foundational characteristics of virtual teacher pedagogy, a closer examination of the instructional practices employed by virtual teachers is needed to understand *how* they are using technology to transmit their content knowledge.

K-12 Virtual School Teacher Practice

Currently, there is significant research on teachers' perspectives of effective instructional strategies in the traditional, face-to-face school setting, and while the field of research on virtual teaching practice is growing steadily, continued exploration is needed. DiPietro, Ferdig, Black, and Preston's (2008) foundational study sought to understand the practices of successful virtual school teachers. After interviewing K-12 virtual school teachers, the researchers identified possible "best practices" for virtual educators, which included 12 general characteristics, two classroom management strategies, and 23 pedagogical strategies. The researchers recommended future research in online classroom management as well as a framework for online certification to help promote a standardized model for K-12 virtual education. Black, DiPietro, Ferdig, and Polling (2009) developed a survey to measure the best practices of K-12 online instructors using the characteristics and strategies from the prior study (DiPietro et al., 2008). Their results indicate that the teachers found having an interest in technology, having an online presence, and monitoring student progress closely are best practices in virtual school teaching.

DiPietro (2010) later explored virtual educators' perceptions of their instructional roles in order to understand strategies that will support teacher pedagogy, technology, and content. Using a constructivist framework, an analysis of 16 interviews revealed five themes: connecting with students, fluid practice, engaging students with the content, managing the course, and supporting student success. Corry, Lanacone, and Stella (2014), in their comparison between face-to-face classrooms and virtual classrooms, found instructional practices that spanned both mediums, like the need for teachers to be flexible and communicate at high levels. However, two practices were unique to virtual teachers: relationship building and personalized learning. In the virtual environment, "personalized

learning through pedagogical strategies allows the teacher to react to student deficits and mastery of content" (Corry et al., 2014, p. 604).

Instructional strategies are often the same when teaching virtually or face-to-face, but the difference may be in the tools used to impact student achievement. According to Rice (2012):

> Learners participate in discussions, take exams, work on projects, and give presentations. These same strategies and tools exist in the online environment. You will exchange verbal discussions or text-based discussions using live chat or threaded forums, for example. Your overhead projector might be exchanged for an electronic presentation tool or a Web conferencing tool. (p. 42)

Virtual school teachers possess skillsets that are similar to those of face-to-face classroom teachers; however, they also execute tasks that are unique to the virtual environment (Corry et al., 2014; DiPietro et al., 2008). Some of the nuances in virtual pedagogy are developed as teachers negotiate how to accomplish everyday tasks, such as communication and content delivery, in ways that are distinctive to the online medium (Barbour & Unger, 2014). If we can understand these distinctive details in pedagogical approaches, we can be more accurate in representing the work that virtual teachers are doing daily.

Methods

To further examine virtual pedagogy, we distributed a quantitative instrument to 34 full-time virtual school teachers, guided by the following research questions:

1. What are the common practices among virtual school teachers as described by full-time K-8 virtual school teachers?
2. From the perspective of full-time K-8 virtual school teachers, how are current online standards, recommendations, and practices implemented in their online classrooms?

Site

Teachers from the largest statewide full-time public virtual school participated in the study. The accredited public school serves students in grades K-8. Teachers and students come from urban, suburban, and rural communities dispersed across the state of Florida. During the 2015-2016 school year, there were approximately 114 full-time teachers in grades K-8, with an enrollment of 4,500 students in grades K-8.

Quantitative Instrument

A set of survey questions, derived from Rice's (2012) synthesis of standards and recommendations and tested for content and readability during a focus group session, were

added to an existing survey, the Survey of Preservice Teachers' Knowledge of Teaching and
Technology (Schmidt et al., 2009), which calls for teacher self-ratings on their knowledge of
teaching and technology. Permission to use the Survey of Preservice Teachers' Knowledge
of Teaching and Technology was granted by the authors. During the survey, teachers
indicated the extent to which they believe student learning is impacted for each teacher
practice. Next, the participants were asked to rank order the frequency of specific tasks,
previously compiled by the focus group, used to ensure the practice or standard is achieved.
Teachers also had an opportunity to select "other" if their preferred strategy was not listed.
If "other" was selected, survey participants had the ability to rank order the added approach.
The results that explore an understanding of virtual teaching practices are shared within this
article, while survey questions that addressed topics outside the scope of this study have
been excluded.

Reliability and Validity

Since the survey items from the Survey of Preservice Teachers' Knowledge of
Teaching and Technology (Schmidt et al., 2009) were found to be valid and reliable, a focus
group reviewed any additional drafted questions for readability and content. Internal validity
of the drafted survey items was addressed by checking teacher interpretation of the
questions throughout the focus group setting. The researcher asked each focus group
member to talk through what they believed each question was asking. The questions were
also asked in two formats: during the focus group and in a survey. The drafted survey items
were then modified based on the feedback received during the focus group. Once the focus
group findings were compiled, the focus group members read the new survey items to
determine if they captured the focus group's message, thus validating the new survey that
was created (Merriam, 2009).

Description of Survey Participants

One hundred and fourteen K-8 full-time virtual school teachers were asked to
participate in the survey. Over a two-week period, a total of 47 (41%) teachers started the
survey and a total of 34 teachers completed the survey in its entirety, for an overall
response rate of 30%. The findings presented below are based on the responses of the 34
completed surveys.

Education, age, and professional certification. The survey requested that virtual
school teachers indicate the area in which they currently hold a bachelor's or master's

degree. Participants were able to select multiple options or select "other" if their degree area was not listed. The eight participants that selected "other" for degree major listed the following degrees: Outdoor Education, Educational Leadership, Early Childhood, Communications, Human Resource Management, and Instructional Technology. One participant listed two degrees in Business Administration and Educational Leadership. Table 1 (Appendix A) shows the breakdown of participant degrees.

In addition to reporting their degree majors, participants reported their age by selecting from four age ranges listed on the survey: 22-27, 27-32, 32-37, or 37 and older. With regard to age, 5.88% of the responding teachers were between the ages of 22 and 27 and 20.59% of the participants fell within the 27-32 age range. The majority of the participants were over the age of 32, with 38.34% reporting an age between 32 and 37 and 32.35% stating they were 37 or older. Of the teachers who completed the study, 2.94% preferred not to share their current age group.

The teachers were also asked to select the area(s) in which they held a professional teaching certificate. Table 2 (Appendix B) shows the most common certifications held by the survey participants were Elementary Education, English Speakers of Other Languages and English/Language Arts/Reading.

Grade level and content areas taught. The survey participants were also asked about their experience and content/grade level teaching assignments. Teachers had the ability to select more than one grade level. The survey also allowed participants to select "I prefer not to answer." The results of the survey indicated that the majority of the participants, 23, taught elementary school, grades kindergarten through 5th grade.

Teaching experience and professional development. According to Stronge, Tucker, and Hindman (2004) voluntary teacher participation in professional development outside of what is offered at the school level is an indicator of teacher effectiveness. As a result, on the survey, teachers were asked, "Are you currently enrolled in any professional development or teacher education preparation courses outside of what is currently being offered at your school?" As evident in Table 3 (Appendix C), eleven (32.35%) participants indicated they were enrolled in professional development or teacher preparation courses outside of what was offered at the school level while 23 (67.65%) participants stated they were not taking additional coursework.

Table 4 (Appendix D) shows that four teachers (11.76%) specified that they have not completed a teacher education program and 30 (88.24%) teachers revealed that they have completed a teacher education program. These numbers indicate that teachers may be certified in areas other than what they are teaching or have received degrees in areas other than education, thus taking teacher preparation courses to complete state requirements for certification.

In Florida, teachers may be hired with a temporary teaching certificate while they complete additional coursework required for a permanent teaching license. The survey results also reflected that 29 respondents (85.29%) had three or more years of face-to-face teaching experience and 5 (14.71%) participants had between zero and three years of face-to-face teaching experience. Virtual school teaching experience was almost evenly split with 16 (47.06%) participants stating they had between zero and three years of virtual school teaching experience and 18 (52.94%) participants stating they had three or more years of virtual school teaching experience (including the current school year).

Data Collection and Analysis

Survey participants were asked to rank order how frequently they implemented each practice. Given the focus of this article, not all survey questions are relevant to the results discussed here. Thirteen survey questions were directly related to virtual school practice and used in this analysis. To analyze survey questions, the percent of teachers selecting each practice as the most frequently used was calculated and the practices were then sorted from the greatest to least. Teachers were able to select more than one practice as the most frequently used in the event that they use two or more practices equally.

Results: Defining Virtual School Teacher Pedagogy

The most commonly selected approaches used by the majority of virtual school teachers included in this study are reported in Table 5 (Appendix E). We reorganized these approaches into four broad categories that describe what virtual educators do: use technology tools, evaluate student needs, collaborate, and provide individualized instruction. Table 6 (Appendix F) shows how the most commonly selected approaches fit into the categories. Based on how virtual teachers reported using these approaches in their classrooms, some of them fall into multiple categories.

Figure 1 (Appendix G) gives an overview of how the four categories of virtual instructional strategies may interact with each other within virtual teaching pedagogy.

Findings indicate teachers most frequently used some form of collaboration and technology tools to implement each practice. Full-time virtual school teachers use technology tools to provide individualized instruction, to collaborate, and to evaluate student needs. Figure 1 extends the survey findings to propose a visual representation of how the four instructional strategies may be related in pedagogical practice. There could potentially be many more ways in which these four categories work together in practice; however, this visual suggests instructional methods eventually lead to individualized instruction for students. Figure 1 also highlights how instructional practices do not exist in isolation but are part of a larger pedagogical framework. It is our hope that the nature of these relationships sparks further discussion about virtual teacher pedagogy.

Use Technology Tools

The importance of using technology tools explains its top position on the framework for K-8 full-time virtual school teacher pedagogy. The most commonly selected instructional strategies of using e-mail communication, live sessions, and phone conferences fall within the use of technology tools. Teachers specifically reported using phone conferences to provide individualized instruction and assess student needs. To ensure students receive high-quality instruction, virtual school teachers keep digital notes within the Learning Management System (LMS) after each interaction with a student. Consequently, each student's account has an ongoing log of all student interventions, enrichment activities, areas of concern, areas of strength, and a variety of other pertinent student data. This differs from face-to-face classroom teaching since virtual school teachers are required to keep detailed notes regarding each teaching session with each student.

Additionally, live sessions are delivered through various technological tools that allow the teacher to bring students together synchronously for small-group or whole-group instruction. This tool most closely mirrors what students would experience in a face-to-face classroom and provides students with "live" contact with their virtual teacher. Because online learning is managed through a Learning Management System, virtual school teacher effectiveness relies on the teacher's ability to navigate the LMS in combination with effective instructional skills. The virtual school teachers surveyed indicated that they must also work diligently in the virtual setting to ensure the academic integrity of students. Since students do not report to a face-to-face classroom each day, online teachers spend a great deal of time and effort on verifying student knowledge using technology tools.

