Teachers’ Perceptions and Use of the
North Carolina Kindergarten Entry Assessment (KEA)

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Abstract

North Carolina received a Race to The Top- Early Learning Challenge grant that required the creation of a Kindergarten Entry Assessment (KEA). The North Carolina Department of Public Instruction (NCDPI) created a formative KEA that was piloted in a number of select local education agency North Carolina schools in the 2014-2015 school year. In the 2015-2016 school year the KEA was implemented in all North Carolina kindergarten classrooms. An electronic survey was sent to 381 Kindergarten teachers to learn about their experience with the KEA. Results show that participants had an average to good experience with the assessment, but the majority reported they did not use the data gained from the assessment to inform their instruction which is the purpose of formative assessment. These findings have implications at the state, local education agency and classroom level.

Keywords: Kindergarten Entry Assessment, formative assessment, kindergarten, formative assessment process
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Teachers’ Perceptions and Use of the North Carolina Kindergarten Entry Assessment (KEA)

Past research has shown that formative assessment leads to an increase in student learning (Buldu, 2010; Bakula, 2010). Formative assessment is defined as an assessment that provides information on students’ learning that is used by teachers to modify teaching (Black & Wiliam, 1998). A more recent definition from Wren (2008) states that when teachers obtain information about student’s knowledge and use that data to inform instruction is considered formative assessment. This allows teachers to use the findings from the assessment to adjust their teaching methods to best support each student's needs. Formative assessment can be conducted during typical play-based activities and is developmentally appropriate for young children (Pollitt 2015).

The Race to the Top- Early Learning Challenge was approved by Congress in 2011 (U.S., 2014). This program was created to improve the quality of early childhood programs (U.S., 2014). In the first phase, North Carolina was one of nine states that received a four-year Race to the Top grant in 2012 that funded the creation of a formative Kindergarten Entry Assessment (KEA) (U.S., 2014). Other states that received this grant include California, Delaware, Maryland, Massachusetts, Minnesota, Ohio, Rhode Island and Washington (U.S. 2014). As part of this grant North Carolina legislation mandated that the Office of Early Learning design a developmentally appropriate assessment for children in kindergarten through third-grade (North Carolina Department of Public Instruction Office of Early Learning, NCDPI, n.d.). NCDPI defines formative assessment as “a process used by teachers and students during instruction that provides feedback to adjust ongoing teaching and learning to help students
improve their achievement of intended instructional outcomes” (Council of Chief State School Officers, 2006, p. 3).

Description of the NC KEA

The KEA for North Carolina Public Schools was developed in order to provide teachers with resources and an electronic platform to collect information on the whole child’s current developmental level when entering kindergarten in order to inform instruction (NCDPI Office of Early Learning, n.d.). The results of the assessment are intended to inform teachers, parents, and policymakers about the development of the students and provide information to teachers which is encouraged to be used to modify instruction based on the results continuously. There are five sections of the North Carolina formative assessment process for the KEA, which include: (1) selecting learning targets, (2) developing criteria for success, (3) eliciting evidence of learning, (4) interpreting the evidence, and (5) adapting/responding to learning needs (NCDPI Office of Early Learning, n.d.).

The five domains of learning are covered in the KEA and include: (1) Approaches to Learning, (2) Cognitive Development, (3) Emotional-Social Development, (4) Health and Physical Development, and (5) Language Development and Communication (NCDPI Office of Early Learning, n.d.). Each domain consists of a construct progression of skills and knowledge that help the teacher to localize the child’s current status in each of the five domains of development and direct the teacher to what the child should be learning next. A construct progression is defined as “a carefully sequenced set of understandings and skills for a particular concept that moves from a less sophisticated state to a more refined state” (NCDPI Office of Early Learning, n.d.). An example of a construct progression can be found in FIGURE X. The teacher may model the behavior he or she is looking for from the child in order to guide the
student in the direction of the goal. The teacher prompts the child with situations and/or uses activities in order to elicit the evidence from the child that illustrates where that child is in the process of meeting a learning target on the progression for each of the domains. Next, the teacher interprets the evidence that was collected and documents the child’s current learning status. The teacher is then asked to select the next learning target which refers to identifying the next developmental or academic goal for a specific child. After choosing a learning target, the teacher develops the criteria for success, which outlines what evidence qualifies that individual child for meeting that goal. The final step in the formative assessment process is responding to learning needs. The teacher provides the student with the criteria for success, feedback on their development, another learning experience and guidance to higher learning and development. Additionally, the teacher should modify their instructional practices to meet the needs of each individual student (NCDPI Office of Early Learning, n.d.).

![Table](image)

**Figure 1.** Construct for Object Counting. This figure illustrates an example of one of the constructs from the KEA

**Implementation Science**

For the implementation of this new formative assessment tool, the NCDPI is drawing on the principles Implementation Science. Implementation Science is designed to aid in the creation, assessment and maintenance of new initiatives. Implementation is structured around four frameworks (1) teams, (2) drivers, (3) stages, and (4) cycles.
Teams. Implementation science encourages the creation of teams to help increase the accountability and sustainability of a new program. For the implementation of the KEA, teams were developed at multiple levels that included both district teams and school level teams.

Drivers. Drivers are activities such as professional development and regular evaluation of the implementation fidelity of an initiative. Furthermore, drivers include strategies for how administrations and leadership can support the new initiative.

Stages. Stages are the different steps the initiative must take to implement the program, because Implementation Science is a process. The stages direct the teams through handling the system change in the state, community and organizational level as well as guiding the teams to sustain the initiative.

Cycles. Cycles are also referred to as improvement cycles in which useful data are reviewed regularly to promote effective implementation of the program. It is imperative that the practitioners and policy makers have communication which allows for ongoing improvements and modifications to ensure successful implementation of the initiative.

Responsibilities for implementation of NC KEA

The NCDPI listed the responsibilities of the various stakeholders in the state needed to ensure successful implementation of the assessment. The State was responsible for creating the assessment, conducting the pilot in order to evaluate reliability, usability and validity testing for implementation, providing professional development as well as coaching and technical assistance to the educational regions to support sustainability of the assessment. The local education agencies were in charge of creating a district implementation team, developing continuous improvement plans that includes data to update ongoing professional development. The schools had the responsibility of choosing a leader or multiple leaders for the
implementation and provide time for staff to receive professional development. The teachers are ultimately responsible for implementing the KEA by following the administration regulations and by engaging in the continuous professional development to improve or modify instruction for the children in their classroom based on the data gained by the assessment (NCDPI Office of Early Learning, n.d.).

**Implementation of the NC KEA**

The KEA was piloted in 82 North Carolina elementary schools during the 2014-15 school year. During the 2015-2016 school year, all public school kindergarten teachers in North Carolina were required by NCDPI to implement the NC KEA formative assessment in their classroom. Before the school year, teachers in the pilot programs received professional development by NCDPI on how to reliably implement the KEA over the summer. The KEA pilot group received professional development to learn about formative assessment and how to implement it. This first use of the assessment statewide focused on two of the five domains: (1) Cognitive Development, and (2) Language Development and Communication. Within these domains, object counting was assessed for cognitive development; book orientation and print awareness were evaluated within the language development and communication domain (NCDPI Office of Early Learning, n.d.). The kindergarten teachers were required to collect information about each child in their classroom during the first 60 days of school in order to create a child profile in the two targeted areas. The NCDPI Office of Early Learning provided the teachers with a checklist for each of the measured areas (i.e., object counting, book orientation and print awareness) that lists the learning targets the teachers were to use as their guide. The kindergarten teachers needed to collect evidence to demonstrate the location of each individual child in their class on the progression continuum for each of the three constructs. Teachers were
required to upload the evidence, such as classwork, photos and videos, and learning status for each individual child to an online platform called the NC K-3 Formative Assessment Process platform that both the teacher and school administration could access. The NCDPI Office of Early Learning recommended that the teachers use this information to modify and enhance instruction and that the process be utilized across the school year (NCDPI Office of Early Learning, n.d.).

The NCDPI Office of Early Learning provided examples of how the formative process would look in the classroom. One instance could be a teacher setting up an activity after reviewing the song “5 Little Pumpkins” with his or her class. The teacher could divide the children up into small groups to create a picture about the song using materials such as scissors and construction paper. While the students are carrying out this activity, the teacher could observe behaviors in developmental domains such as Physical Development, Cognitive Development, Language Development, and Approaches to Learning. Within Physical Development, the teacher could observe the students cutting and their hand dominance (e.g. preferred hand to eat and write). For Cognitive Development, the students might count the number of pumpkins while drawing them. The students might also sing the song while they are working which would illustrate Language Development to the teacher. With preparation, teachers can carry out activities such as these that can provide opportunities for the teacher to observe and record children’s current stage of development (NCDPI Office of Early Learning, n.d.).

Formative assessment provides teachers with valuable information about the student’s current skill level that the teacher can use to modify their instruction to target each student. In order for the students to benefit from this, the teachers should modify their instruction to fit each
student’s learning needs based on the results of the formative assessment. Although kindergarten teachers in North Carolina were required to administer the KEA to their students, it is unknown if teachers actually used the KEA data to modify their instruction to meet the needs of each student. Therefore, it is important to investigate the teachers experience with the assessment and the extent to which teachers adjusted their instruction after receiving the data from the KEA.

