

Culturally Responsive Instruction Observation Protocol (CRIOP) Professional Development:

Program Evaluation

Collaborative Center for Literacy Development

Susan Chambers Cantrell, Ed.D.

Pamela Correll, M.A.

Victor Malo-Juvera, Ed.D.

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Executive Summary

This evaluation examines the professional development activities of the Center for Culturally Responsive Pedagogy funded through a National Professional Development Program Grant from the U.S. Department of Education Office of English Language Acquisition. Professional development that focused on the Culturally Responsive Instruction Observation Protocol (CRIOP) was provided for 27 classroom teachers in four elementary schools in central Kentucky. The yearlong professional development included school and project-wide training sessions along with school- and classroom-based coaching. Effects of the evaluation were investigated through pre- and post- teacher surveys, classroom observations using the CRIOP, teacher interviews, and student assessments. The specific components of the professional development and its effects are presented below.

Professional Development Components

- Each teacher participated in one day of summer training focused on inquiry-based learning, development of inquiry projects, family collaboration, and incorporating families' funds of knowledge into classroom curriculum. One-half day was spent with each teacher in grade-level planning meetings.
- School and classroom-based coaching was provided for an average of 50.4 hours per teacher in implementing the CRIOP elements. Coaching focused on curriculum development, instructional planning, and implementation of culturally responsive teaching practices.
- Participating teachers also attended full-day follow-up sessions focused on elements of the CRIOP. These sessions focused on (a) inquiry-based learning and family collaboration, (b) English Language Learners and second language acquisition, academic language development and standards, (c) assessment, provisions of Title 3, vocabulary instruction for English Language Learners, lesson planning, and core content.

Effects of the Professional Development

- Student achievement in reading and math for students in participating teachers' classrooms, as measured by MAP and ThinkLink assessments, improved significantly from fall to spring of the school year. Reading and math scores for English Language Learners increased significantly, with many of these students gaining more than one year's growth.
- Fall and spring classroom observations using the CRIOP as an evaluative tool to measure teachers' culturally responsive practices indicate that teachers' implementation of culturally responsive instruction was significantly higher as a result of participation in the professional development.

- Teachers' self-efficacy for implementing culturally responsive instruction increased significantly, as demonstrated by participants' survey responses on the Culturally Responsive Teaching Survey (Siwatu, 2007).
- Teachers who participated in the professional development reported that they observed improved student learning, increased student engagement, and enhanced classroom relationships as a result of culturally responsive instruction in their classrooms. These teachers also expressed that their own learning had increased, that their instructional planning and practices for facilitating student engagement and learning benefitted, and that instruction for English Language Learners had improved.
- Participating teacher described the following challenges with implementation: language barriers in communicating with English Language Learners, facilitating family involvement, and imposed constraints in planning and implementing culturally responsive instruction.

Teacher Education Component

As one element of this grant program, teacher educators in the teacher preparation program at the sponsoring institution participated in a 3-day professional development seminar. Subsequently, these college faculty revised course objectives, course outcomes, and course assignments within teacher preparatory course syllabi. Modifications in course syllabi included additions of study of the components of the CRIOP, culturally responsive instruction practices, and strategies to meet the language and learning needs of English Language Learners.

Conclusions

In the first year of this professional development project, project staff achieved high implementation of the professional development model. Classroom observations and interviews indicate teachers' learning and implementation of new practices gained through the model. Increases in implementation from fall to spring observations show growth in development over time and illustrate the power of school-based coaching and mentoring for supporting teachers as they try new approaches in their work with students. Despite challenges that serve as barriers to implementation, teachers perceived positive outcomes for students related to their implementation of the practices they learned through the professional development model. Outcome results are positive in the first year of the project. Although it is impossible to attribute student progress to the project alone in the absence of a comparison group, the data serve as supportive documentation of participating teachers' efforts to meet the needs of their English Language Learners across the year they participated in the project, and the data provide validation of project staff's strategies to support those teachers.