Collaborate

Through collaborative efforts, virtual school teachers also enhance the use of technology tools, their ability to provide individualized instruction, and their ability to evaluate student needs. In Figure 1 (Appendix G), the arrows move in a downward trend toward collaboration, evaluating student needs, and providing individualized instruction. In virtual teaching, frequent collaboration with peers, faculty members, parents, and students is essential to avoid isolation. Virtual teachers indicated that professional development and collaboration with peers were commonly used approaches in virtual education. Collaboration is also crucial to teaching students in an online environment. Participants reported collaborating with peers and professional learning communities and engaging in professional development as a frequent means for carrying out standards, practices, and recommendations in delivering online instruction. Teachers also collaborate with parents during phone conferences, through e-mail communication, and in providing feedback within the grade book. They further reported participating in using an LMS to document individual student needs as a form of professional development, which may differ from the type of professional development sought by classroom teachers based on the unique needs of virtual educators. Virtual teachers collaborated with their peers in weekly meetings, during which they discussed methods for meeting with each of their students individually and delivering targeted small group instruction. This helped them to continuously improve their instructional practices in an individualized setting.

Evaluate Student Needs

Virtual teachers selected approaches such as using feedback on assessments and determining students in the bottom quartile as common instructional strategies that assist them in evaluating student needs. In a virtual environment, teachers rely less on an observational assessment of understanding since they have little to no access to the nonverbal cues provided by their students. Without consistent face-to-face opportunities, virtual educators use phone conferences, in addition to assessments, to definitively identify the individual needs of their students. The digital log created in the LMS of previous interactions and interventions used by the teacher allows them to make adjustments to the curriculum for each student. While teachers in face-to-face classrooms do many of these same things, the tools created to record interventions, interactions, and feedback allow

virtual educators to consistently have the means to make data-based decisions for their students.

Provide Individualized Instruction

While virtual school teacher practices begin with the use of technology tools, the primary purpose is to provide individualized instruction for students. Ultimately, all paths of the framework lead to individualized instruction for students. Teachers described how this individualized instruction may look different from face-to-face classroom teaching through the use of curriculum-based assessments via phone. Students learn concepts in small-group live sessions based on their results during curriculum-based assessments and lesson performance or on standardized tests. Unlike in a face-to-face classroom, students are invited to attend synchronous, small-group live sessions based on their curricular needs. Virtual school students who have demonstrated mastery of certain topics do not need to attend live sessions on those topics.

Individualized feedback that can be clearly understood and applied by students is a necessary pedagogical practice in virtual school teaching. Since they are not in the same physical space as their students each day, virtual school teachers must know how to most effectively use technology tools to reach students when individualizing feedback. For example, students who are strong in reading and writing might benefit from written feedback, however, audio/visual learners would be more apt to receive feedback most effectively through a screen cast recording where the student can see and hear the teacher providing descriptive feedback on how to improve.

Discussion

In the virtual environment, it is the teacher's responsibility to log communications accurately and in a timely manner to ensure students receive the highest quality of instruction in the virtual setting. There is a strong correlation between documenting student learning within the LMS and parent communication in the name of assessing student learning within the virtual setting (Johannesen, 2013). According to the Essential Principles of High-Quality Online Teaching (Southern Regional Education Board, 2003), virtual school teachers work so closely with their students in the one-on-one setting that they often know their students better than teachers get to know their students in a face-to-face classroom. Similarly, virtual school teachers must be aware of how to identify struggling learners despite not seeing their students each day. The SREB (2003) also notes that the teacher's

ability to monitor student performance and academic honesty is an important part of legal and ethical standards in the virtual environment. Using a variety of technology resources, virtual school teachers work to confirm that student grades match the academic ability of each student.

Figure 1 ([Appendix G](#)) gave an overview of how virtual school teachers implement teaching practice online and how the four pedagogical categories interact with each other. Technology tools enable virtual school teachers to reach students, families, teachers, and all virtual school stakeholders more effectively. Without the ability to adequately maneuver a Learning Management system, complete a phone conference, host a webinar, or use instant messaging software and word-processing programs, an online teacher could not evaluate student needs, collaborate, or provide individualized instruction. Virtual school teachers must be able to assess student knowledge using multiple data points despite not being in the student's presence. As a result, teachers must use technology tools in both synchronous and asynchronous environments to determine each student's academic needs. Virtual school teachers must be experts in their grade level and content knowledge to sense when a student may struggle and subsequently personalize their instruction. Although collaboration is a practice that has been well-documented in face-to-face educational settings, it is important to note that virtual teachers still report it as key to their virtual practice. Teaching virtually has the potential to be an isolating experience and many of the meetings and professional development that bring teachers together face-to-face now take place virtually and potentially asynchronously. Ensuring that collaboration is still a staple in virtual schools supports the development of strong virtual teaching pedagogy.

Limitations

This study was limited to full-time K-8 virtual school teachers and examined their perspectives at one specific online school to establish a survey, which was then administered to 114 teachers and successfully completed by thirty-four full-time virtual school teachers. Additional input about virtual pedagogy may be gained from observation of practice and/or from a larger sample size.

Conclusion and Recommendations

Ideally, the tasks that most impact student learning should occur most frequently in the classroom. This study examined teacher practices, but a future study examining the impact of those practices on student learning would extend this work. By using evidence of

student learning to confirm teacher perceptions, eventually a virtual school teacher evaluation tool can be developed to measure teacher effectiveness and accurately model K-8 full-time virtual school teacher pedagogical practices. Creating a teacher evaluation model with teacher perceptions and input on common practices involves teachers in the teacher evaluation process and assists in ensuring the evaluation tool fosters teacher growth. It is important to understand the nuances of virtual pedagogy and be wary of applying teacher evaluation systems designed for face-to-face teaching environments to virtual teachers without rigorous vetting by the teachers themselves. At the time of this study, teacher evaluations in Florida relied heavily on teacher evaluation scores as part of a merit pay system. The mismatch between an evaluation system designed for a face-to-face teaching environment and what can be "seen" in a virtual teaching environment can be detrimental to a virtual teacher's evaluation score. Current policy may dictate how teachers in a state are to be evaluated, but these policies need to leave room for the variances that occur in practices across mediums.

This study's results indicate that full-time K-8 virtual school teachers report using technology, evaluating student needs, collaborating, and providing individualized instruction as foundational aspects of their pedagogy. Currently, most states do not require additional coursework or certification areas for teachers to teach online. The pedagogical model presented in this study coupled with student performance data can also be used as a guideline for establishing virtual school teacher certification modules in K-8 virtual education that will support the development and growth of quality virtual educators. Teachers in this state are not allowed to teach without certification in their subject area, yet there is not currently a certification for teaching virtually. Teaching virtually can present just as many challenges as teaching students in different content areas or teaching students with varying needs in a face-to-face classroom. An endorsement on the current teaching license would assist in ensuring that all virtual teachers receive the training in the aspects of virtual pedagogy that are key to successful teaching in that medium. Further, teacher education programs can use this information to assess how they are currently supporting the development of virtual school educators within their programs of study. As new teachers enter the field and take positions working in a variety of contexts, they need to be exposed to a myriad of pedagogical models, and perhaps complete fieldwork in face-to-face and

virtual environments in order to apply the strategies learned through their coursework as pre-service teachers.

Finally, this study's findings are valuable for instructional designers and curriculum design teams creating online courses for use in virtual schools. The pedagogical practices of full-time K-8 virtual school teachers are important to consider when designing and writing courses for full-time virtual school teachers and students. Curriculum writers should understand how virtual school teachers reach students through technology tools. Virtual school teachers' pedagogical practices in collaboration and evaluating students' needs to individualize instruction must be considered during course design. As a result, instructional designers should understand the importance of creating flexible courses to meet the needs of teachers and students. The course should not be a one-size-fits-all model, as it must be flexible in order to best meet the individualized needs of students.

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Appendix A

Table 1. *Full-Time K-8 Virtual School Teachers' Reported Majors*

Subject	Percent	Frequency
Elementary Education	70.6	24
English/Language Arts/Reading	23.5	8
Science	2.9	1
Exceptional Education	14.7	5
English for Speakers of Other Languages (ESOL)	14.7	5
Prefer not to answer	2.9	1
Other	23.5	8

Appendix B

Table 2. *Full-Time K-8 Virtual School Teachers' Reported Professional Certification*

Professional Certification Area	Percent	Frequency
Elementary Education	97	33
English/Language Arts/Reading	44	15
Science	0	0
Social Studies	3	1
Arts Education (Art, Drama, Music, etc.)	0	0
Health and Physical Education	3	1
Exceptional Education	24	8
English for Speakers of Other Languages (ESOL)	71	24
Prefer not to answer	12	4
Other	0	0

Appendix C

Table 3. *Full-Time K-8 Virtual School Teachers' Reported Professional Development*

	Percent	Frequency
No additional coursework	68	23
Additional professional development/coursework outside of virtual school	32	11

Appendix D

Table 4. *Full-Time K-8 Virtual School Teachers' Reported Preparation*

	Percent	Frequency
Completed a teacher education program	88	30
Did not complete a teacher education program	12	4

Appendix E

Table 5. *Most Commonly Reported Virtual Teaching Approaches*

Virtual Teaching Approach	Frequency as "most commonly used"
Collaborating with peers/teacher collaboration	105
Professional development	91
E-mail communication	71
Phone conferences	53
Feedback on assessments	52
Live sessions with students	45
Professional learning communities	37
Curriculum-based assessments via phone	24
Determination of students in bottom quartile	23
Communicating with family stakeholders	20

Table 6. *Commonly Listed Virtual Approaches Distributed into Pedagogical Categories*

Use Technology Tools	Evaluate Student Needs	Collaborate	Provide Individualized Instruction
E-mail communication	Determination of students in bottom quartile	With peers/teachers	Curriculum-based assessments via phone
Live sessions with students	Feedback on assessments	E-mail communication	Feedback on assessments
Phone conferences	Phone conferences	Professional development	Live sessions with students
		Professional learning communities	
		With family stakeholders	
		Phone conferences	