**Purpose of this study**

The purpose of this study is to find out (1) the experience of North Carolina kindergarten teachers in using the KEA and (2) how often the teachers used the data from the KEA to modify their instruction. The answers to these questions will provide the NCDPI with useful information on how the new initiative is working in kindergarten classrooms across the state to inform instruction and also can shed light on the importance of such an initiative to inform the field of early education across the country.

**Literature Review**

To begin an investigation of North Carolina kindergarten teachers’ implementation of the KEA formative assessment process, first a comprehensive understanding of formative assessment is needed. First, a definition of formative assessment is provided. Then, this section reviews previous research about the strategies, benefits, and implementation of formative assessment in the classroom in order to gain insight into effective methods of implementation. Additionally, an understanding of how schools and teachers implement a new initiative is important. A discussion of Fullan’s Change theory (2006) and how it aligns with the NCDPI’s use of Implementation Science will be outlined.

**Definition**

NCPDI uses the following definition when discussing formative assessment.
“A process used by teachers and students during instruction that provides feedback to adjust ongoing teaching and learning to improve students’ achievement of intended instructional outcomes” (CCSSO, 2008).

**Strategies**

There are many ways to use formative assessment in the classroom including: (1) questioning, (2) feedback without grades, (3) self-assessment, (4) peer assessment, (5) formative use of summative assessment (Volante and Beckett 2011). For example, teachers can ask students open-ended questions to gather information about their knowledge on a concept. A study conducted by Pollitt (2015) examined the use of open-ended questioning to assess knowledge of numbers in early childhood centers. Forty-seven four-year-olds from a metropolitan area in Melbourne participated in this study. Pollitt created a small-group activity where she gave children wooden numerals from zero to nine. She used prompts to gain insight into “how many” the numerals meant to the children in which they responded in relation to their age, time, distance, etc. This activity provoked conversation and questioned children on the numbers they chose and challenged the children’s thinking. The teachers followed the lead of the students by asking questions increasing in difficulty based on the information the students were telling them about the numerals in order to scaffold higher level thinking about numbers. Two of the participants drew the numbers on paper and then conversed about the drawn numbers. One child asked another child about her number and stated that she drew her number reversed. The researcher recorded this conversation and then observed the other children fixing the numbers that they drew.

Buldu (2010) studied the use of pedagogical documentation in an international kindergarten in the United Arab Emirates. Six teachers participated in this study each with their
own classroom with a total of 141 students. The teachers received professional development on what pedagogical documentation is and what to document at the beginning of the study. The teachers and researcher collaborated while making documentation panels, where the teacher was deciding how to organize the panels with the documentation of the children. At the end of each two-week period, the teacher posted the panels around the classroom for the class to discuss and for the parents to look at.

**Benefits**

Studies show that the use of formative assessment results in positive learning outcomes for students. Using six different formative assessments, Bakula (2010) studied the benefits of formative assessment with 95 culturally diverse seventh-grade students from low socioeconomic backgrounds in Missouri. Five of the assessments were “traditional pen/paper assessments” (p. 39) and one was performance-based assessment in the form of a lab. The results of the assessments led to certain students being retaught the lesson in different ways including hands on methods and discussion. Additionally, the students completed surveys that measured their interest and understanding in the topic. After the unit was over, the teacher assessed the students using a summative assessment to compare the results to the initial formative assessment. The initial formative assessment showed that 57% of students were proficient in the unit and the summative assessment revealed that 81% of the students were proficient. Bakula claimed that the comparison of the formative assessment scores and the summative assessment scores showed that the use of formative assessments improved the students’ learning and the teacher’s teaching which had a positive impact on the students’ summative assessment scores.

As discussed in the previous section, Buldu (2010) reviewed pedagogical documentation as a formative assessment strategy. During and/or at the end of the study, the teachers, students
and parents were interviewed or observed to discuss their opinions of pedagogical documentation in the classroom. While interviewing the teachers, the researcher found the following four themes to the teacher’s perspective of pedagogical documentation it (1) informs teaching, (2) is self-reflective process, (3) creates professional learning community and (4) increases dialogue and communication with parents. In terms of the self-reflective process, the teachers found that the observations they recorded of their students helped them to decide on the current understanding of their students and what learning experience they needed next. For the students, the researcher found that pedagogical documentation has benefits for children’s learning as well. This strategy scaffolds children’s learning, creates a community of learners, increases children’s participation, motivation and interest in learning and increases the children’s self-awareness. The interviews with the teachers found that the documentation allowed the teacher to make an informed decision about the next learning experience for the students (repeat material, expand on material, or move on to another experience) and helped them to scaffold children’s learning. Additionally, the teachers reported that the children felt a sense of ownership for the work that they had done as it was posted around the classroom and they got to share it with their classmates. This study also looked at the benefits of pedagogical documentation for the parents of students in the classroom. The parents received a pre-documentation questionnaire about what they were interested in learning about their children’s learning status. A post-documentation questionnaire revealed that parents felt that the pedagogical documentation increased the awareness of the children’s learning experiences at school, it increased the dialogue between parents and their children and the school and it helped to educate parents on how to support their children at home. To summarize, Budlu (2010) found that pedagogical documentation informed teachers about children’s current learning status and what experience to
introduce next, helped students scaffold their learning and feel a sense of ownership of their work and allowed parents to take on a more involved role in their children’s learning.

As stated earlier, Pollitt’s (2015) study used open-ended questioning as a strategy of formative assessment. This study found that using this method in the classroom during typical play-based activities is developmentally appropriate and allows communication of knowledge between the students and the teacher. The students were able to converse and correct each other while the teacher was able to question and scaffold the students to higher level thinking about the math concept of numbers.

Implementation

In order for formative assessments to be most beneficial, the teacher must effectively implement the assessment. Buck and Trauth-Nare (2009) used cooperative inquiry, researching with the participants rather than on participants, to get a better understanding of how one teacher implemented formative assessment in her classroom. A sixth-grade science teacher participated in professional development for formative assessment and sought support for implementation. The sixth-grade teacher and two teacher educators from Midwestern U.S. created a cooperative inquiry group that looked into the formative assessment practices of the sixth-grade teacher and the benefits and obstacles of the implementation of the formative assessment. The two teacher educators were the researchers for the study. The researchers worked with the classroom teacher and led nine weekly planning sessions to facilitate the implementation. The researchers conducted interviews with the teacher before and after the study. They also conducted student interviews and conducted classroom observations. The teacher interviews showed that the teacher’s initial implementation of formative assessment was not effective, because her decision to use selected response assignments were not providing her with an accurate display of what her
students understood. When prompted to use open-ended, constructed-response questions the sixth-grade teacher found that many of the students were not on the skill level that she had previously thought. The study suggests that during ongoing professional development, teachers have the ability to learn more about formative assessment and how to effectively implement it in their classroom.

In another study, Volante and Beckett (2011) interviewed 20 elementary and secondary school teachers in Ontario, Canada to learn about their comprehension and implementation of specific formative assessment strategies. In this study, the 20 participants’ teaching experience ranged from three to 28 years. In Ontario, the Ministry of Education created a policy for assessment, evaluation and reporting in 2010. The researchers interviewed the teachers on their knowledge of formative assessment and the extent to which they are implementing formative assessment in the classroom as well as what types. The results of this study were organized into six formative assessment practices: 1) questioning, 2) feedback without grades, 3) self-assessment, 4) peer assessment, 5) formative use of summative assessment, and 6) professional development. The interviews showed that many of the teachers used a hierarchy for questioning students in the classroom, meaning the teacher would judge the students’ knowledge by asking a broad question and then question more specifically as the class understood the material. The teachers described obstacles for providing their students feedback without grades. They explained that many students do not take the time to read and understand the feedback the teachers provide them if it is not linked to a grade. One teacher combatted this challenge by discussing her use of self-assessment to help the students understand where their grades were coming from.
Overall, Volante and Beckett (2011) found that: 1) the teachers were not satisfied with the use of peer assessment as a form of formative assessment because the students were unable to objectively evaluate their peers and many did not have enough knowledge on the unit to accurately assess peers; 2) the teachers used the students’ responses to provincial school district achievement exams (i.e., summative assessments) to pinpoint where certain students did not understand the material or the question as it was posed and used this information formatively to plan for upcoming lessons in order to target the students’ areas of challenge with those questions; 3) the teachers felt that the professional development they received to implement formative assessment was not helpful, and they would have preferred a self-directed approach to professional development to gain a better understanding of the formative assessment process.

A study conducted by Ruiz-Primo and Li (2013), analyzed findings from three studies of teachers’ practices giving written feedback to students. The researchers instructed the teacher participants to utilize science notebooks in their classroom, and, at the end of the school year, the researchers randomly selected six to nine science notebooks from each class to analyze. This study analyzed the notebooks to answer three research questions regarding 1) if the teachers provide feedback, 2) the characteristics of teachers’ feedback, and 3) the accuracy of the teacher’s interpretations of student responses.