Introduction

Overview of Evaluation

The Center for Culturally Responsive Pedagogy and its professional development activities were funded through a National Professional Development Program Grant from the U.S. Department of Education Office of English Language Acquisition. During the first year of this grant project, school-based professional development, which focused on the Culturally Responsive Instruction Observation Protocol (CRIOP), was provided for 27 classroom teachers in four elementary schools in central Kentucky. Evaluators examined implementation and effects of the program during its first year. To investigate the effects of the professional development model, evaluators examined outcomes related to teachers' self-efficacy for implementing culturally responsive instruction (CRI), change in implementation of the CRIOP model over time, and change in students' performance in reading and math. Data were disaggregated for English Language Learners and for other student groups. In addition, the course syllabi from courses taught by seven teacher educators at Georgetown College were analyzed for modifications consistent with the objectives of the CRIOP. The evaluation answered the following questions:

- What was the level of implementation of the professional development model in terms of teacher participation in professional development and provision of school-based coaching?
- To what extent did teacher educators modify their course syllabi to match the CRIOP objectives?
- What was the impact of the professional development model on teachers' efficacy for culturally responsive instruction and outcome expectancy?
- What were changes in teachers' implementation of the CRIOP model over their year of participation?
- What were teachers' perceptions of their successes and challenges in implementing the CRIOP model?
- What were changes in students' achievement in reading and math during the year their teachers participated in the professional development model? For English Language Learners? For other groups of students?
- What was the relationship between teachers' implementation of the CRIOP model and student achievement in reading and math?

Background and Description of CRIOP Model

The CRIOP is an instructional framework and measurement tool designed to assess and support instruction in seven components of culturally responsive instruction: classroom relationships, family collaboration, assessment, curriculum, instruction/pedagogy, discourse, and socio-political consciousness.

The CRIOP instrument consists of the seven holistic areas of culturally responsive instruction listed above and 24 specific indicators of culturally responsive practices, with examples and non-examples included for comparison and evaluation. Ratings are assigned for observed CRI practices on a 4-point scale: 1=not at all, 2=occasionally, 3=often, and 4=to a great extent. Classroom observations are the primary data sources for the instrument. A teacher interview component, consisting of a *Post-Observation Teacher Interview* and a *Family Collaboration Interview*, is an additional element of the protocol.

The CRIOP was developed as the result of a Collaborative Center for Literacy Development (CCLD) research initiative exploring literacy instructional practices in schools receiving state funding for a reading intervention program in elementary schools. Data collected over three years revealed that while reading instructional intervention resulted in improved student achievement overall, gaps in achievement remained between students from middle-class White backgrounds and students from culturally and economically diverse backgrounds. Researchers noted that culturally responsive instructional practices were observed infrequently in these classrooms.

The research team conducted a comprehensive review of published literature relating to culturally responsive instruction and categorized their findings into themes. The themes identified by the team were identified as major components of culturally responsive instruction and incorporated as pillars of the CRIOP instrument. This work led to the publication of an over-arching edited text entitled *Literacy for All Students: An Instructional Framework for Closing the Gap* (Powell & Rightmyer, 2011), which provided conceptual and research support for the CRIOP components.

Components of Planned Professional Development Model

This project intends to serve at least 25 in-service teachers per year (125 total) who serve English Language Learners in their classrooms and who also teach math and science as part of the curriculum. The CRIOP professional development model includes summer training for teachers, school-based mentoring to encompass professional development sessions, site-based instructional coaching, and revision of teacher preparation course syllabi.

Summer training. Plans for the CRIOP professional development grant included two

days devoted to teacher training led by the project director and the ESL consultant. The professional development sessions were designed to focus on creating and strengthening relationships with families and learning about best practices for ELL students. In addition, plans were included for an August or September social event for ELL families or for teacher visits to students' homes prior to the beginning of the school year.

School-based mentoring. During the fall semester, participating teachers were to participate in two days of professional development devoted to theories and application of second language acquisition and technology applications for ELLs. The training sessions were to be conducted by a bilingual consultant, a technology consultant, and a representative from the Kentucky Department of Education. Two additional professional development days dedicated to implementing components of the CRIOP were to be held in the spring semester.

Site-based coaching was planned for participating teachers throughout the school year. The project director and the school-based coach were to provide classroom and instructional support for teachers. Coaching was intended to support curriculum development, instructional planning, and implementation of culturally responsive teaching practices. Videotaping of lessons, peer analysis, and critique related to implementation of elements of the CRIOP were part of the year-long intensive professional development training.

Revision of teacher preparation course syllabi. The teacher educator component of the professional development plan for the first project year included analysis of course syllabi and aligning those syllabi with CRIOP pillars. Teacher educators at Georgetown College were to revise their syllabi in core courses to ensure course content is aligned with CRIOP pillars and that the courses included emphasis on standards for teaching English Language Learners. The project plan for the second and third years of the CRIOP professional development initiative includes three professional development sessions for college faculty and one professional development session for school administrators.