Appendix G

Figure 1. *Framework for Full-Time K-8 Virtual School Teacher Pedagogy*
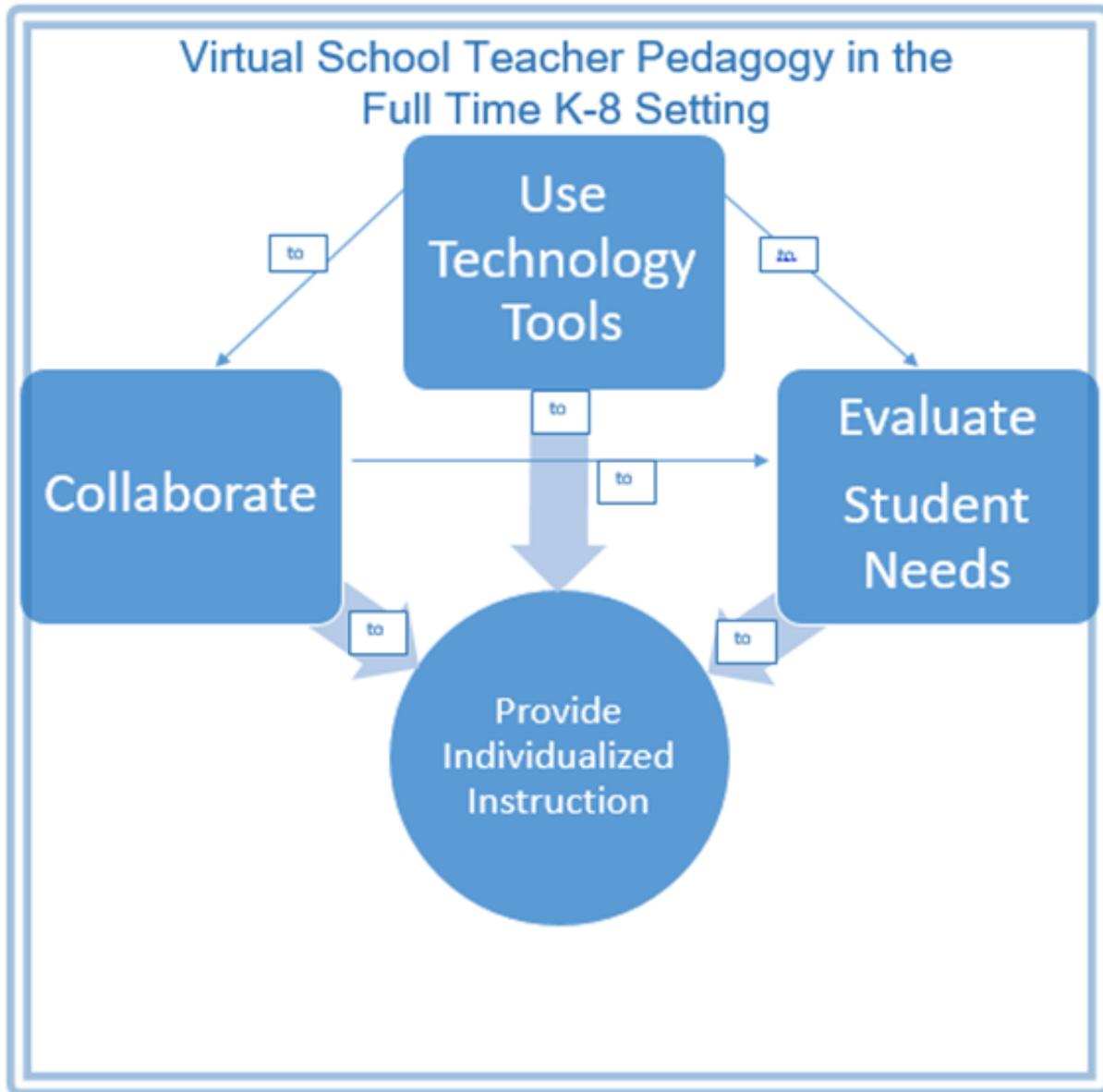
Virtual School Teacher Pedagogy in the Full Time K-8 Setting

Job-Embedded Graduate Programs for In-Service Teachers: Redesigning for Measurable Success in the 21st Century

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Abstract

Master's degree programs in education are increasingly under fire in policy arenas due to mounting evidence that such programs do not result in increased student learning outcomes. Informed by the Blue Ribbon Panel's 2010 recommendations for clinically rich teacher preparation, this article makes a case for a reconceptualized master's program, centered on clinical practice and focused on improving teacher practice. In addition, placing this type of program online has the potential to reach full-time practitioners through job-embedded structures. A model program is described along with evidence that this type of job-embedded program impacts both teacher practice and student learning. Unless graduate teacher education refocuses on improving teacher practice and building capacity of teacher leaders, public policies may further erode the need for graduate education programs as well as incentives for teachers to seek advanced degrees.

Introduction

The Blue Ribbon Panel Report (National Council for the Accreditation of Teacher Education [NCATE], 2010) issued a call to turn teacher education upside down, putting clinical practice and partnerships with schools and districts at the center. Although the call was aimed at the preparation of pre-service teachers, it can also transform traditional education master's degrees in light of the negative attention these programs have received in recent years. It also echoes Tom's (1999) call, two decades ago, to reconceptualize the master's degree for practicing teachers to make it more relevant, more connected to student learning, and more collegial. In effect, Tom was calling for a master's degree centered on clinical practice with many of the same design principles now described in the Blue Ribbon Panel Report. In this article, we describe a graduate program based on these two conceptions of teacher education, along with principles of high-quality professional development for teachers. This redesigned job-embedded graduate program for full-time teachers is situated within school reform and focused on improving student outcomes by improving the quality of the educators who work with them. Furthermore, it is delivered online in order to respond to the current needs of full-time educators. We describe an example of such a program in action in Florida with demonstrated impact on student performance in the classrooms of participating teachers. This program analysis can assist universities in responding to the call to reconceptualize master's degree programs as relevant, responsive, and efficacious, despite very visible publicity that paints master's degree programs as having no impact on student outcomes (Smith, 2008).

The Case against Traditional Education Master's Degrees

Graduate degrees in education are the most frequently granted advanced degrees in America (National Center for Education Statistics [NCES], 2012). This has led to growing scrutiny of the effectiveness of master's degree programs in education and their direct impact on raising the achievement levels of the participants' students. In 2009, Dr. Katherine Merseth, the current Director of Teacher Education Programs at Harvard University, stated that of the 1300 graduate schools in education, only about 100 adequately prepare teachers and the others should be shut down (Ramirez, 2009). She argued there is little accountability for teachers to prove that obtaining a master's degree increases student achievement. She further described how graduate degree granting institutions provide minimal connection to the participants' actual practice. A study by the

Center for American Progress (Miller, Roza, & Center for American Progress, 2012) supported her claim and concluded that nearly 90% of graduate education degree awarding programs are unrelated to or unconcerned with instructional efficiency. A controversial report by the National Council on Teacher Quality questioned the quality of more than 90% of all American undergraduate and graduate teacher preparation programs (Greenberg, McKee, & Walsh, 2013).

Beyond these reports, a vast amount of literature decries the effectiveness of teachers with master's degrees in raising K-12 student achievement in their schools. Just a handful of empirical studies provide correlations of teachers with advanced degrees creating positive effects on student achievement (Ferguson & Ladd, 1996). Many empirical studies on high school students (Goldhaber & Brewer, 1997, 2000), middle school students (Betts, Zau, & Rice, 2003; Dee, 2004; Nye, Konstantopoulos, & Hedges, 2004), and elementary students (Buddin & Zammaro, 2009; Clotfelter, Ladd, & Vigdor, 2007; Croninger, Rice, Rathbun, & Nishio, 2007; Rowan, Correnti, & Miller, 2002) all concluded that advanced degrees held by teachers, with the exception of subject-specific degrees in the secondary grades, do not result in higher student achievement. Even a meta-analysis (Wayne & Youngs, 2003) of over 20 related studies indicated no conclusive evidence that teachers holding master's degrees or higher had increased student achievement in their classrooms compared to their colleagues without a graduate degree. Rather, studies have indicated that teaching experience is the biggest contributor to student achievement (Buddin & Zammaro, 2009; Clotfelter, Ladd, & Vigdor, 2007; Feistritzer, 2011; Harris & Sass, 2011).

The lack of correspondence between the completion of an advanced degree program and enhanced student outcomes raises important questions: Why have educators sought these degrees in the past? What has been the purpose for secondary institutions to offer graduate degree programs in education? A major historical factor was that some states mandated that recertification renewal of teacher certification was contingent on the educator's earning a master's degree. Other states used it as an avenue for teachers to earn continuing certification if they entered the profession on a provisional or temporary certification (Darling-Hammond, Berry, & Thoreson, 2001). Therefore, post-secondary institutions in these states carved out a convenient niche in granting these general degrees at a feverous pace (Anderson, 2000). It quickly became apparent that with the demand for teachers, and the substantial logistical requirement of this continuing certification, the

requirement was an inefficient school improvement model (Boyd, Lankford, Goldhaber, & Wyckoff, 2007; Knapp, 1990). Thus, as of 2012, only eight states still had this master's degree contingent requirement, and many were accepting the completion of graduate courses as sufficient (Embry, 2010; Miller et al., 2012).

With the establishment of a nationally recognized certification for teachers by the National Board for Professional Teacher Standards (NBPTS), master's degree programs throughout the country began to cite board certification as one of their program objectives (Johnson, 2001). As time progressed, empirical studies showed that NBPTS certified teachers without a master's degree had higher student achievement in their classrooms than teachers with no NBPTS certification and a master's degree (Clotfelter, Ladd, & Vigdor, 2007). Correspondingly, recent years have seen a drop in master's programs offering NBPTS as a goal and an increase in private corporations' assisting teachers in obtaining NBPTS certification. However, the nationwide recession also led to a decrease in the number of teachers seeking NBPTS certification, likely due to the lack of pay increase incentives. As of 2010, only 45.7% of school districts in the country offered salary increase incentives for teachers earning their NBPTS certification (NCES, 2012).

One incentive that has historically attracted teachers to graduate work is a pay increase for advanced degree completion, possibly *the* main impetus for teachers to earn a master's degree (Darling-Hammond et al., 2001). But with schools systems' perennial budget cuts, the cost-benefit question is being asked nationwide as to whether the money spent for master's pay increases should be redirected into more specific student achievement programs. Galluzzo, Isenberg, White, and Fox (2012) described the shift: "Master's degrees, once accepted as a statement of higher accomplishment, are now questioned as tax burdens on local communities that have historically awarded salary increases to teachers who earn them" (p. xi). The Center for American Progress (Miller et al., 2012) released a nationwide study on the total costs of states offering pay increases for teachers' master's degrees and the actual student achievement gains that take place in these teachers' classrooms, compared to their non-master's degree colleagues. The study found that in 2008, $14.8 billion was being spent on master's degree "bumps" for teachers, which equates to an average of an extra $300 per student expenditure. Only 16 states require that school districts increase the pay for a teacher with an advanced degree, yet most school districts nationwide offer this incentive. Yet there are significant groups taking

note of this so-called wasteful spending. The state of Virginia and Baltimore City Public Schools in Maryland no longer offer this pay increase for teachers who earn their master's degree (Embry, 2010). This trend is spreading to other places around the country as schools are finding it more effective to implement these funds directly into student-achievement vehicles rather than the indirect route of the master's bump (Miller et al., 2012).

This downplaying of master's degrees was further endorsed by the federal policies of former President Obama and his Secretary of Education, Arne Duncan. The Obama administration supported a shift toward merit-based pay for teachers (Kirylo & McNulty, 2012). In fact, the 2012 report *Condition of Education* (NCES, 2012) neglected to include advanced degrees as a survey item for teacher pay incentives. Secretary Duncan explicitly stated that general education master's degrees were a waste of school money, and only subject specific master's degrees in math and science result in increased student achievement (Kirylo & McNulty, 2012). It can be assumed that this attack on master's degree programs will continue during the current and future administrations (Barkan, 2011), as popular and bi-partisan support for performance-based pay has been in place for some time (Podgursky & Springer, 2007).

A Master's Degree Program for the Current Education Context

If master's degree programs are to remain relevant in the current national education context and desirable among educators, they must be able to prove an impact that enhances student outcomes on standardized achievement tests, the currency of most import to education policy makers. In this section, we outline a program with a rigorous research agenda designed to do just that. By understanding more about how to design research agendas around the effectiveness of graduate programs, those of us in graduate teacher education can add to the body of research on our own programs and begin to make the case for the benefit of graduate work in terms of impact on teacher practice and student achievement—areas important to the public and policymakers alike and critical for sustaining the availability of graduate programs in education.