In Study 1, the participants included ten fifth-grade science teachers. This study focused on the notebook entry of the teacher’s feedback. The researchers coded the teacher’s feedback on a six-point scale ranging from incorrect feedback provided (-2) to helpful, reflective feedback (3) (Ruiz-Primo, 1998). In Study 2, the participants included eight seventh-grade science teachers. The researchers analyzed the form of feedback that the teachers wrote in the science notebook. First, they coded the type of feedback into three categories: (1) symbols such as
question marks and happy faces, (2) numerical scores without a rubric, and (3) written feedback. Next, the researchers coded the scope of the feedback quality into the following categories: informative, accurate, focused, cognitively stimulating and supportive (Ruiz-Primo & Li, 2004).

Study 3 included 16 participants, eight of which were from the previous study. These participants were seventh-, eighth- and ninth-grade science teachers. This study also looked at the feedback aspect of the science notebook, but focused on four feedback sets including accuracy, form, “nature” (type), and usability. The researchers created a scoring rubric to more definitively classify the feedback.

The data from the three studies were used to answer three research questions regarding if teachers provide written feedback to the students, and if so, what type of feedback and if the feedback is correct. To answer the first question, the research showed that 40%, 88%, and 81% of the teachers provided feedback in studies 1, 2, and 4, respectively. Using the results from the second study, the data showed that the teachers provided written feedback significantly less than grades and symbols. To find out the accuracy of the feedback to answer the third research question, among the three studies, there was a common theme of infrequent high-quality feedback. Additionally, the feedback did not address student misconceptions on material.

Bennett (2015) conducted a qualitative study to find out teachers’ experiences utilizing formative assessment. The participants included 40 purposefully-chosen elementary school teachers from a southern, suburban school district. Bennett used open-ended questions while interviewing the participants on topics such as their implementation of formative assessment and the use of feedback. The interviews revealed that the teachers believed they frequently were giving their students feedback and were utilizing peer-feedback, self-assessment, and student-created rubric. The study found the feedback they were providing to the students was evaluative.
feedback. However, the data from this study showed that descriptive feedback was found to be the most influential on academic achievement. About 90 percent of the participants indicated that their formative assessments were differentiated based on the students’ current performance and half of the participants described creating small groups based on the results of previously conducted formative assessment. Overall, this study found that teachers need additional professional development for implementing formative assessment effectively in their classroom.

Budlu (2010) found that implementing pedagogical documentation, one strategy of formative assessment, although holds benefits for children’s learning, can be difficult to implement. To start with, the teachers found that this process was very time-consuming and a lot of extra work. The teachers felt that they had to be constantly paying attention to the children’s interactions and then analyzing the data they observed became very overwhelming, because of the amount of documentation they were doing. The teachers also noted that the children changed their behavior when they knew they were being recorded. Additionally, they felt that without the resources a support that the study provided them, they were unsure if they would be able to continue pedagogical documentation. To summarize, the teachers felt pedagogical documentation as a strategy for formative assessment had challenges including taking up a lot of time, being a lot of added work and changing the children’s behavior.

**Change Theory**

The theoretical foundation for the present research is Fullan’s (2006) Change Theory which describes elements of successful implementation of large-scale reform. This type of change requires seven aspects 1) motivation, 2) capacity building, 3) learning in context, 4) changing context, 5) bias for reflective action, 6) tri-level engagement and 7) persistence and flexibility in staying the course.
To begin, any sort of transformation requires motivation for the change at all times. All seven parts of the theory entail motivation. Capacity building focuses on results and are strategies that promote positive results. An increase in capacity building leads to superior implementation. Additionally, teachers, schools, districts and the state must learn to improve in the context in which they are desiring growth. Prevailing standards must be changed by those in that context in order to improve the standards. The larger context must have the capacity to change. Knowledge and motivation are spread amongst the bigger context and capacity building occurs on a larger scale. Fullan (2006) emphasizes the importance of completing reflection in the context to learn. Individuals must reflect, inquire, and gather evidence during the transformation. The state, district, school and community have open communication and work together to use strategies within all three levels. Lastly, Change will not happen overnight and there will be challenges and complications, but it is important to continue to support the reform.

Fullan (2006) discusses an implementation dip when a change is introduced. This dip is in both performance and confidence as all parties being introduced to the change face new challenges in skills and understanding.

Effective implementation of formative assessment depends on the assessment strategy and if the teachers modify their instruction based on the information gained from the assessment. The use of open-ended questions, especially in early childhood, promotes higher-level thinking and increases student learning (Pollitt, 2015). In order to effectively execute formative assessment in the classroom, studies show that adequate professional development and support are needed (Buck & Trauth-Nare, 2009).

North Carolina public schools implemented the KEA, but there has been no follow up study to determine the impact of this formative assessment has affected classroom instruction.
The present study looked at the North Carolina kindergarten teachers’ experience with the KEA and how often the teachers modified their instruction based on student performance data from the KEA.

**Research Methodology**

During the 2014-2015 school year the KEA was piloted by 82 schools. The following school year, 2015-2016, all public school kindergarten teachers in North Carolina were required to participate in the NCDPI Early Learning Kindergarten Entry Assessment Formative Assessment process. Again, the purpose of this study was to answer the following research questions 1) what the North Carolina kindergarten teacher’s overall experience was using the KEA and 2) how often the teachers used the data from the KEA to modify their instruction. Survey methodology was employed to address these questions. An electronic survey was emailed to a sample of North Carolina Public Kindergarten teachers across all regions of the state.

**Obtaining Institutional Review Board Approval**

This study was ruled exempt by the non-biomedical University of North Carolina Institutional Review Board (IRB) on May 3rd, 2016. The IRB number is 16-1292. Both the faculty and the researcher completed the Collaborative Institutional Training Initiative’s Group 2 Social and Behavioral Research training along with the requisite conflict of interest disclosures. All of the collected survey data were stored in Qualtrics’ HIPPA-compliant secure database.

**Research Participants**

Participants included teachers working in public schools across the state. The schools were both purposely and randomly selected from the NCDPI’s eight Education regions to create three geographic regions of North Carolina (NC State Board of Education). The eight Education
regions are as follows: District 1 (Northeast Region), District 2 (Southeast Region), District 3 (North Central Region), District 4 (Sandhills Region), District 5 (Piedmont Triad Region), District 6 (Southwest Region), District 7 (Northwest Region), and District 8 (Western Region). Districts 1 and 2 were combined to represent the Eastern region, Districts 3, 4 and 5 were combined to represent the Central Region and Districts 6, 7, and 8 were combined to represent the Western Region.

During the 2014-2015 school year, a selection of local education agencies piloted the KEA. A sample of the pilot teachers was purposely chosen to participate in this study to see if their additional year of using this assessment had an impact on their experience and use of the KEA the following year. Seventy-one schools that piloted the KEA were randomly selected from three different regions: 25 schools from both the Central and Western region and 21 schools from the Eastern region. Sixty-eight non-piloted schools were selected to represent an equivalent number of local counties from each region. From each of the 139 schools, the email addresses of the kindergarten teachers were collected from the school’s public website. Thirteen selected pilot schools and eleven selected non-pilot schools did not publicize the teacher’s email addresses. This resulted in 58 pilot schools and 60 non-pilot schools, which lead to a list of 381 teacher emails; of the 381, 184 were pilot teachers and 197 were non-pilot teachers.

Survey Design

The survey covered a range of questions about the teacher’s experience implementing the NC KEA. The majority of the questions were asked on a Likert-type scale. There was also an open-ended section of the survey in which teachers were able to share anything they felt was important to note about the KEA Formative Assessment process. The survey was designed on
the online survey platform, Qualtrics, using a password-protected account. The complete electronic survey can be found in Appendix A.

As noted above, the teachers’ emails were accessed from the North Carolina Public School websites, which is public domain. Using Dillman’s (2014) Tailored Design Method of survey research to guide the distribution of the survey, an invitation letter with an anonymous link to the electronic Qualtrics survey was emailed to the kindergarten teachers seeking their participation. The teachers were contacted five times over the course of two months seeking their participation (see Appendix B). The results were stored in a secure file through UNC’s School of Education, and were analyzed by the Odum Institute at the University of North Carolina at Chapel Hill. The survey was emailed to a total of 381 North Carolina kindergarten teachers. Five days after the invitation letter was sent, the second point of contact was made with the survey link and 56 teachers completed the survey. After another week, the third point of contact was made, resulting in 61 additional completed surveys. One week after the third point of contact, an email informing the teachers that this was the second-to-last contact was sent, and this distribution resulted in an additional 36 finished surveys. The final distribution which was sent one week after the fourth point of contact resulted in an additional 10 surveys being completed. Of the 381 teachers who received the email, a total of one hundred and sixty-three teachers completed the survey, meaning the survey had a 43% response rate. Overall, 43% of the North Carolina teachers who received the email completed the survey from start to finish. See Table 3.1 for number and percentage of participants who completed the survey in relation to email contact. The first survey question asked respondents their participation in the KEA implementation. Sixteen participants responded that they were not sure or did not participate in
any implementation of the KEA. These responses were removed from the data, so a total of 147 responses were included in this study.

**Table 3.1**

Data on participation in survey in relation to email contact

<table>
<thead>
<tr>
<th></th>
<th>Number of Participants</th>
<th>Percentage of Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>First contact</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Second contact</td>
<td>56</td>
<td>34.36%</td>
</tr>
<tr>
<td>Third contact</td>
<td>61</td>
<td>37.42%</td>
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<tr>
<td>Fourth contact</td>
<td>36</td>
<td>22.10%</td>
</tr>
<tr>
<td>Fifth contact</td>
<td>10</td>
<td>6.13%</td>
</tr>
</tbody>
</table>

**Data Analysis**

The quantitative survey data were analyzed using descriptive and inferential statistics. The researcher looked at the total participant responses and separated the responses between participants who participated in the KEA pilot and the state-wide implementation during the 2014 – 15 school year and participants who were not involved in the pilot, but participated in the state-wide implementation the following year (2015-2016). The researcher ran t-tests to look for statistically significant differences between the pilot and non-piloted groups responses to how they rated their experience with aspects the KEA and how often they used the data from the KEA to modify their instruction. Additionally, the mean and standard deviation were examined of the whole group responses to what strategies they used to modify their instruction using the KEA data and how often they implemented these strategies during the school year. Correlations between the whole group response to what strategies the kindergarten teachers implemented to
modify their instruction using data from the KEA and how often the kindergarten teachers
applied these strategies were examined. The survey had one open-ended question asking for the
participant’s suggestions in improving the KEA. The researcher used a grounded-theory
approach to find themes among the responses. These qualitative data were analyzed to provide
the participants’ perspective on the KEA and to provide additional insight to supplement
quantitative data.

**Results**

The results of this study are based on data provided by 147 public school kindergarten
teachers who were working in the state of North Carolina during the pilot and/or the statewide
implementation. Following are the findings from the electronic survey.

**Total Respondents**

147 kindergarten teachers in North Carolina’s responded to the survey of their participation in the implementation of the KEA which represented a 38.5% return rate. The study was set up to be representative of the three geographical regions of the state of North Carolina and participants represented approximately one-third from each region. In total, 42 (34.43%) of the participants reported being from the Eastern region, 45 (36.89%) of the total participants were from the Central region and 35 (28.69%) of the participants were from the Western region. The majority (85.82%) of participants reported their race/ethnic background as white.

**KEA Pilot Respondents**

Fifty-six participants (38%) reported that they were involved in the pilot study of the KEA. Forty-six (82.14%) respondents who participated in the pilot study reported their educational regions; of these, 14 (30.43%) participants reported teaching in the Eastern region,
14 (30.43%) were from the Central region, and 18 (39.13%) from the Western region. The majority (47.06%) of the KEA pilot participants were between the ages of 40 and 49. All of the pilot participants held a bachelor’s degree and about half of the KEA pilot participants also held a master’s degree. Appendix D Table 1 provides a complete summary of respondents’ demographic characteristics.

**KEA Non-Pilot Respondents**

Ninety-one respondents (61.9%) stated that they were not involved in the pilot year of the KEA but instead participated only in the 2015-2016 required implementation of the KEA. Seventy-six (83.52%) reported the location of their school: 28 (34.43%) participants reported teaching in the Eastern region, 31 (36.89%) reported working the Central region and 17 (28.69%) reported working in the Western region of the state. The participants were mostly between the ages of 40 and 49 (41.56%). All of the participants held a bachelor’s degree and about a third of those participants also received a master’s degree. A summary of demographic characteristics for non-pilot respondents is also provided in Appendix D Table 1.

**Experience with the KEA**

One section of the survey asked participants to rate their overall experience with the KEA. Participants rated four aspects of the KEA including 1) ease of use, 2) helpfulness in instruction, 3) online platform experience, and 4) interpretation of data. Findings from the whole group responses will be reported followed by a comparison of the pilot group and non-pilot group responses. See Appendix C for Pilot vs Non-Pilot responses.

**Total respondents.** The majority of the North Carolina kindergarten teachers rated their experience with the KEA between average and good. See Figure 2.
Figure 2. Total Participants’ Rating of the KEA. This graph shows the participants’ responses to rating the KEA.

**Comparison of Pilot group and Non-Pilot’s group experience with KEA**

**Ease of use.** The first four items on this section of the survey dealt with the participant’s ease of use of the KEA, including the ease of 1) assessing a student’s current skill level, 2) entering in evidence (photo/video/comments) to online platform, 3) choosing student’s current skill level individually on online platform, and 4) choosing student’s current skill level in bulk on online platform. The non-pilot group scored statistically significantly higher than the pilot group ($p < .05$). This means that the non-pilot group found that the KEA was more difficult to use than the pilot group. Appendix D Table 2 provides the means and standard deviations for these variables.

**Helpfulness in instruction.** The fifth item on this section of the survey asked participants to rate the KEA for its helpfulness in choosing a student’s next learning target. The ratings of the non-pilot group ($M = 3.18$, $SD = .76$) were significantly higher than that of the pilot
group \((M = 2.61, SD = 1.02), t = -3.76, p < .05\). The non-pilot mean response to the fifth aspect was between poor and average whereas the pilot group’s mean response was between average and good.

**Online platform experience.** Regarding their online platform experiences, participants responded to two items that asked about 1) accessing student’s individual report on online report on online platform and 2) accessing class report on online platform. For both items, the pilot group’s average score for use of the online platform was between good and average and the non-pilot group’s average score was between average and poor. Appendix D Table 2 also provides means and standard deviations for these variables.

**Interpretation of data.** The last aspect of the KEA that the participants were asked to score was their ability to interpret the student’s learning target on the online platform. The ratings of the non-pilot group \((M = 3.15, SD = .79)\) were significantly higher than that of the pilot group \((M = 2.65, SD = .95), t = -3.31, p < .05\). The non-pilot group’s average score was significantly higher than the pilot groups score meaning that the KEA pilot group had a better experience interpreting the data from the KEA. See Appendix D Table 2 for the group comparison.

The survey also contained an open-ended question asking kindergarten teachers if they had suggestions about ways to improve the KEA. This question allowed teachers to give their opinions about the KEA. The question asked for suggestions, but many participants responded with solely challenges with the KEA; only a few provided suggestion to improve the KEA. Seventy-one participants (48%) made comments. A grounded-theory approach was used when transcribing and analyzing the open-ended response. The analysis of the participants’ responses results in five themes.
I. The KEA was time consuming and too much work

II. The KEA overlapped with skills being assessed with other mandated assessments

III. The teachers need more professional development and support to conduct the KEA

IV. The teachers had difficulties with the KEA online platform

V. Other challenges with the KEA

Theme I: Too time consuming and too much work. Thirty-six of 71 responses (51%) to this question discussed the KEA either being too time consuming, too much work or both. One teacher felt “for the KEA program to be successful, other assessments that are currently required need to be tabled. There is only so much time in a classroom and it seems that the majority of time is used for assessing. We need to reduce assessing time and use more time for actual instruction.” Another teacher agreed, but also suggested that “the testing should be consolidated into one single test that addresses the necessary elements, rather than having several to do the same thing, requiring a waste of many precious hours of children’s instructional time and much of the teacher’s limited time, both at school and out / at home.” An additional teacher had a similar reaction and added that “administration needs to be informed and EXPECTED to give the teachers time on a weekly basis to input the critical anecdotal records and observations. If I had the uninterrupted time, I would LOVE to utilize this system. I truly believe this is the way to evaluate children.”

Theme II: The overlap of skills being assessed with other mandated assessments. Twenty-seven of the 71 responses (38%) to this question stated that the skills being assessed by the KEA are already being evaluated by another assessment. One teacher exclaimed that they “currently gather the information using mClass, county wide assessments, school wide
assessments, and informal assessments” and they “only use this assessment tool to complete minimum requirement set by my administrator.” Another teacher felt that “if KEA is going to continue to be mandatory and a non-negotiable, it should be able to link to these other assessments with just a click of button through technology.” A third teacher agreed and said that “assessments are already required by DPI, such as mClass/Reading 3D, to count objects and letter name. It seems unnecessary to do it again.”

**Theme III: Difficulties with the online platform.** Fourteen of the 71 responses (20%) to the open-ended question talked about the online platform for the KEA being difficult to use and “not user friendly.” One teacher “found too many times where they[I] couldn’t even enter info because of website problems.” While another teacher agreed with that reaction indicating that “there has been a load of technical issues using the KEA assessment tool (losing entered information, unable to save information, unable to login, etc.).” To summarize, one teacher said “the online platform desperately needs work. It is very difficult to navigate, is not user friendly, and is not easy to quickly find where a student is in a certain area.”