The Teacher Leadership for School Improvement program (TLSI) at the University of Florida is a reconceptualized graduate program originally designed to directly address the challenges in high-poverty schools in Florida. Program leaders began conceptualizing a strong research agenda attached to this graduate program from the beginning with simultaneous program design and research plans. We valued longitudinal research focused

on impact and effectiveness in terms of changes in teacher practice (both perceived and eventually observed) and improvements in student learning, rather than simpler, less expensive, course-by-course evaluation, which might show changes in thinking as a result of coursework, but is hard to translate to changes in classroom practice and results.

As such, research on this program has been a long time in coming. We admitted our first cohort in Fall 2005 (graduating in 2008) and it took until 2012 to have enough graduates to conduct a large-scale, quantitative study focused on P-12 student outcomes, which we knew would be the gold standard of impact research according to policymakers. As such, we begin by reporting these achievement data findings, and then work backward to describe the program features as well as other research efforts.

Student Impact Data

The TLSI program has demonstrated significant impact on student performance in both math and reading standardized achievement tests in the classrooms of participating teachers, both upon their entry to the program and continuing after their graduation. Using 11 years of standardized test scores (Florida FCAT test), researchers (Adams, Ross, Leite, & Jimenez, 2014) tracked student scores over time, specifically comparing the results of teachers in the program against expected gains for all students statewide. Researchers tracked student scores before, during, and after teachers' participation in the program using Interrupted Time Series method, which is similar to single-subject design that tracks outcomes based on an intervention. In this case, the program was the "intervention." Data were analyzed using a Cross-Classified Random Effects model, similar to value-added models currently used to assess teacher performance based on student outcomes, but using 11 years of outcome data, which is substantially more than most value-added models. The researchers found *significant* improvements in reading and math scores for students in program teachers' classrooms during the degree program and then further growth beyond program completion. In addition, researchers found *significant* improvements in student attendance in program teachers' classrooms, contributing to an interaction effect with the achievement data outcomes. These significant outcomes related to achievement and attendance are explained in detail in the full paper (Adams, Ross, Leite, & Jimenez, 2014).

Program Goals and Structure

The TLSI program was developed to transform graduate education into a powerful form of job-embedded professional development and teacher learning, built on an intimate

relationship between the university partner school districts and schools, and the teachers and leaders within them. In this way, the program responds to the political pressures of accountability and teacher evaluation by recognizing two interconnected assumptions: a) the most important in-school factor affecting students' learning is the quality of their teacher (Sanders & Rivers, 1996), and b) the best way to improve teacher quality is through intentional teacher empowerment through teacher leadership, teacher research (inquiry), and a simultaneous direct focus on improving pedagogical and content knowledge. To this end, there are 3 goals in the program to help teachers develop as master teachers, teacher leaders, and teacher researchers, defined below:

- Master teacher: A master teacher takes responsibility for all learners. A master teacher designs and delivers high-quality instruction for all students and continuously evaluates outcomes using a variety of measures and methods to refine and adapt teaching practices to meet learners' needs.
- Teacher Researcher: A teacher researcher systematically studies their own teaching practices on an ongoing basis. This involves the analysis of multiple data sources to inform instructional decision-making and maximize successful outcomes for students.
- Teacher Leader: A teacher leader assumes formal and informal leadership and mentoring roles within and beyond the school community and serves as an advocate for students and families. These leadership functions improve educational outcomes and the effectiveness of the professional community (TLSI Program Website, 2019).

The TLSI program consists of 36 credits and results in a Master's in Education (M.Ed.) or Educational Specialist (Ed.S.) degree in Curriculum and Instruction. The program is delivered online to reach full-time teachers beyond the university campus and to accommodate the busy lives of working professionals with families who value flexible learning environments. The program was designed with a strong emphasis on implementation of new learning with a required portfolio in which students document their growth in the three goal areas through demonstration of changes in teacher practice and student learning linked to learning within the graduate program (see Adams & Ross, 2014, for more details on program design and structures, and Appendix for Course Design Principles).

Other Evidence of Program Effectiveness

Beyond the longitudinal study of the program's impact on student achievement described above, there has been a rigorous research agenda to analyze the program's impact on teachers, their instructional practice, their students' learning, and their schools'

performance. First, a survey was conducted to examine teacher perceptions of program impact on specific teaching, collaboration, and leadership practices. Second, an interview study was conducted to dig more deeply into the qualitative experience of teacher participants within the program, interviewing both graduates and their school principals. Finally, a randomized control trial is currently underway—based on a federal Investing in Innovation (i3) grant through the US Department of Education with SRI as external evaluators—to validate all findings to date by testing the program's impact on school performance, classroom instruction, and student achievement using experimental and quasi-experimental designs. Details of these studies are outlined in the following sections.

Instructional practices survey. This study was designed to assess whether graduates perceived changes in their teaching, collaboration, and leadership practices a year beyond program completion (Adams, Ross, Swain, Dana, Leite, & Sandbach, 2013). A retrospective pre-post design was used to minimize response shift interference. The survey, based on 25 graduates (75.8% response rate), was designed for participants to rate the frequency with which they employed various instructional strategies, both before and after the graduate program, and the extent to which they increased collaboration and leadership activities after graduation. Twenty-three of the 30 items on the survey were significant ($p \leq .05$) showing increased frequency of practices such as creating and implementing culturally responsive lessons, conducting inquiry into their own teaching, and leading professional development for colleagues beyond their own grade level or department.

Interview study. To examine teachers' and principals' perceptions of the TLSI program's impact on transforming their frames of reference, 20 graduates and 6 principals were interviewed (Ross, Adams, Bondy, Dana, Dodman, & Swain, 2011). Using Mezirow's (2000) transformative learning theory, the study documents transformation of teachers' frames of reference. Two frames of reference emerged related to teaching, specifically in adopting an inquiry stance and learning to view oneself as an autonomous professional. Transformation in two other frames of reference also emerged related to adopting a leadership stance and viewing student learning as a communal responsibility. The study indicates the program is effective not only in encouraging the participants to pursue more of a master teacher and teacher leadership role, but also in transforming teachers' entire frame of reference so they view the entire profession and their professional responsibilities through a master teacher and teacher leader lens.

Randomized control trial. As part of a federal Investing in Innovation grant, the program participated in an external evaluation incorporating experimental and quasi-experimental designs and hierarchical linear modeling to evaluate the program's impact on school performance, classroom instruction, and student achievement. Forty schools were recruited to participate in the study, and 20 schools were randomly assigned to treatment and control groups over the course of a four-year experiment. Teachers within the treatment schools were eligible to apply for full tuition scholarships to complete the program free of charge as part of a school improvement effort in high-need elementary schools. Two cohorts of teachers were followed through the program during the four-year study. The evaluation examined the program's impact on: (1) school performance in terms of overall student performance on standardized achievement tests and school-wide surveys measuring teacher perceptions of collaboration and opportunities for professional learning, (2) classroom instruction in terms of teacher observations using the Classroom Assessment Scoring System (CLASS; Pianta, La Paro, & Hamre, 2008), and (3) student learning in terms of the performance of students from participating teachers' classrooms on standardized achievement tests. Although we do not yet have published results from this study, it is included here because the design and external evaluation scope are largely unheard of related to graduate program effectiveness.

Potential to Serve as a Model for Job-Embedded Graduate Programs

Overall, the TLSI program is meant to serve as a valuable form of embedded teacher education to improve teachers' personal practice, the overall school climate, and the achievement of participants' students. The format of the program directly corresponds to best approaches to teacher education, which:

> focus on instruction and student learning specific to the setting in which participants teach; are sustained and continuous, rather than episodic; provide opportunities for teachers to collaborate with colleagues inside and outside of the school; and help teachers develop theoretical understanding of the skills and knowledge they need to learn. (McLaughlin & Talbert, 2006, p. 9)

The main components of the program—specifically learning situated in the teachers' context, ongoing structured discussion and sharing of teacher learning within blended delivery, and in-residence support structures—substantiate this claim and can be adopted by other graduate programs as the TLSI program serves as a model for job-embedded master's programs in institutions of higher education.

Making the Case for a Transformed Master's Degree in Education:

Common Design Features

A common argument held by opponents of master's degree programs for practicing teachers is that they are not focused enough on effective techniques to increase student achievement and rather simply focus on achieving the professional goal(s) of each teacher participant. It is the intent of TLSI to develop teachers with the skills and abilities of critical thinkers and active learners who can respond to the demands of the accountability and evaluation movements in the current education policy context with intelligence rather than blind compliance. We argue that the TLSI program is based on proven theoretical foundations, with the needs of the students, school, and local community at the forefront of program design and structure, through which teachers are able to embody the kind of teacher professionalism that benefits the students and overall school community.

As described in the Blue Ribbon Panel report (NCATE, 2010), turning teacher education upside down calls for a primary focus on connections to clinical practice. As argued previously, the same should be true for graduate programs for veteran teachers. This new clinically focused vision should take into account the design principles from the Blue Ribbon Panel report, Tom's (1999) call for reinventing the master's degree, as well as literature in adult learning, professional development, and teacher leadership. Across these bodies of literature, three overarching design categories emerge: Focus, Praxis, and Collaboration.

Focus

The reinvented master's must be relevant, practical, timely, and strongly connected to the daily work of educators. PK-12 student learning must be the primary focus (NCATE, 2010; Tom, 1999) and coursework and assignments should directly connect to school improvement needs as well as current educational mandates, practices, and policies, such as Common Core State Standards, teacher evaluation frameworks, or RtI (Darling-Hammond & McLaughlin, 1995; Lave & Wenger, 1990; NCATE, 2010; York-Barr & Duke, 2004). This connection to teacher practice makes the program truly *job-embedded.* In a graduate program, it means that courses link to daily instructional and school improvement issues, and the teachers' classrooms and schools serve as laboratories of practice. Supports for new learning are available to teachers through the use of clinical faculty members who work

closely with graduate students and their school colleagues and leadership teams to make use of school-based coaching.

Praxis

A new graduate program should be based on *praxis*: inquiry and reflection in/on action (Cochran-Smith & Lytle, 1999; Dana & Yendol-Hoppey, 2009; Darling-Hammond & McLaughlin, 1995; Feeney, 2009; Muijs & Harris, 2003; Tom, 1999; York-Barr & Duke, 2004; Zeichner & Liston, 1996). Courses should contain components that require teachers to implement new learning and reflect on that implementation both while teaching and after teaching. The collection and analysis of student data connected to implementation cycles help connect theory to practice and keep the graduate program deeply connected to improving teaching practice and student learning.

Collaboration

The reinvented master's program must move away from graduate study as an individual endeavor toward a focus on collaboration. Whether in local or virtual cohorts, graduate students should learn within professional communities where ideas and practices are shared and critiqued (Darling-Hammond & McLaughlin, 1995; Desimone, 2009; Edge & Mylopoulos, 2008; Feeney, 2009; NCATE, 2010; Tom, 1999). In addition, collaboration should extend beyond course or program peers to include professional colleagues who are not in the graduate program, but with whom the graduate students collaborate in their daily work. For example, within the TLSI program, course assignments and activities encourage students to develop school improvement and professional development activities consistent with the principles of highly functioning PLCs (Louis & Marks, 1998; Vescio, Ross, & Adams, 2008) with colleagues in their own schools and across schools in order to connect graduate work with authentic, real-world problem-solving in their contexts.