**Theme IV: The need for more professional development and support to conduct the KEA.** Ten of the 71 responses (14%) to this question revealed that the participants wanted better/ more professional development and more support to implement the KEA. One teacher suggested that “newer kindergarten teachers need more professional development in understanding developmentally appropriate practices that would coincide with KEA.” While another teacher agreed to that reaction and stated that “more training or staff development offered to help teachers understand the value of formative assessment and how to use it as a means to document student growth and achievement.” One suggestion included that “it would be nice to have activities we can do once we mark a child to help them get to the next level. There
are not specified activities or skills we can work on a child with in a lesson plan format, and I think it would help a lot to have that added.”

**Theme V: Other challenges with the KEA.** Five of the 71 responses to this question discussed that the KEA should be implemented at the end of Pre-K or that the sequence of skills does not align with that of the state assessments. One teacher stated that “this assessment should be implemented the last 60 days of Pre-K and only required to be done the first 60 of Kindergarten for the Kindergartners that did not attend a Pre-K program. This data would be much more beneficial as a child enters the Kindergarten classroom on day one.” Another teacher felt that “the KEA developmental levels do not align with current county/state assessments. For example, in KEA a child is considered meeting developmental literacy benchmarks at the beginning of the year when proficient with concepts of print, while the concurrent state mClass assessment would consider that below proficient (proficiency measured at Reading Behaviors).” Similarly, one teacher stated the “KEA does not line up with Mclass on print concepts you can score a C on KEA and still be below PC on Mclass.”

A few teachers made suggestions for the KEA. One teacher suggested “an element in the computer program where progress or information can be sent home to parents. This needs to be the tool that is child’s progress report, or aligned with current report card.” A recommendation was that “it could be a good resource for someone who is new to the profession that needs more guidance on where their students are and how to help them grow.” One teacher made a generalized statement about assessment that read “it seems to me that the majority of our society, up to and including the teaching profession, has decided that this continual, excessive testing is stressful, disrupts instruction, and basically has little to no benefit.”

**Used to Modify Instruction**
One section of the survey asked respondents how often they used the data they received from the KEA to modify their instruction. A t-test was conducted to compare the results between the pilot group and the non-pilot group. See Appendix C for results of each group. The t-test revealed no statistical difference between the KEA pilot and KEA non-pilot group on how and how often they used the data they received from this assessment to modify their instruction. The majority of participants reported their use of the data from the assessment to modify their instruction between “once a month” and “never.”

Discussion

Research has indicated that formative assessment can be beneficial for both teachers and students (Bakula, 2010; Buldu, 2010). Formative assessment can provide teachers with valuable information about the student’s current skill level that the teacher can then use to modify their instruction to assist each student. In order for the students to benefit from this, the teachers should modify their instruction to fit each student’s learning needs based on the results of the formative assessment (Buldu, 2010). Building on this research, the North Carolina Department of Public Instruction (NCDPI) developed a developmentally appropriate individualized formative assessment for children in grades kindergarten through third grade in an effort for teachers to understand and use formative instruction to benefit students. The purpose of this study was to find out what a sample of North Carolina public school kindergarten teacher’s 1) overall experience was using the North Carolina Department of Public Instruction mandated Kindergarten Entry Assessment (KEA) and 2) how the teachers used the data from the KEA to modify their instruction. Previous research indicated that effective implementation of formative assessment depends on the strategies of assessment and the teacher’s modification of instruction based on the results of the assessment. These studies showed that adequate professional
development and support are also necessary to successfully use formative assessment in the classroom (Ruiz-Primo & Li, 2013).

North Carolina’s Department of Public Instruction currently requires that all public school kindergarten teachers use the KEA to assess the children in their room within the first 60 days of school. The teachers are encouraged to continue using the assessment throughout the school year as a formative assessment for the purpose of linking instruction children’s outcomes. To date there has been no follow up study reported in the literature as to if this formative assessment has affected classroom instruction. This was a first study to explore teachers’ experiences with the KEA, including how teachers used the KEA to modify instruction, the ease of use of the KEA, and teachers’ suggestions and critiques of the KEA.

Implementation of new initiatives in education frequently faces challenges (Fullan, 2006). Listening to the voices of those who are responsible for implementation can provide important information to inform the practice. The findings of this initial study have implications at different levels, including teachers both in-service and preservice, administrators, and policy.

**Research Question 1**

The results showed that the participants average overall experience with the KEA was between average and good. The comparison of the non- pilot groups responses to the pilot group responses to their overall experience with the KEA revealed that the non- piloted group scored significantly higher than the piloted group (\( p < .05 \)) meaning that the pilot group had an overall better experience with the KEA than the non-pilot group.

**Ease of use.** As indicated by the results, teachers who had a prior year of experience with the KEA found using the KEA significantly easier than teachers who were using it for the first time. This ease is use was found in 1) assessing a student’s current skill level 2) entering in
evidence (photo/video/comments) to online platform 3) choosing student’s current skill level
individually on online platform and 4) choosing student’s current skill level in bulk on online
platform. This finding is not particularly surprising given the KEA pilot group received
professional development from the NCDPI for the pilot year of implementation and in addition
received a second year of professional development from their school system to successfully
implement the KEA formative assessment. This finding is in line with Fullan’s (2006) change
theory in that change takes time and there is an implementation dip. This indicates that pairing
implementation of formative assessments with adequate professional development may help
optimize effective implementation for best results.

**Helpfulness in instruction.** Buck and Trauth-Nare (2009) found that a teacher’s initial
implementation of formative assessment was not effective for figuring out the current standing in
learning the material, but with ongoing support the teacher learned more effective strategies for
implementing this type of assessment and was able to get a more accurate understanding of the
status of the students. The pilot group found the KEA more helpful for choosing a student’s next
learning target than the non-pilot group. This finding seems fitting given that the pilot group had
an extra year of professional development over the non-pilot group.

**Online platform experience.** The pilot group found that using the online platform to
access student and class information was better than the non-pilot group. This finding seems
appropriate given that the pilot group again had an extra year of using the platform over the non-
pilot group.

**Interpretation of data.** The pilot group found interpreting the data from the KEA on
student’s progress was easier than the non-pilot group. This finding aligns with the previous
findings from this study, in that the pilot group had an additional year to understand and practice interpreting the data from the KEA.

**Research Question 2**

The purpose of the KEA is to determine within the first 60 days where all kindergartners are across the five KEA domains. Because formative assessment provides teachers with information about the development of their students, NCDPI encourages teachers to continue to use the KEA to modify their instruction to promote continuous learning benefits for the children in their room.

**Used to modify instruction.** A t-test revealed no statistical difference between the KEA pilot and KEA non-pilot group on how and how often they used the data they received from this assessment to modify their instruction. The overwhelming majority of participants reported their use of the data from the assessment to modify their instruction between “once a month” and “never.” Bakula (2010) found that using the results from assessments to decide which students needed to be retaught the lesson and then teaching the follow up lesson in an alternate way than the first time it was provided improves student’s learning. The majority of the Kindergarten teachers did not use, or very rarely used the data from the KEA to modify their instruction.

**Recommendations for the Field**

Implementation of new initiatives in education frequently faces challenges (Fullan, 2006). Listening to the voices of those who are responsible for implementation can provide important information to inform practice. The findings of this initial study suggest several recommendations at different levels, including teachers both inservice and preservice, administrators, and policy makers. All recommendations are intended to benefit children’s learning as a result of using formative assessment to inform instruction.
**In-service teachers.** The teachers are the individuals ultimately responsible for carrying out the KEA assessment. Their expertise and skill with understanding and using formative assessment is what has the potential to impact students’ learning.

Buldu (2010) found that pedagogical documentation informed teachers about children’s current learning status and what experience to introduce next, helped students scaffold their learning and feel a sense of ownership of their work and allowed parents to take on a more involved role in their children’s learning. Results of this study show that the majority kindergarten teachers either never used the information they gained about their students from the KEA to modify instruction or used it once a month. In order for students to reap the benefits of formative assessment, teachers must use the information they receive from the assessments to inform and modify their instruction. Teachers should use their PLC groups to discuss how they are using the data to inform instruction.

**Pre-service teacher training.** College education programs should be teaching pre-service teachers about the benefits of using formative assessment. In addition, teacher candidates would benefit from understanding how to implement formative assessment. Currently many states across the US are adopting this type of assessment (U.S. 2014). Gaining knowledge, skills, and experience with formative assessments will allow pre-service teachers to see firsthand the important benefits of using formative assessment and how to implement it in their future classrooms. Furthermore, pre-service teachers could explore the current formative assessment that different states are utilizing where they hope to gain employment so they will have familiarity with a state’s specific assessment in the future.

**Local education agencies administration.** In NC the Local Education Agencies (LEA) are intended to play a pivotal role in the implementation of the NC KEA. Administrators’
Responsibilities include creating an implementation team at the local education agency to support the initiative. One recommendation for LEA administrators would be to make sure they put together a group of teachers who are engaged, motivated, and work well together. Another recommendation would be for the implementation teams to provide more support for the teachers in terms of technology problems, general questions, and help in implementation as suggested by the participants in this study.

**Local schools.** In NC, the principals or the principal’s designee is in charge of choosing a team of teachers to lead the implementation effort in their local school. Teachers mentioned in their suggestions for the KEA that they desired more professional development to implement the KEA. Principals need to provide an environment in which teachers have time for ongoing professional development. Additionally, the schools need to listen to the teachers concerns, as expressed in the suggestions question in this study’s survey, and advocate for improved assessment policy at the state level for teachers that have an impact on taking away important instructional time.