Together these three components cover most, if not all, of the design principles outlined in the Blue Ribbon Panel report (NCATE, 2010) and have the potential to provide an outline for reinvented graduate programs with clinical practice at the center. TLSI embodies these design principles in the ways described above. Other programs with these elements are also beginning to emerge: e.g., George Mason University (Galluzzo et al., 2011), Western Michigan University (Muchmore, Marx, & Crowell, 2002), but research on the impact of these programs has been minimal due to the challenges of linking graduate programs to changes in teacher practice and improvements in student outcomes. Here, too the TLSI

program has broken some ground due to the evaluation efforts described above. For these reasons, the program has positioned itself as a substantive model in the re-design of the education master's degree program.

Discussion

As the trend toward the diminishing value of master's degrees in education gains momentum, seminal works such as Levine (2010) and the National Council for the Accreditation of Teacher Education Blue Ribbon Panel Report (2010) express the need for teacher education programs to be reinvented for the modern education system so they may be seen as valuable to participants and the outside public. Although these scholars are arguing for a reinvented teacher education program aimed at initial teacher preparation, we argue the same should be true for master's programs if those programs are to fill the previously described voids.

Indeed, data show there is an audience for a relevant, technology-infused, job-embedded master's degree program in education. The potential pool of practicing teachers without a master's degree is quite large. The 2011 Profile of Teachers in the U.S. conducted by the National Center for Education Information (NCEI; Feistritzer, 2011), surveyed 2,500 randomly selected teachers from K-12 public schools across the country. Their results indicated that 43% of all teachers have a bachelor's degree as their highest education. The US Department of Education estimates that 54% of all public school teachers have a master's degree (NCES, 2012). Of all the teachers surveyed in the NCEI study, 65% entered into the profession having only earned their bachelor's degree. This means that currently, of the estimated 3.5 million K-12 public school educators, 20% (700,000) completed a master's degree program in education after they had been teaching at a school for over a year (Feistritzer, 2011; United States Department of Labor [USDL], 2013). With such a large number being subject to the "ineffective" master's programs of the past, it is important to provide the current teacher workforce with a relevant master's degree option that allows for job-embedded training.

Furthermore, alternative routes to certification are on the rise in the US, resulting in underprepared teachers who need support on the job and who might find such support through graduate coursework. Alternative certification programs are typically defined as routes to teacher certification for second career individuals or individuals who already hold a bachelor's degree in a non-education field. Before 1980, 88% of all teachers entered into

the profession through a traditional campus-based Bachelor's degree and certification program. Now, that same route is taken by fewer than 50% of all teachers (Feistritzer, 2011), showing the increased reliance on alternative routes into teaching. It is currently estimated that each year, over 60,000 people are getting certified through an alternative certification program (Feistritzer, 2011). Alternatively certified teachers make up 16% of the public school teaching force, but for teachers with fewer than five years' teaching experience, this number jumps up to 39% of the overall teaching force (Feistritzer, 2011). Individuals who have not completed a significant amount of embedded teacher professional development, like their traditionally-trained and certified counterparts, are shown to be interested in a job-embedded master's degree option that allows them to further their teaching abilities (Feistritzer & Haar, 2008). In addition, as the enrollment drops for traditional campus-based teacher preparation, creating job-embedded graduate programs for practicing teachers (alternatively certified or not) is a promising strategy for colleges of education to regain enrollment with a new audience.

Master's degrees in education are now primarily being obtained by an older demographic of professionals and teachers with family dependents (Fallahi & Gulley, 2008). This group may also be motivated by the pay incentives that are still offered by school districts across the country. Eighty-one percent of all teachers surveyed in the National Center for Education Information believed that level of education should be a factor that determines the pay rate for a teacher (Feistritzer, 2011). This family-centered demographic has also led to a decreased enrollment in on-site master's degree programs in education but a significant increase in online master's education degree programs. Master's degrees through an online format are growing among institutes of higher education. In 2007-2008, 22% of all postbaccalaureate students took online graduate classes. Nine percent of all postbaccalaureate students completed their entire graduate degree through this distance education format. Students 30 years or older took the greatest number of distance education courses compared to their younger counterparts (NCES, 2012). The data presented in this article can be used to determine that most individuals who earn their master's degree while currently teaching would fall in this 30+ age range. It can be assumed that most of these teachers also have families, and data show that students with spouses and children were seven times more likely to take a graduate course online rather than a traditional campus-based course (NCES, 2012). Again, finding a non-traditional service

delivery option may provide traditional campus-based colleges of education with another method of regaining enrollment with a new audience.

Hence, having a master's program with online components seems most appealing to continuing educators who cannot leave their jobs to return to full time study. If colleges of education seek to recruit these teachers as potential students within their advanced degree programs and remain relevant in the national conversation on education reform, it would be wise to heed the calls for a job-embedded, practice-centered, clinical degree program. Simultaneously, programs should build in evaluation that links the program to improvements in both teacher practice and student learning if they are to remain relevant to policy makers and the public at large. The TLSI program provides a strong example of such a program currently in practice.

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Appendix

TLSI Course Design Principles

Program faculty identified the following design principles based on our assumptions and beliefs about professional development and adult learning. They should provide guidance as you prepare your course for inclusion within the TLSI program.

Course Design Principles and Program Information	

Program goal areas	• The TLSI program is designed to help each student develop as a
	      o Master Teacher (content and pedagogical mastery)
	      o Teacher Researcher
	      o Teacher Leader or Educational Advocate

Integration of 1-2 assignments within the course that could serve as portfolio entries	• Students create portfolios over the course of the program to provide evidence of professional growth in each goal area. • Each course in the core should address one or more goal area. • Specialization courses typically address content and pedagogy related to development as a Master Teacher. • Portfolio entries should focus on application of new knowledge, not simply acquisition of new learning or theory. We encourage assignments in which students are looking not only at their own practice in terms of what they are doing/saying but also what is happening with students (what they are doing/saying AND the evidence they provide of their new knowledge). • Portfolio entries are ideally implemented within the course itself, but could be implemented over time after the course. However, to be included in the portfolio, an artifact MUST have evidence of implementation. Plans for action are not acceptable unless they are implemented and reflected upon.
Learning situated within teachers' context	• All students are full-time practicing educators. • Course content should attempt to link to teachers' context, questions, and issues. • Begin by helping learners activate prior knowledge and experience. • Focus on developing practical tools: teachers should be able to immediately implement the concepts they are learning in each course.

Explicit focus on inquiry	• Collection and analysis of evidence of impact on students/families (inquiry/equity focus)
	      o Planning based on data and new learning (Learn/Explore)
	      o Delivery or Implementation (Try/Apply)
	      o Follow-up (Collect Evidence)
	      o Evaluation (Analyze/Reflect)

Structured discussions around what teachers are learning	• Multiple opportunities for teachers to discuss new learning • Opportunities to "talk back" or question what they are learning in the context of their prior experiences • Use of discussion protocols when possible and appropriate, along with instruction and scaffolding
Explicit focus on development of practical tools	• Help readers connect theory to practice by thinking about their contexts and their professional roles (teacher, coach, principal) and how they can use what they are learning immediately. • Provide explicit examples (videos, demos, cases) when possible. • Provide web-based resources (e.g. links to websites, articles, books).

Extended interactions/ connections between facilitator and participants	• Multiple points across time for development, analysis, interaction
	• Variety of online tools and pedagogy
	    o discussion forums, blogs, wikis
	    o Illuminate (video conference) sessions
	    o Google docs for faculty and student collaboration
	• Responsive to student questions and e-mails within reasonable boundaries that are well-communicated
	• When possible, structure course due dates to accommodate working professionals (preferred due date of Sunday at midnight)
	• Working professionals also like to plan their upcoming time commitments, so opening all modules in advance helps them plan ahead. This does not mean you need to allow them to work ahead, as that often limits interaction.

Lastinger Center supports to draw upon	• Not all students are in Lastinger Center partner districts. However, 90% are, so you should be aware of district supports that the university provides.
	• The Professor-in-Residence (clinical faculty) in each partner district can be a great connection to individual students who are struggling or need immediate communication. These faculty teach the CORE courses, advise students in their district, and act as a liaison to campus-based faculty.
	• Lastinger Center school improvement initiatives in place will vary by district but can include
	    o Teacher inquiry as professional development
	    o Formative data tools to provide schools feedback on the nature of instructional practices and school collaborative culture
	    o On-going principal professional development
	    o School-based professional learning communities
	    o Facilitative leadership training for teacher leaders
	    o Summer institutes, content professional development for all school staff

Kindergarten Teachers' Developmentally Appropriate Practices and Beliefs

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Abstract

This study examined kindergarten teachers' developmentally appropriate beliefs and practices concerning the current status of the kindergarten curriculum. A sample of 107 kindergarten teachers participated in the study by completing a survey instrument. The findings showed that kindergarten teachers' beliefs and practices were not aligned. The kindergarten teachers tended to have developmentally appropriate beliefs, but they seldom engaged in developmentally appropriate practices. Kindergarten teachers' beliefs and practices overall were not significantly correlated. In addition, the findings showed that kindergarten teachers in Title I schools engaged in more developmentally inappropriate practices than did the kindergarten teachers who were not at Title I schools. Kindergarten teachers with more teaching experience engaged in more developmentally appropriate practices.

Introduction

In recent years, researchers in the field of early childhood education have expressed concerns about a shift from a developmental instructional approach to an academic, standards-driven focus in public school kindergarten classes (e.g., Bassok, Latham, & Rorem, 2016; Gullo & Hughes, 2011a; Miller & Almon, 2009; Repko-Erwin, 2017). While some researchers maintain there is too much focus on teaching academic skills and content (e.g., Carlsson-Paige, McLaughlin, & Almon, 2015; Claessens, Duncan, & Engel, 2009; Copple & Bredekamp, 2009; Watts, Duncan, Siegler, & Davis-Kean, 2014), others are concerned about the lack of opportunities for children to play in kindergarten (e.g., Gallant, 2009; Miller & Almon, 2009; Russell, 2011). The outrage of early childhood educators concerning this issue is reflected in the use of labels such as "crisis" (Miller & Almon, 2009, p. 16), "rigorous classroom environment" (Gao, 2005, p. 1), and "the beginning of serious academic instruction" (Russell, 2011, p. 237), and in the founding of organizations such as *Defending the Early Years* (Carlsson-Paige et al., 2015). The title of a *Washington Post* article, "How Ed Policy is Hurting Early Childhood Education," aptly sums up the opinion of many early childhood educators concerning this issue (Carlsson-Paige, Levin, & McLaughlin, 2012).

The so-called "crisis" concerns the recent shift in kindergarten education from the use of Developmentally Appropriate Practices (DAP), broadly based on a child-centered philosophy, to a standards-driven prescribed curriculum that focuses on teaching literacy and mathematics skills through direct instruction (Copple & Bredekamp, 2009; Goldstein, 2007a, 2007b; Gullo & Hughes, 2011b; Miller & Almon, 2009). This curricular shift has prompted many early childhood professionals to describe kindergarten as *"the new first grade"* (Bassok et al., 2016; Miller & Almon, 2009; Tyre, 2006). These changes are likely a consequence of recently implemented national policies, state legislation (Goldstein, 2007a, 2007b; Hirsh-Pasek, Berk, & Singer, 2009), and related calls for improved academic standards and greater accountability. For example, the 2001 reauthorization of the Elementary and Secondary Education Act (No Child Left Behind Act, 2001) introduced an emphasis on mastery of academic skills, learning outcomes, and accountability within kindergarten that continued with the 2015 reauthorization titled the Every Student Succeeds Act (Elementary and Secondary Education Act, 2015). Such an emphasis had previously been confined to first grade and above (Miller & Almon, 2009), yet given the

increased emphasis on academic skills and accountability, many kindergarten teachers are now required by their school districts to implement prescribed scripted curricula that seem to be at odds with DAP and best practices in early childhood education. Many of today's kindergarten students are provided few opportunities to learn through play and exploration, or to exercise and use their imaginations (Miller & Almon, 2009).