**NC policy makers.** North Carolina had many responsibilities in the development of the KEA and its implementation. One of the NC’s responsibilities for the implementation of the KEA was to conduct a pilot in order to evaluate the assessments reliability, validity, and usability. Additionally, NC is supposed to provide professional development to the educational regions to support the initiative. Research completed by Ruiz-Primo & Li (2013) and Bennett (2015) found that teachers who received effective professional development for using formative assessment in their classroom found implementation easier. Results of this study seem to indicate this is true with pilot teachers who had two years of experience with the KEA indicate more ease with using the KEA. However, the results also suggest that more work needs to be accomplished if NCDPI
wants teachers to use the data to modify their instruction. Therefore, explicit PD on using formative assessment to inform instructional practice it seems would be critical at this point.

Another recommendation is that NCDPI should consider streamlining the mandated assessments that the kindergarten teachers must complete in the beginning of the school year. According to the NCDPI’s website, the State was in charge of providing technical assistance to the local level. Fullan’s (2006) has suggested that in order for a large-scale reform to be successful the school/ community, the district and state must work together and follow through with their responsibilities for implementation of the reform. This finding implies that NCDPI needs to evaluate its stakeholder’s responsibilities to see if they are carrying out their designated job.

Future Research

Previous research emphasized the importance of ongoing support and professional development for teachers to implement formative assessment. The qualitative data showed that teachers desired more guidance and professional development opportunities. This study did not collect data on the number of hours of professional development that the teachers received to implement the KEA. Future research could consider the number of hours of professional development in relation to overall experience with the KEA.

A critical part of the KEA was the follow through of the responsibilities of the stakeholders including the implementation teams. A district implementation team and a school team leader were supposed to be created and chosen in order to effectively implement the KEA in schools. The qualitative data found that teachers desired more support in the implementation process, so future research should look at what kind of support systems were created for the
teachers. As well as determine if the stakeholders carried out the responsibilities that they were assigned in the KEA implementation.

Finally, it is recommended that this study be replicated in other states that are implementing the KEA to determine whether or not results are specific to this location or can be generalized.

**Limitations**

First, limitations for this study would include the voluntary nature of the survey; the results may be limited in representing the whole picture of teachers’ perceptions as there are not responses from all of the kindergarten teachers who used the KEA. Second, because the teachers responding to this survey may have extreme opinions both positive or negative on the NC KEA formative assessment process, this might lead to inaccurate representation of kindergarten teachers across the state. Third, the limited response options for the Likert-type items used on the survey did not leave room for explanation and the items may have been interpreted differently by the participants. The limited number of survey questions may not provide a comprehensive picture of the current situation of formative assessment procedure in North Carolina.

Despite these limitations, this research provided information about how the kindergarten teachers in North Carolina Public Schools implemented formative assessment in order to modify their instruction to benefit the students. This information can provide crucial feedback that can lead to increased resources to teachers, additional professional development, more support from the North Carolina Department of Public Instruction and modifications in the process/online platform.
Conclusion

The existing literature found that when formative assessment is used effectively, meaning when teachers use the data that they received from the assessment to inform their teaching, students’ performance increases. The present study found that North Carolina teachers found the assessment easy to use, but they are not using the information they gathered about the students to modify their instruction. This study showed that teachers need more professional development on how to effectively implement formative assessment and NCDPI should consider streamlining mandated assessments to reduce repetition.
References


Appendix A

NC KEA formative assessment process
In 2014, North Carolina implemented the Kindergarten Entry Assessment (KEA). The KEA is a formative assessment process used to get information on the current skill level of children entering kindergarten. The following questions refer to the KEA.

Which of the following describes your participation in the KEA? (Check all that apply.)
- I participated in the 2015-2016 KEA implementation.
- I am not sure if I participated in the KEA.
- I did not participate in the KEA.

The following is a list of some of the skills measured by the KEA. For each skill, please indicate the point in the school year you used the KEA to assess your students.

<table>
<thead>
<tr>
<th>Skills Measured by KEA</th>
<th>Between beginning of year and middle of year</th>
<th>Between middle of year and end of year</th>
<th>Not Applicable/Did Not Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Print Awareness</td>
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<tr>
<td>Book Orientation</td>
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<tr>
<td>Object Counting</td>
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</tbody>
</table>

How would you describe the professional development you received to implement the KEA? (Check only one.)
- A. Very good
- B. Good
- C. Acceptable
- D. Poor
- E. Very poor
- F. I did not receive professional development to implement the KEA.

How would you rate each of the following aspects of the KEA?

<table>
<thead>
<tr>
<th>Aspect of KEA</th>
<th>Very good</th>
<th>Good</th>
<th>Average</th>
<th>Poor</th>
<th>Very poor</th>
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</thead>
<tbody>
<tr>
<td>Ease in assessing a student’s current skill level</td>
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<tr>
<td>Ease of entering in evidence (photo/video/comments) to online platform</td>
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<tr>
<td>Ease of choosing student’s current skill</td>
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<td>Level individually on online platform</td>
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<td>Ease of choosing student’s current skill level in bulk on online platform</td>
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<td>Helpfulness in identifying a student’s next learning target</td>
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<tr>
<td>Access student’s individual report on online platform</td>
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<tr>
<td>Access class report on online platform</td>
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<tr>
<td>Interpret student’s individual learning target on online platform</td>
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</tbody>
</table>

How often did you use results from the KEA to do each of the following?

<table>
<thead>
<tr>
<th></th>
<th>More than once a day</th>
<th>About once a day</th>
<th>About once a week</th>
<th>About once a month</th>
<th>Never</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group students based on ability</td>
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<tr>
<td>Decide which skills to reteach</td>
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<tr>
<td>Decide which students to provide with enrichment or remediation</td>
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<tr>
<td>Track individual student progress over time</td>
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<tr>
<td>Track whole class progress over time</td>
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</table>
To what extent do you believe the information provided by the KEA is different from the information provided by the Mclass?
- Very different
- Somewhat different
- Somewhat similar
- Very similar

Next year the NCDPI will require all 5 domains and 7 related constructs to be assessed using the KEA. How beneficial would you rate the information gathered on each additional construct? *School district selects one from the two options

<table>
<thead>
<tr>
<th>Highly beneficial</th>
<th>Somewhat beneficial</th>
<th>Not beneficial</th>
<th>Information already gathered on another required assessment instrument</th>
<th>Unsure</th>
</tr>
</thead>
</table>
### Engagement in Self-selected activities

<table>
<thead>
<tr>
<th>Object Counting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emotional Literacy</td>
</tr>
<tr>
<td>Grip &amp; Manipulation</td>
</tr>
<tr>
<td>Crossing Midline*</td>
</tr>
<tr>
<td>Hand Dominance*</td>
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<tr>
<td>Following Directions</td>
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<tr>
<td>Letter Naming</td>
</tr>
</tbody>
</table>

**Suggestions for future KEA implementation** (open ended)

1. **If you have any suggestions about ways to improve the KEA, please enter your thoughts in the textbox below.**

**Demographic information**

In which North Carolina public school district do you work? ________

**** Drop down menu***

Which best describes your ethnic/racial background? (Check all that apply)

A. White  
B. Hispanic or Latino  
C. Black or African American  
D. Native American or American Indian  
E. Asian / Pacific Islander  
F. Other ___________

In what year were you born (YYYY)? ________

What is the highest grade or year of school you completed?

A. High school graduate or equivalent  
B. Some college  
C. Bachelor’s degree  
D. Master’s degree  
E. Doctoral degree
In what area is your highest degree?
   A. Early Childhood
   B. Elementary Education
   C. Other (please specify)

How many years have you been employed as a full-time classroom teacher? _____ years

How many years have you taught kindergarten in North Carolina public schools as a full-time classroom teacher? _______ years

If you are interested in participating in a brief phone call about your experience with the KEA, please enter your email address.
Appendix B

Email 1
Dear kindergarten teacher,

A few days from now, you will receive and email to request your participation in a survey being conducted for a School of Education Honors thesis at the University of North Carolina Chapel Hill. You have been selected to participate in the project because you are a public school Kindergarten teacher in the state of North Carolina.

This survey seeks your important contribution to the evaluation of the North Carolina Kindergarten Entry Assessment.

I am writing in advance because I have found many people like to know ahead of time they will be contacted. The study is an important one that will help in understanding teacher’s experience with the North Carolina Kindergarten Entry Assessment in regard to how they modified their teaching as a result of the information provided from the assessment.

Thank you for your time and consideration. It is only with the generous help of people like you that research such as this can be successful.

Sincerely,

Tori Yeglewel
UNC-Chapel Hill School of Education Class of ‘17
Child Development and Family Studies

Email 2
Dear kindergarten teacher,

My name is Tori Yegelwel and I am a Honors student at the University of North Carolina at Chapel Hill School of Education in the Child Development and Family Studies program. For my Honors thesis, I am researching teacher’s experience with the North Carolina Kindergarten Entry Assessment. I am seeking feedback on the implementation and overall experience with this process.

Please take a moment to consider participating in my online survey of North Carolina Kindergarten teachers. The survey consists of three sections: experience with the KEA formative assessment process, a section for you to share any comments that may be pertinent to this area of research and demographic information.

The majority of the questions are Likert-scale questions, and the survey will take approximately fifteen minutes to complete. If you agree to participate, the online survey form will ask for your consent and will allow you to continue to the survey. You may withdraw from the study at any point by closing your Internet browser and you will also have the option to refrain from answering any question or questions that you choose. All responses will be anonymous and
confidential. Any report of this research that is made public will not include your name or any other personal identifiers. Once you have completed the survey, feel free to email me with any questions or concerns you may have about the survey or your participation in it.

This survey has been approved by the University of North Carolina Chapel Hill’s Internal Review Board, and its identification number is 16-1292

Thank you for considering my request to participate in this survey. I am drawn to this area of research in order to gain insight about how teachers are using formative assessment to enhance instruction. Your voice is critical in helping to understand this important part of teaching.

If you have any further questions or concerns, please do not hesitate to contact me at yegelwel@live.unc.edu.

Sincerely,
Tori Yegelwel
UNC-Chapel Hill School of Education
Child Development and Family Studies Class of 2017

Email 3
Dear kindergarten teacher,

Last week, you received an email seeking your feedback regarding your experience with the North Carolina Kindergarten Entry Assessment. Your school’s name was randomly selected in a sample of all public schools across your region.

If you have already completed the survey, please accept my sincere thanks. If not, please do so today. I am especially grateful for your help, because without your feedback, I cannot explore the implementation of the KEA.

Your voice on this important topic will assist in modifying professional development and evaluating the assessment process to assist future educators like myself, who will work with Kindergarten school students in our state.

Here is the link: https://unc.az1.qualtrics.com/jfe/form/SV_cZRz01G9RAJ3soZ
https://unc.az1.qualtrics.com/SE/?SID=SV_cZRz01G9RAJ3soZ

If you have any questions, please do not hesitate to contact me. Thank you!

Tori Yegelwel
UNC-Chapel Hill School of Education Class of ‘17
Child Development and Family Studies
Email 4
Dear kindergarten teacher,

About three weeks ago I sent you an email containing a link to a survey regarding your feedback on your experience with the North Carolina Kindergarten Entry Assessment. People who have already responded have had important insights to share about their implementation of the KEA.

I believe the results will have some real implications for future educators in UNC’s School of Education and hopefully for the education of teachers in the state of North Carolina as a whole.

If you have already completed the survey, thank you! But if you have not, I ask that you please do so at your earliest convenience. With every response I receive, my data becomes more and more representative of the state of North Carolina and allows me to make stronger and smarter conclusions about the implementation and experience of the KEA.

Here is the link: https://unc.az1.qualtrics.com/jfe/form/SV_cZRz01G9RAJ3soZ

Sincerely,
Tori Yegelwel
UNC-Chapel Hill School of Education Class of ‘17
Child Development and Family Studies

Email 5
Dear kindergarten teacher,

During the last month I have sent you several emails about an important thesis research study I am completing for the University of North Carolina Chapel Hill’s School of Education. It’s purpose is to get your feedback on the implementation and overall experience with this assessment process.

The study is drawing to a close, and this is the last contact that will be made with the random sample of kindergarten teachers in North Carolina. I am sending this final contact because of my concern that people who have not yet responded may feel differently about how their needs are being met than those who have responded. Hearing from everyone in this small, statewide sample helps assure that the survey results are as accurate as possible.

I also want to assure you that your response to this study is voluntary, and if you prefer not to respond, that’s fine. If you have not responded yet, but still want to participate I would greatly appreciate it!

Here is the link: https://unc.az1.qualtrics.com/jfe/form/SV_cZRz01G9RAJ3soZ
Your time and your opinions are very valuable to me, and I thank you deeply for your participation in my survey.

Sincerely,

Tori Yegelwel
UNC-Chapel Hill School of Education Class of ‘17
Child Development and Family Studies
### Appendix C

**Pilot A**

<table>
<thead>
<tr>
<th>Question</th>
<th>Never</th>
<th>About Once a Month</th>
<th>About Once a Week</th>
<th>About Once a Day</th>
<th>More Than Once a Day</th>
<th>Mean (Std. Dev.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group students based on ability</td>
<td>30</td>
<td>10</td>
<td>10</td>
<td>2</td>
<td>2</td>
<td>4.19 (1.10)</td>
</tr>
<tr>
<td>Decide which skills to reteach</td>
<td>24</td>
<td>10</td>
<td>14</td>
<td>2</td>
<td>3</td>
<td>3.94 (1.18)</td>
</tr>
<tr>
<td>Decide which students to provide with enrichment or remediation</td>
<td>25</td>
<td>14</td>
<td>10</td>
<td>3</td>
<td>2</td>
<td>4.06 (1.11)</td>
</tr>
<tr>
<td>Track individual student progress over time</td>
<td>27</td>
<td>15</td>
<td>11</td>
<td>0</td>
<td>1</td>
<td>4.24 (0.91)</td>
</tr>
<tr>
<td>Track whole class progress over time</td>
<td>29</td>
<td>16</td>
<td>7</td>
<td>0</td>
<td>1</td>
<td>4.36 (0.86)</td>
</tr>
<tr>
<td>Communicate with parents about a student's progress</td>
<td>33</td>
<td>16</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>4.53 (0.70)</td>
</tr>
<tr>
<td>Communicate with school staff (e.g., administrator, grade level chair) about an individual student’s progress</td>
<td>30</td>
<td>15</td>
<td>8</td>
<td>1</td>
<td>0</td>
<td>4.37 (0.81)</td>
</tr>
<tr>
<td>Communicate with school staff (e.g., administrator, grade level chair) about the whole class’s progress</td>
<td>35</td>
<td>12</td>
<td>6</td>
<td>1</td>
<td>0</td>
<td>4.50 (0.77)</td>
</tr>
</tbody>
</table>

**Non-Pilot A**

<table>
<thead>
<tr>
<th>Question</th>
<th>Never</th>
<th>About Once a Month</th>
<th>About Once a Week</th>
<th>About Once a Day</th>
<th>More Than Once a Day</th>
<th>Mean (Std. Dev.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group students based on ability</td>
<td>49</td>
<td>18</td>
<td>8</td>
<td>3</td>
<td>4</td>
<td>4.28 (1.10)</td>
</tr>
<tr>
<td>Decide which skills to reteach</td>
<td>44</td>
<td>16</td>
<td>15</td>
<td>2</td>
<td>5</td>
<td>4.12 (1.17)</td>
</tr>
<tr>
<td>Decide which students to provide with enrichment or remediation</td>
<td>43</td>
<td>17</td>
<td>17</td>
<td>1</td>
<td>3</td>
<td>4.19 (1.05)</td>
</tr>
</tbody>
</table>
### Pilot B

<table>
<thead>
<tr>
<th>Question</th>
<th>Very Poor</th>
<th>Poor</th>
<th>Average</th>
<th>Good</th>
<th>Very Good</th>
<th>Mean (Std. Dev.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ease in assessing a student's current skill level</td>
<td>0</td>
<td>6</td>
<td>15</td>
<td>26</td>
<td>7</td>
<td>2.37 (0.85)</td>
</tr>
<tr>
<td>Ease of entering in evidence (photo/video/comments) to online platform</td>
<td>4</td>
<td>11</td>
<td>15</td>
<td>17</td>
<td>7</td>
<td>2.78 (1.14)</td>
</tr>
<tr>
<td>Ease of choosing student’s current skill level individually on online</td>
<td>0</td>
<td>7</td>
<td>15</td>
<td>27</td>
<td>5 (9.26)</td>
<td>2.44 (0.84)</td>
</tr>
<tr>
<td>platform</td>
<td>(0.00)</td>
<td>(12.96)</td>
<td>(27.78)</td>
<td>(50.00)</td>
<td>(9.26)</td>
<td></td>
</tr>
<tr>
<td>Ease of choosing student's current skill level in bulk on online platform</td>
<td>0</td>
<td>6</td>
<td>18</td>
<td>24</td>
<td>6</td>
<td>2.44 (0.84)</td>
</tr>
<tr>
<td>Helpfulness in identifying a student's next learning target</td>
<td>2</td>
<td>8</td>
<td>18</td>
<td>19</td>
<td>7</td>
<td>2.61 (1.02)</td>
</tr>
<tr>
<td>Access student's individual report on online platform</td>
<td>1</td>
<td>7</td>
<td>19</td>
<td>23</td>
<td>4 (7.41)</td>
<td>2.59 (0.88)</td>
</tr>
<tr>
<td>Access class report on online platform</td>
<td>2</td>
<td>7</td>
<td>23</td>
<td>19</td>
<td>3 (5.56)</td>
<td>2.74 (0.89)</td>
</tr>
<tr>
<td>Interpret student's individual learning target on online platform</td>
<td>2</td>
<td>7</td>
<td>20</td>
<td>20</td>
<td>5 (9.26)</td>
<td>2.65 (0.95)</td>
</tr>
</tbody>
</table>