While the evidence concerning recent changes in kindergarten education is primarily anecdotal, recent empirical evidence (Bassok et al., 2016) confirms that today's kindergarten classrooms are structured similarly to first-grade classrooms of the late 1990's. By analyzing longitudinal data from the National Center for Education Statistics' (NCES) Early Childhood Longitudinal Studies (ECLS), Bassok and colleagues (2016) reported that there were fewer activity centers within today's kindergarten classrooms compared to classrooms in the late 1990's. Notably, the researchers also found that kindergarten classrooms with students from low-income families and non-White students seemed to have been most severely impacted by the curriculum shift to a more academic focus. In sum, the findings support the oft-cited claim that "kindergarten is the new first-grade" (Bassok et al., 2016).

Although there is empirical evidence that the kindergarten curriculum has changed in recent years, such that there is less focus on DAP, the developmental levels of the children served remains the same (Elkind, 2007). Simply put, the fundamental varying developmental characteristics of kindergarten children are the same as they were two decades ago (Gullo & Hughes, 2011a). Presumably, the National Association for the Education of Young Children's (NAEYC) position statement on DAP is based on expert opinion concerning best practices for *"promoting young children's optimal learning and development"* (Copple & Bredekamp, 2009, p. xii). Moreover, this influential document is based on "research on child development and learning and in the knowledge base regarding educational effectiveness" (p. xii). Since children's development is unchanged, engaging in teaching practices that differ significantly from those that are recommended by the NAEYC could be problematic and challenging for kindergarten teachers.

Regardless of their origin, school districts' directives and recommendations for kindergarten practices must be implemented by the classroom teachers. After all, it is the classroom teacher who is faced with the challenge of operationalizing curricular changes. Thus, it is the kindergarten teachers and students who have been directly impacted by the

recent changes in the kindergarten curriculum and related teaching practices, yet little is known about the nature and extent of early childhood educators' opinions about the status of today's kindergarten teaching practices. Furthermore, little is known about the extent to which current kindergarten teaching practices are aligned with DAP.

Kindergarten teachers adopt practices in accordance with recommendations and directives from their district and school administrators. Furthermore, they are likely to draw from their own knowledge base concerning child development and best practices in early childhood education. It is also well established that teachers' practices are influenced by their own beliefs (Calderhead, 1987). Teachers' beliefs can be defined as dispositions to actions and major determinants of behavior (Brown & Cooney, 1982). Although there has been some disagreement concerning the precise definition of teacher beliefs (e.g., Pajares, 1992), it is evident that they motivate teachers' behaviors. In the context of teaching, beliefs can be considered principles that guide teachers' practices.

It is well established that teachers' beliefs play a significant role in how they teach and what practices they use in their classrooms (Charlesworth et al., 1993; Fang, 1996; Gallant, 2009). If teachers, for example, hold strong beliefs about DAP, then their classroom teaching practices will most likely reflect those beliefs. In contrast, teachers holding strong beliefs in direct academic instruction, or what can be described as developmentally inappropriate practices (DIP), will adopt more didactic teaching practices. However, given recent changes to the kindergarten curriculum, it is possible that teachers' practices may not reflect their beliefs. They could hold strong beliefs about DAP while their practices are more aligned with teacher-centered direct instruction. That being the case, a reasonable assumption would be that kindergarten teachers could be concerned about, or disagree with, the recent changes to the kindergarten curriculum.

In sum, educators and policymakers have expressed concerns about the nature of public-school kindergarten curricula and teaching practices (Bassok et al., 2016; Hirsh-Pasek et al., 2009; Miller & Almon, 2009). The kindergarten curriculum seems to have shifted from a developmental approach, using practices defined as developmentally appropriate (DAP), to the use of more scripted didactic approaches (Bassok et al., 2016). Little is known, however, about kindergarten teachers' responses to this change, including their beliefs and practices concerning DAP. Also, little is known about the extent to which the changing kindergarten curriculum has resulted in a corresponding change in kindergarten

teachers' beliefs. Relatedly, there is a paucity of research concerning kindergarten teachers' response to the demands of the academic standards that were recently adopted, as well as the expectations emerging from NCLB (2001) and the Every Student Succeeds Act (2015).

Early childhood experts have claimed DAP can be implemented while also meeting the demanding academic standards for kindergarteners (Gullo & Hughes, 2011a; Hirsh-Pasek et al., 2009). Researchers, however, have not explored the relationship between kindergarten teachers' beliefs and practices concerning the recent changes to the kindergarten curriculum. Therefore, this study was designed to examine the beliefs and practices of kindergarten teachers about the kindergarten curriculum and determine the extent to which they were able to adopt practices aligned with the basic tenets of DAP.

Method

This study was guided by the following three questions:

1) To what extent are kindergarten teachers' self-reported beliefs and self-reported practices aligned with Developmentally Appropriate Practices (DAP)?
2) Is there a correlation between kindergarten teachers' self-reported beliefs and self-reported practices?
3) Are there any differences between kindergarten teachers' self-reported beliefs and self-reported practices across different subgroups?

Participants

Participating in the study were 107 kindergarten teachers sampled from five counties in the State of Florida. The five counties were randomly selected from the five regions of Florida as defined by the Florida Department of Education (2016): Northwest Florida, Northeast Florida, Central Florida, Southwest Florida, and Southeast Florida. An email was sent to all of the public school kindergarten teachers (n=814) in each of the five counties inviting them to participate in the study. Of these, a total of 107 agreed to participate and complete the online survey instrument, representing a response rate of 13%.

Procedure

The study adopted a non-experimental survey research approach (Johnson & Christensen, 2008) by adapting and administering a preexisting survey instrument. An effort was made to determine the optimal sample size for the study. To this end, a G Power analysis was conducted prior to recruiting the participants. This analysis was based on an effect size of 0.50, which according to Cohen (1988) can be characterized as a "large" effect. Given the number of groups that would be used in the statistical analyses (i.e.,

ANOVA), G Power analyses were conducted based on four groups. The results of these analyses indicated that a sample size of 76 (i.e., 10% response rate) should yield sufficient power.

Data collection for the study was conducted using an online platform. A survey instrument was sent to kindergarten teachers through their schools' email addresses. Initial contact included information concerning the nature of the study, informed consent, and the protection of human subjects, along with an invitation to participate. Data for the study included information concerning kindergarten teachers' beliefs and practices regarding DAP within their curriculum and classrooms.

Instrument. The instrument adopted for the purposes of the study was the kindergarten version of the Teacher Questionnaire designed by Charlesworth et al. (1993). The instrument was initially developed by aligning questions in accordance with NAEYC's guidelines for DAP in kindergarten. The instrument consists of three sections with the first devoted to questions concerning respondents' background information. The second section concerns teachers' beliefs about their teaching, while the final section is devoted to questions concerning respondents' instructional practices in their classrooms. The teacher beliefs section consists of 37 questions asking participants to rate, on a scale of 1 to 5, the importance of various school and curricular practices that are considered developmentally appropriate or inappropriate. Then, the instructional activities section consisted of 34 questions asking teachers to indicate how often their students participate in various instructional activities, using a scale of 1-5: 1 = not very important at all, 2 = not very important, 3 = fairly important, 4 = very important, 5 = extremely important. This questionnaire included items such as the following:

- It is ___ for school activities to be responsive to individual differences in development.
- It is ___ that each curriculum area be taught as separate subjects at separate times.
- It is ___ for kindergarten students to learn to read.

The teacher beliefs sections yields six factors including (1) inappropriate structure, (2) appropriate integrated curriculum beliefs, (3) appropriate literacy activities, (4) appropriate individualization, (5) appropriate socialization, and (6) inappropriate activities and materials (Charlesworth et al., 1993). Similarly, the instructional activities section results in measures of eight factors including: (1) inappropriate management and guidance techniques, (2) inappropriate transitional activities, (3) planned multicultural and outdoor

activities, (4) appropriate integrated curriculum practices, (5) creative exploratory learning, (6) inappropriate learning, (7) inappropriate literacy activities, and (8) appropriate activities.

Data analyses. The data were analyzed using descriptive and inferential statistics including two-way Analyses of Variance (ANOVA) (Johnson & Christensen, 2008). First, reliability scores of the test items and constructs were analyzed using Cronbach's reliability estimates. The results were then compared to the reliability estimates provided by Charlesworth and colleagues (1993). Descriptive statistics were computed in the form of frequencies, means, medians, and standard deviations. For the purposes of this study, the Likert scale was treated as an interval scale in the data analyses (Knapp, 1990). Although there is some controversy concerning treating Likert scales as interval data, the fact that DAP represents a continuum contributed to the decision to adopt this approach (Jamieson, 2004). Furthermore, the exploratory nature of the study was a factor in determining how the data would be analyzed.

Descriptive statistics were computed in the form of means and standard deviations for each of the relevant sections of the instrument. Next, the correlations between the two factors were estimated by computing correlation coefficients and determining their statistical significance. Finally, a comparison of means for different subgroups was conducted. The subgroups included the type of school (Title I or non-Title I) and the number of years the teachers had been teaching. First, the means of the subgroups' scores for the teachers' beliefs section of the questionnaire and the instructional activities section of the questionnaire were computed. Then, two-way ANOVA and a post hoc of the two-way ANOVA were conducted to determine whether mean differences across the grouping variables were statistically significant.

Results

Data from the teachers' beliefs and practices instrument were used to determine the extent to which teachers' beliefs were in agreement with the standards advocated by the NAEYC guidelines. The measures of kindergarten teachers' beliefs and instructional activities in the form of means and standard deviations are reported in Table 1 (Appendix A). As expected, the kindergarten teachers varied in their agreement with the NAEYC guidelines. Kindergarten teachers' beliefs were more aligned with DAP than DIP. This is evident in that higher means were obtained in the relevant categories (see Table 1, Appendix A). However, the kindergarten teachers' practices were more aligned with DIP than DAP. The higher mean

scores in the inappropriate categories suggest the respondents used these practices more often, and the lower scores for the appropriate categories suggest such practices were infrequently used.

Correlation of Beliefs and Practices

The correlation between the two factors was estimated by computing the Pearson Product-Moment correlation and determining its statistical significance. The results of the correlational analyses are reported in Table 2 (Appendix B). The findings suggest the kindergarten teachers' beliefs and self-reported practices were not correlated. While the kindergarten teachers had strong DAP beliefs, their self-reported practices were not aligned with DAP. Although the kindergarten teachers held DAP beliefs, the data suggest they did not engage in DAP consistent with those beliefs.

Differences across Subgroups

A two-way ANOVA was calculated to determine whether there were any statistically significant mean differences across the subgroups based on Title I status and number of years of teaching experience. Finally, two-way ANOVA post-hoc tests (Tukey's) were conducted to compare significant differences between each of the groups based on the number of years of teaching experience.