### Non-Pilot B
### Perceptions and Use of the KEA

<table>
<thead>
<tr>
<th>Question</th>
<th>Very Poor</th>
<th>Poor</th>
<th>Average</th>
<th>Good</th>
<th>Very Good</th>
<th>Mean (Std. Dev.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ease in assessing a student's current skill level</td>
<td>3</td>
<td>7</td>
<td>45</td>
<td>25</td>
<td>3</td>
<td>2.78 (0.80)</td>
</tr>
<tr>
<td>Ease of entering in evidence (photo/video/comments) to online platform</td>
<td>10</td>
<td>24</td>
<td>33</td>
<td>16</td>
<td>0</td>
<td>3.34 (0.93)</td>
</tr>
<tr>
<td>Ease of choosing student’s current skill level individually on online platform</td>
<td>6</td>
<td>9</td>
<td>44</td>
<td>23</td>
<td>1</td>
<td>2.95 (0.85)</td>
</tr>
<tr>
<td>Ease of choosing student's current skill level in bulk on online platform</td>
<td>5</td>
<td>12</td>
<td>44</td>
<td>18</td>
<td>3</td>
<td>2.98 (0.87)</td>
</tr>
<tr>
<td>Helpfulness in identifying a student's next learning target</td>
<td>4</td>
<td>20</td>
<td>45</td>
<td>13</td>
<td>0</td>
<td>3.18 (0.76)</td>
</tr>
<tr>
<td>Access student's individual report on online platform</td>
<td>4</td>
<td>17</td>
<td>43</td>
<td>17</td>
<td>0</td>
<td>3.10 (0.78)</td>
</tr>
<tr>
<td>Access class report on online platform</td>
<td>4</td>
<td>14</td>
<td>48</td>
<td>16</td>
<td>0</td>
<td>3.07 (0.75)</td>
</tr>
<tr>
<td>Interpret student's individual learning target on online platform</td>
<td>5</td>
<td>17</td>
<td>45</td>
<td>15</td>
<td>0</td>
<td>3.15 (0.79)</td>
</tr>
</tbody>
</table>
## Appendix D

Table 1

Selected Demographic Variables for Pilot, Non-pilot and All participants

<table>
<thead>
<tr>
<th>Variable</th>
<th>Pilot</th>
<th>Non-pilot</th>
<th>All</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td><strong>Race</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>44</td>
<td>83.02</td>
<td>71</td>
</tr>
<tr>
<td>Black or African American</td>
<td>4</td>
<td>7.55</td>
<td>4</td>
</tr>
<tr>
<td>Other (Hispanic or Latino, Native American or American Indian, Asian/Pacific Islander)</td>
<td>5</td>
<td>9.43</td>
<td>6</td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20-29 years old</td>
<td>2</td>
<td>3.92</td>
<td>13</td>
</tr>
<tr>
<td>30-39 years old</td>
<td>11</td>
<td>21.57</td>
<td>22</td>
</tr>
<tr>
<td>40-49 years old</td>
<td>24</td>
<td>47.06</td>
<td>32</td>
</tr>
<tr>
<td>50-59 years old</td>
<td>10</td>
<td>19.61</td>
<td>9</td>
</tr>
<tr>
<td>60-69 years old</td>
<td>4</td>
<td>7.84</td>
<td>1</td>
</tr>
<tr>
<td><strong>Highest degree</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bachelor’s</td>
<td>29</td>
<td>55.77</td>
<td>51</td>
</tr>
<tr>
<td>Master’s</td>
<td>23</td>
<td>44.23</td>
<td>30</td>
</tr>
<tr>
<td><strong>Discipline of highest degree</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Early Childhood</td>
<td>11</td>
<td>21.15</td>
<td>13</td>
</tr>
<tr>
<td>Elementary Education</td>
<td>38</td>
<td>73.08</td>
<td>67</td>
</tr>
<tr>
<td>Other (Theatre, technology in education,</td>
<td>3</td>
<td>5.78</td>
<td>2</td>
</tr>
</tbody>
</table>
Table 2
T-test comparing means of Pilot and Non-Pilot experience using KEA

<table>
<thead>
<tr>
<th>Question</th>
<th>Parameter</th>
<th>Mean (StdErr)</th>
<th>t Value</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ease of use</td>
<td>Pilot</td>
<td>2.51 (0.10)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Non-Pilot</td>
<td>3.01 (0.08)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pilot vs.</td>
<td>-0.50 (0.13)</td>
<td>-3.73</td>
<td>0.0003*</td>
</tr>
<tr>
<td>Helpfulness in identifying a student's next</td>
<td>Non-Pilot</td>
<td>3.18 (0.10)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>learning target</td>
<td>Pilot</td>
<td>2.61 (0.12)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Non-Pilot</td>
<td>3.18 (0.10)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pilot vs.</td>
<td>-0.57 (0.15)</td>
<td>-3.76</td>
<td>0.0003*</td>
</tr>
<tr>
<td>Online platform experience</td>
<td>Pilot</td>
<td>2.67 (0.11)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Non-Pilot</td>
<td>3.09 (0.09)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pilot vs.</td>
<td>-0.43 (0.14)</td>
<td>-3.04</td>
<td>0.0028*</td>
</tr>
<tr>
<td>Interpret student's individual learning target</td>
<td>Pilot</td>
<td>2.65 (0.12)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>on online platform</td>
<td>Non-Pilot</td>
<td>3.15 (0.09)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Question</td>
<td>Parameter</td>
<td>Mean (StdErr)</td>
<td>t Value</td>
<td>p</td>
</tr>
<tr>
<td>------------------------------------------------------------------------</td>
<td>--------------------------------</td>
<td>---------------</td>
<td>---------</td>
<td>---------</td>
</tr>
<tr>
<td>Group students based on ability</td>
<td>Pilot vs. Non-Pilot</td>
<td>-0.50 (0.15)</td>
<td>-3.31</td>
<td>0.0012*</td>
</tr>
<tr>
<td></td>
<td>Pilot</td>
<td>4.19 (0.15)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Non-Pilot</td>
<td>4.28 (0.12)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pilot vs. Non-Pilot</td>
<td>-0.10 (0.19)</td>
<td>-0.49</td>
<td>0.6225</td>
</tr>
<tr>
<td>Decide which skills to reteach</td>
<td>Pilot</td>
<td>3.94 (0.16)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Non-Pilot</td>
<td>4.12 (0.13)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pilot vs. Non-Pilot</td>
<td>-0.18 (0.21)</td>
<td>-0.86</td>
<td>0.3901</td>
</tr>
<tr>
<td>Decide which students to provide with enrichment or remediation</td>
<td>Pilot</td>
<td>4.06 (0.15)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Non-Pilot</td>
<td>4.19 (0.12)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pilot vs. Non-Pilot</td>
<td>-0.13 (0.19)</td>
<td>-0.69</td>
<td>0.4928</td>
</tr>
<tr>
<td>Track individual student progress over time</td>
<td>Pilot</td>
<td>4.24 (0.12)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Non-Pilot</td>
<td>4.31 (0.10)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pilot vs. Non-Pilot</td>
<td>-0.07 (0.16)</td>
<td>-0.43</td>
<td>0.6675</td>
</tr>
<tr>
<td>Track whole class progress over time</td>
<td>Pilot</td>
<td>4.36 (0.12)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Non-Pilot</td>
<td>4.35 (0.09)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pilot vs. Non-Pilot</td>
<td>0.00 (0.15)</td>
<td>0.03</td>
<td>0.9744</td>
</tr>
<tr>
<td>Communicate with parents about a student's progress</td>
<td>Pilot</td>
<td>4.53 (0.09)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Non-Pilot</td>
<td>4.56 (0.07)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pilot vs. Non-Pilot</td>
<td>-0.03 (0.12)</td>
<td>-0.28</td>
<td>0.7782</td>
</tr>
<tr>
<td>Communicate with school staff (e.g., administrator, grade level chair)</td>
<td>Pilot</td>
<td>4.37 (0.11)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Non-Pilot</td>
<td>4.43 (0.09)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Question</td>
<td>Parameter</td>
<td>Mean (StdErr)</td>
<td>t Value</td>
<td>p</td>
</tr>
<tr>
<td>-------------------------------------------------------------------------</td>
<td>-------------</td>
<td>---------------</td>
<td>---------</td>
<td>-------</td>
</tr>
<tr>
<td>Communicate with school staff (e.g., administrator, grade level chair)</td>
<td>Pilot vs.</td>
<td>-0.06 (0.14)</td>
<td>0.40</td>
<td>0.6927</td>
</tr>
<tr>
<td></td>
<td>Non-Pilot</td>
<td>4.50 (0.10)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pilot vs.</td>
<td>Non-Pilot</td>
<td>4.46 (0.08)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-Pilot</td>
<td>Pilot vs.</td>
<td>0.04 (0.13)</td>
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*Notes.  *p < .05