In the subgroup of Title I Status, 79 (74%) kindergarten teachers reported that they worked in a Title I Status school, while 28 (26%) kindergarten teachers reported that they were employed in non-Title I schools. Table 3 (Appendix C) reports the results of the two-way ANOVA in terms of differences between kindergarten teachers' self-reported beliefs across Title I and non-Title I Schools. The findings indicate no significant mean differences across appropriate and inappropriate categories of beliefs for participants in Title I schools and those who were in non-Title I schools. However, the results of the two-way ANOVA that examined differences between kindergarten teachers' self-reported practices across Title I and Non-Title I schools reveal a statistically significant difference for the inappropriate literacy activities category. Additionally, the inappropriate learning category shows a significant mean difference (*p*= .03). The kindergarten teachers who worked in Title I schools reported that they used more inappropriate literacy activities and inappropriate learning practices than did those teachers who worked in non-Title I schools.

The subgroup of number of years of teaching kindergarten was created by grouping teachers into three clusters: 0-5 Years, 6-17 Years, and 18+ Years. The 0-5 Years category

was determined based on Raue and Gray (2015), who stated that the first 5 years of a teacher's career are the critical years, and teachers who have been employed more than 5 years are more likely to stay in the profession. The 18+ Years category was created because these teachers would have seen the difference in curriculum practices enforced by the policies associated with the NCLB (2001). The teachers in the 6-17 Years category can be considered established as teachers and they may not have been as directly affected by the NCLB (2001) policies. Of the 107 teachers, 61 (57%) reported having 0-5 years' experience in teaching kindergarten, 31 (29%) reported having 6-17 years' experience, and 15 (14%) teachers reported having 18+ years' experience. Table 3 (Appendix C) shows the results of the two-way ANOVA examining kindergarten teachers' self-reported beliefs based on teachers' years of experience. The results showed that the Inappropriate Management & Guidance Techniques Category (p= .04) and the Inappropriate Transitional Activities Category (p= .03) were statistically significant. The two-way ANOVA post-hoc (Table 4, Appendix D) results showed that kindergarten teachers with 6-17 years of experience used more inappropriate transitional activities than did the teachers with 18+ years' experience (p= .049). The findings also suggested that there was a difference in the scores for Inappropriate Management & Guidance Techniques between kindergarten teachers with 6-17 years of experience and those with 18+ years' experience. These results suggest kindergarten teachers 0-5 years' experience used more inappropriate management and guidance techniques than did the kindergarten teachers with 18+ years' experience. The results of the two-way ANOVA (Table 3, Appendix C) showed that the interaction term between Title I status and number of years of experience subgroups was not significantly different. This suggests that teachers' years of experience was not related to whether or not they were employed in Title I schools.

Discussion

The main purpose of the study was to describe the beliefs and practices of kindergarten teachers about the kindergarten curriculum and determine the extent to which they were able to adopt practices aligned with the basic tenets of DAP. In addition, the study examined the extent to which the kindergarten teachers' beliefs and practices differed for beginning teachers in comparison to more experienced teachers, as well as for different teaching contexts (i.e., Title 1 vs. non-Title 1). DAP has a long history in the field of early childhood education in general, and more specifically with regard to kindergarten teaching

practices (Copple & Bredekamp, 2009). The findings revealed that the kindergarten teachers in the current study held strong DAP beliefs but engaged in developmentally inappropriate practices. Responses to the survey instrument suggested that their beliefs were consistent with DAP as outlined by Copple and Bredekamp (2009), yet as expected, their self-reported practices were not as closely aligned with the tenets of DAP. Furthermore, this was confirmed by the correlational analyses in that there was not a significant relationship between the measures of teachers' beliefs and practices.

Beliefs have been defined as a person's "lively idea related to or associated with present impressions" (Ginsberg, 1972, p. 3). Findings from the current study suggested that the kindergarten teachers held DAP beliefs, much like those of teachers who participated in prior studies (e.g., Charlesworth et al., 1993; Kim & Buchanan, 2009). It seems that little has changed with regard to teachers' beliefs since these earlier studies. However, unlike teachers in previous studies, the practitioners sampled for the current study were unable to align their beliefs and practices. Although it is well recognized that teachers' beliefs affect their classroom practices (e.g., Fang, 1996; Green 1971), this was not the case for the teachers sampled for this study.

We know from recent empirical evidence that the kindergarten curriculum has strayed away from a developmental approach (Bassok et al., 2016). Data from the current study are consistent with this finding, in that the self-reported kindergarten teaching practices, on the whole, were not consistent with a developmental approach. However, the kindergarten teachers' scores on the instrument suggest that they held beliefs that differed from their practices. Understanding why there were differences in teachers' beliefs and self-reported practices is beyond the scope of the study. One plausible explanation is that teachers are not able to distinguish between beliefs and practices and may believe that certain practices reflect DAP teaching, when in fact they do not. Another possibility is that they do not have the autonomy to adopt practices that are consistent with their beliefs. Relatedly, it is possible that the teachers could have been having difficulty practicing what they actually believed in. Such findings seem to be consistent with other recent studies including findings reported by Shi, Zhang, and Lin (2014) who also found that kindergarten teachers' beliefs and practices were not aligned. Clearly, further research is needed, first to validate these findings, and second to understand the reasons for the differences in the kindergarten teachers' beliefs and practices.

Based on the two-way ANOVA, kindergarten teachers in Title I schools engaged in more developmentally inappropriate practices than did the kindergarten teachers in the other schools. The Title I designation means that at least 40% of the school's students qualify for free and reduced lunch (United States Department of Education, 2011). According to the study's findings teachers who worked in Title I schools adopted practices that were more didactic and, as such, not consistent with a DAP approach. Again, understanding why there are differences in kindergarten teachers' instructional practices in Title I vs. non-Title I is beyond the scope of the current study. Clearly, there could be many possible explanations for this finding. One plausible explanation for this difference is that the teachers at the Title I schools were not given as much flexibility to modify their kindergarten curriculum or classroom instructional practices. Other factors that could have influenced the kindergarten teachers, beyond their own beliefs, could be the students in their classrooms or family expectations.

Finally, the study compared the beliefs and practices of experienced and less experienced kindergarten teachers. According to the findings, those teachers who had been teaching for more than 18 years adopted DAP more often than the less experienced kindergarten teachers. One plausible explanation for this difference could be that kindergarten teachers with 18 years or more teaching experience were exposed to DAP before NCLB (2001) was introduced. These teachers with more DAP exposure could have been able to draw on their experience to modify their curricular approach so that they engaged in more DAP.

Gullo and Hughes (2011b) maintain it is possible to engage in developmentally and culturally appropriate practices while at the same time addressing academic standards. That is, teachers do not have to reject DAP in order to maintain high academic standards. The more experienced teachers in the current study were seemingly able to engage in DAP. These teachers, drawing on their own professional expertise and day-to-day experiences with kindergartners, believed in DAP and were able to use DAP in their classrooms. Further research is recommended to understand why some teachers are able to adopt more practices that are consistent with DAP.

Research is recommended to validate the findings of the current study, which were based on a relatively small sample of kindergarten teachers. Future studies should be conducted with larger samples of participants. It is also recommended that future studies be

conducted with more diverse participants, including those teaching in different school districts and different states. Thus, it is important for future research to examine the relationship between developmentally appropriate practices and academic achievement with primary grade children who represent normative population characteristics. Furthermore, establishing a causal relationship between teachers' beliefs and practices and children's academic achievement and social skills is beyond the scope of the present study. Further research, therefore, is recommended to verify these initial findings.

The current study relied on teachers' self-reports of their beliefs and practices, as well as on their ratings of their students' social skills. Questions related to the reliability of these measures potentially restrict the validity of the conclusions. Future research should incorporate independent measures, such as classroom observations, peer ratings, and student self-reports of teachers' educational practices. Another consideration for future research relates to the relationship between kindergarten instructional practices and student achievement. Beyond using standardized test scores, future research could also examine student learning using teacher observations and student work samples. Such data could provide more meaningful information on student performance in context. Finally, longitudinal follow-up studies are needed to clarify the interplay among developmentally appropriate practices and student achievement.

Given that the findings represent the beliefs and opinions of practicing teachers, they could be of interest to educational administrators, policymakers and teacher educators. After all, the teacher beliefs identified in this study are those of professionals who work most closely with young children. More importantly, kindergarten teachers sampled for this study do not teach in accordance with their beliefs about how children learn. That being the case, educators should consider the extent to which current kindergarten instructional practices are meeting the needs of kindergartners.

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Appendix A

Table 1. *Means and Standard Deviations for the Measures of DAP Beliefs and Practices*

Category	Mean	SD
Beliefs Inappropriate Activities & Materials	3.96	0.54
Beliefs Inappropriate Structure	4.58	0.84
Beliefs Appropriate Socialization	4.24	0.66
Beliefs Appropriate Individualization	3.87	0.55
Beliefs Appropriate Literacy Activities	4.46	0.84
Beliefs Appropriate Integrated Curriculum	3.72	0.64
Practices Appropriate Activities	2.84	1.04
Practices Creative Exploratory Learning	2.99	0.94
Practices Appropriate Integrated Curriculum	2.85	0.98
Practices Planned Multicultural & Outdoor Activities	2.72	1.00
Practices Inappropriate Literacy Activities	3.75	0.72
Practices Inappropriate Learning	3.61	0.75
Inappropriate Management & Guidance Techniques	3.64	0.89
Practices Inappropriate Transitional Activities	3.11	0.99

Appendix B

Table 2. *Correlations of Appropriate and Inappropriate Beliefs Factors and Appropriate and Inappropriate Practices Factors*

		Beliefs					
		Inappropriate Activities & Materials	Inappropriate Structure	Appropriate Social	Appropriate Individual	Appropriate Literacy	Appropriate Integrate Curriculum
Inappropriate Literacy	Pearson Correlation	.189	-.138	-.033	.041	-.007	-.041
	Sig. (2-tailed)	.052	.157	.736	.678	.940	.677
Inappropriate Learning	Pearson Correlation	.270**	.007	.051	.166	.086	.170
	Sig. (2-tailed)	.005	.946	.601	.087	.376	.080
Inappropriate Management	Pearson Correlation	.110	-.012	.059	.136	.122	.029
	Sig. (2-tailed)	.261	.900	.546	.163	.212	.765
Inappropriate Transition	Pearson Correlation	.216*	.166	.136	.096	.180	.047
	Sig. (2-tailed)	.026	.061	.135	.096	.100	.149
Appropriate Activities	Pearson Correlation	.109	.126	.092	.180	.060	.182
	Sig. (2-tailed)	.266	.198	.344	.064	.539	.056
Appropriate Explore	Pearson Correlation	.061	.070	.033	.047	.048	.110
	Sig. (2-tailed)	.534	.473	.736	.631	.621	.259
Appropriate Curriculum	Pearson Correlation	.111	.044	.068	.063	-.003	.145
	Sig. (2-tailed)	.257	.650	.488	.517	.979	.135
Appropriate Multicultural & Outdoor	Pearson Correlation	-.016	-.115	-.051	-.062	-.146	.136
	Sig. (2-tailed)	.866	.238	.605	.526	.134	.163

(Row group label: Practices)

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

Appendix C

Table 3. *Two-Way ANOVA Differences between Respondents' Beliefs and Practices across Subgroups*

	df	Mean Square	F	Sig. (*p* value)
Inappropriate Management Practices				
Title I Status	1	7.39	1.05	0.3
Years' Experience	2	23	3.28	0.04*
Title I Status x Years' Experience	2	3.52	0.5	0.6
Inappropriate Transitional Practices				
Title I Status	1	0.55	0.14	0.7
Years' Experience	2	13.17	3.39	0.03*
Title I Status x Years' Experience	2	2.08	0.53	0.58
Appropriate Multi. & Outdoor Activities Practices				
Title I Status	1.00	0.78	0.18	0.66
Years' Experience	2.00	1.42	0.33	0.71
Title I Status x Years' Experience	2.00	1.93	0.46	0.63
Appropriate Curriculum Practices				
Title I Status	1.00	9.78	0.62	0.43
Years' Experience	2.00	17.58	1.12	0.32
Title I Status x Years' Experience	2.00	21.58	1.37	0.25
Appropriate Exploratory Practices				
Title I Status	1.00	1.86	0.08	0.77
Years' Experience	2.00	62.34	2.85	0.06
Title I Status x Years' Experience	2.00	15.02	0.68	0.50
Inappropriate Learning Practices				
Title I Status	1.00	22.14	4.41	0.03*
Years' Experience	2.00	0.27	0.05	0.94
Title I Status x Years' Experience	2.00	4.96	0.98	0.37
Inappropriate Literacy Practices				
Title I Status	1.00	78.08	6.27	0.01*
Years' Experience	2.00	8.92	0.71	0.49
Title I Status x Years' Experience	2.00	13.19	1.06	0.35
Appropriate Activities Practices				
Title I Status	1.00	9.88	0.36	0.54
Years' Experience	2.00	44.17	1.60	0.20
Title I Status x Years' Experience	2.00	29.26	1.06	0.34
Inappropriate Structure Beliefs				
Title I Status	1.00	0.03	0.01	0.92
Years' Experience	2.00	0.73	0.24	0.78
Title I Status x Years' Experience	2.00	1.78	0.60	0.54

Table 3 *(continued) Two-Way ANOVA Differences between Respondents' Beliefs and Practices across Subgroups*

	df	Mean Square	*F*	Sig. (*p* value)
Appropriate Int. Curriculum Beliefs				
Title I Status	1.00	6.95	1.03	0.31
Years' Experience	2.00	6.14	0.91	0.40
Title I Status x Years' Experience	2.00	1.76	0.26	0.77
Appropriate Literacy Beliefs				
Title I Status	1.00	1.47	0.50	0.48
Title I Status x Years' Experience	2.00	0.20	0.06	0.93
Appropriate Individualization Beliefs				
Title I Status	1.00	0.1	0.03	0.85
Years' Experience	2.00	4.42	1.56	0.21
Title I Status x Years' Experience	2.00	0.81	0.28	0.74
Appropriate Socialization Beliefs				
Title I Status	1.00	0.74	0.10	0.75
Years' Experience	2.00	0.78	0.10	0.89
Title I Status x Years' Experience	2.00	0.41	0.05	0.94
Inappropriate Activities & Materials Beliefs				
Title I Status	1.00	11.98	0.40	0.52
Years' Experience	2.00	63.61	2.14	0.12
Title I Status x Years' Experience	2.00	15.46	0.52	0.59
Title I Status x Years' Experience	2.00	1.81	0.61	0.54

* The mean difference is significant at the 0.05 level.

Appendix D

Table 4. *Two-Way ANOVA Post Hoc Differences on Practices By Teachers Years' Experience*

	Mean Difference	Std. Error	Sig. (*p* value)
Inappropriate Management Practices			
0-5 Years vs. 18+ Years	1.6492	.76278	.083
0-5 Years vs. 6-17 Years	.4347	.58378	.738
6-17 Years vs. 18+ Years	2.0839	.83244	.037*
Inappropriate Transition Practices			
0-5 Years vs. 6-17 Years	.7197	.43443	.227
0-5 Years vs. 18+ Years	1.3563	.56763	.049*
6-17 Years vs. 18+ Years	.6366	.61947	.561

* The mean difference is significant at the 0.05 level.

Book Review:
High-Leverage Practices in Special Education, by J. McLesky et al.

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McLesky, J., Barringer, M-D., Billingsley, B., Brownell, M., Jackson, D., Kennedy, M., … Ziegler, D. (2017). *High-leverage practices in special education* (1st ed.). Arlington, VA: Council for Exceptional Children & CEEDAR Center.

High-Leverage Practices in Special Education, which guides the scope and aims of special education teacher preparation programs, is the product of a collaborative effort between the Council for Exceptional Children (CEC) and the Collaboration for Effective Educator Development, Accountability, and Reform (CEEDAR) Center. The authors describe 22 teaching practices regarded as High-Leverage Practices (HLPs) for special education and discuss their foundations in research. The development of these HLPs involved a writing team, focus groups of special educators, and input from special educators via an online survey. Identifying HLPs through consensus contributed to the goal "to improve teacher preparation, with the ultimate goal to increase outcomes of success for any student struggling in school" (p. 11).

Forgoing the traditional use of chapters, the book is organized around four research syntheses: collaboration, assessment, social/emotional/behavioral, and instruction. Within each research synthesis the corresponding High-Leverage Practices are discussed one by one. For example, within the research synthesis on collaboration, there are three HLPs: 1) collaborate with professionals to increase student success; 2) organize and facilitate effective meetings with professionals and families; and 3) collaborate with families to support student learning and secure needed services. Each of these has an introduction, research and policy support (when applicable), and a conclusion. Reference lists are located at the end of each research synthesis so readers can continue to explore the HLPs.

The greatest strength of this text lies in its clear and concise language. Rather than going into details about research methodologies or employing education jargon, each research synthesis serves as a brief overview of the support for the practice. This approach bridges the gap between research and practice, making the text easily accessible to educators, administrators, policy makers, and professors alike. Totaling 136 pages including all references, this book lends itself to use as a quick reference tool.

The organization of each research synthesis is another strength of this text. The structure of first presenting the description of the High Leverage Practice, then a summary, then the research and policy support, and finally the conclusion allows readers to easily locate the specific information they need.

The research and policy support subsections are certainly another strength of the text. The reader not only has access to a synopsis of the policy implications but a wealth of references for learning more about a specific HLP. Moreover, the appendix, which includes a glossary of terms such as "heterogeneous grouping" and "instructional scaffolding," also provides related resources in an organized chart.

There are a few areas that could be improved upon should there be another edition of this book. For example, there are seldom instructions on how to implement these practices, nor are there explicit examples of what these practices may look like in action. Furthermore, the authors fail to make a clear distinction between High Leverage Practices and Evidence-Based Practices except that "HLPs might be used to teach evidence-based practices" (p. 9). The addition of page numbers for each individual HLP within the table of contents would also be a minor improvement.

In concept, this list of special education High-Leverage Practices is similar to the TeachingWorks list of High-Leverage Practices, which consists of a total of 19 practices. There are similar themes within both sets of HLPs. For example, the eighth TeachingWorks HLP is "implementing organizational routines" (TeachingWorks, n.d., n.p.), while the seventh HLP for special education is "establish a consistent, organized, and respectful learning environment" (McLesky et al. 2017, p. 20). The authors of *High-Leverage Practices in Special Education* refer to TeachingWorks when they acknowledge, "although effective teaching practices had previously been identified, these mainly comprised undifferentiated, overall lists with brief descriptions of each practice" (p. 3). A primary difference between

each set of HLPs is that the special education HLPs are more elaborate in their descriptions and include briefs in research and policy.

In conclusion, *High-Leverage Practices in Special Education* is a resource that may benefit any individual involved with teacher preparation. The clear and concise language makes it an enjoyable reference to consult when planning curriculum for teacher development. The authors convey their own hope for the HLPs to be "perceived as a working and evolving set of practices that can be used as teacher educators collectively develop an understanding of core practices, determine how such practices may be best used, and identify how they can be improved" (p. 4). This book is available both as a hard copy for purchase through CEC or as a free PDF downloaded through the CEEDAR Center website.

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Call for Papers: Partnerships in Teacher Education

The Florida Association of Teacher Educators (FATE) is dedicated to improving the effectiveness of teacher education through leadership in the development of quality programs to prepare teachers, by analyzing issues and practices relating to professional development, and by providing opportunities for personal and professional growth of Association members.

The *FATE Journal* is a peer-reviewed publication meant to showcase the best articles on teacher education research and practice in the state of Florida. The journal's themed issues connect statewide interests and concerns to the larger national context.

The next special issue will focus on partnerships in teacher education. This could encompass university-based initial teacher education and professional development, public-private partnerships in education, or partnerships in school settings. The responsibility for education lies with various stakeholders, including policy makers, researchers and teacher educators, teachers, and parents. Teacher education occurs within complex relationships among the various stakeholders, ideally preparing future generations in mutually beneficial ways. Thus, teacher education carries an enormous responsibility, and it cannot do so without successful partnerships. This special issue asks potential authors to articulate and respond to the strengths and challenges related to such vital collaborations in teacher education.

Authors are encouraged but not required to consider any of the following questions in their manuscripts:

- What are some lessons learned in teacher education partnerships?
- How are our teacher education partnerships recruiting and preparing teacher candidates for the PK-12 students, classrooms, and school environments they will inherit?
- How do our school-university partnerships address the changing demographics and individual characteristics of PK-12 learners in our schools?
- What are some research methodologies for the design, deployment and evaluation of mobile learning in teacher education?
- What are some best practices for the development of distant partnerships?

We encourage manuscripts written by practicing and aspiring teachers and teacher educators. Conceptual and empirical papers are welcome, as well as papers guided by practitioner inquiry, self-study, or historical inquiry.

Submission Timeline

Deadline for Submission: August 15, 2019 (Midnight, EST)
Anticipated Publication: November 2019

General Submission Guidelines

Manuscripts should be in double-spaced, Times New Roman, 12-point font with one-inch margins. Manuscripts, excluding references, tables, charts, and figures, should not exceed 20 pages. All pages should be numbered. Please place tables, charts, and figures at the end of the manuscript. All manuscripts should follow APA (6th edition) format. Please do not include a running head. A 250-word abstract should be included at the beginning of your manuscript.

In addition to your *blinded* manuscript, please submit a separate cover page that includes the following: (1) title of the manuscript, (2) authors' names and institutional affiliation & e-mail address of the corresponding author, and (3) statement that this manuscript is not under consideration nor has it been published elsewhere.

Please submit all manuscripts to FATEjournal@gmail.com by the submission deadline. If you have questions as to whether your manuscript is appropriate for the call, please feel free to submit an approximately 250-word abstract to the editors for review.

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The *FATE Journal* welcomes media and book reviews related to education, broadly conceived. Reviews should be no longer than 800 words (excluding references) and include the following:

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- A brief summary, including key points
- A summary of how the work is structured and how that structure helps to facilitate or impede the work's central argument
- The strengths and weaknesses of the work and how it connects to similar books, texts, or films
- For whom this work would be useful and why

General Submission Guidelines

Reviews should be in double-spaced, Times New Roman, 12-point font with one-inch margins. All pages should be numbered. All reviews should follow APA (6th edition) format. Please do not include a running head.

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