Description of Schools and Teachers

Participating schools. Teachers from four elementary schools in the area participated in the professional development program. School A is one of 35 public elementary schools located in a mid-sized city with a population of approximately 300,000 (US Census Bureau, 2013). Schools B and C are part of a county school district in a rural area. School D is an independent elementary school district located in a town with a population of approximately 10,000 (US Census Bureau, 2013). Each of the participating schools had attendance rates slightly above the state average. Percentages of students receiving free or reduced lunch were relatively high across all schools. Table 1 includes student enrollment, free/reduced lunch participation, spending per student, and attendance rates for each of the participating schools.

Table 1

School Demographic Data

School	Student Enrollment	Free/Reduced Lunch Status %	Spending Per Student	Attendance Rate %
State Average		57	\$10,174	94.6
School A	594	99	\$ 9,737	95.4
School B	569	59	\$10,281	95.9
School C	446	66	\$11,383	95.5
School D	357	58	\$10,950	96.1

Note. Data obtained from Kentucky School's Report Card (2013). Percentages for free and reduced lunch are based upon numerical data provided within the report.

Teacher participants. Twenty-seven teachers participated in this study. Teachers were all female, were predominantly White ($n = 26$, 86.7%; African American $n = 1$, 13.3%), and were mostly native speakers of English ($n = 26$, 86.7%; English second language $n = 1$, 13.3%). Nineteen teachers taught all subjects in self-contained elementary classrooms (kindergarten $n = 5$, first grade $n = 6$, second grade $n = 5$, third grade $n = 1$), two teachers taught in self-contained classes containing both kindergarten and first grade, two teachers were special education teachers, one teacher taught physical education, one teacher taught first grade science, one teacher taught language arts, reading, and social studies at the fourth grade level, and one teacher was a reading specialist/second grade teacher. Teachers' education and experience levels are found in Tables 2 and 3.

Table 2

Education Level

Statistic	Degree				Total
	Bachelor's	Master's	Specialist	Doctorate	
Frequency	11	14	2	0	27
Percentage	40.7%	51.9%	7.4%	0%	100%

Table 3

Years' Experience at School Site

Statistic	Years				Total
	0-3	4-7	8-11	16+	
Frequency	13	8	3	3	27
Percentage	48.1%	29.6%	11.1%	11.1%	100%

Evaluation of Professional Development Implementation

Implementation Evaluation Measures, Data Collection, and Analysis

Implementation of the CRIOP professional development model was evaluated through data from the teacher summer training, school-based mentoring, and teacher preparation course syllabi.

Summer training. The project director kept attendance records of teachers and administrators who attended the training sessions and submitted those to a CCLD research assistant. The project director and school-based coach documented the names of teacher participants who attended sessions, the number of hours per session, and the focus and topics of discussion from each summer session. In addition, a CCLD research assistant attended the all-day summer workshop and kept field notes throughout the session.

School-based mentoring. The project director and school-based coach maintained coaching logs of classroom coaching, planning meetings, classroom observations, and school-based professional development conducted with participating teachers. Coaching logs were submitted to the CCLD research assistant who tracked the coaching and professional development hours for each participating teacher.

Revision of teacher preparation course syllabi. College faculty members in the teacher preparation program at the sponsoring institution submitted course syllabi to the project director, who subsequently submitted them to evaluators. Evaluators analyzed these syllabi for alignment with elements of the CRIOP. Course syllabi modifications in course outcomes, candidate assessment, and clinical experiences were tracked. Syllabi revisions in course content, assignments, readings, and resources were also examined and recorded.

Implementation of the Professional Development Model

Summer training. During the summer preceding the 2012-2013 school year, 26 teachers participated in one professional development session of 6.5 hours led by the project director and the ESL consultant for the project. Activities during the workshop included inquiry-based learning, development of inquiry projects, family collaboration, and incorporating families' funds of knowledge into classroom curriculum. The project director and the school-based coach also held a meeting with school administrators from the four participating schools to introduce the CRIOP instrument and to discuss the elements of the protocol.

During the summer, the project director met with kindergarten, first, and second-grade teachers at one of the project schools during their grade-level planning meetings. Each planning session lasted approximately four hours, and teachers were given information about the CRIOP and the professional development grant. The director assisted each grade-level team with planning initial units for the beginning of the school year.

School-based mentoring. Throughout the 2012-2013 school year, teachers received individual classroom coaching, on-site professional development, and instructional planning support. Table 4 delineates the number of hours of professional development project personnel provided to participating teachers through school-based mentoring.

Table 4

Teacher Participation in School-Based Mentoring

Participating School	Number of Participating Teachers	Range of Coaching Hours Per School	Average Number of Coaching Hours Per Teacher
School A	14	36-72	54.2
School B	3	42-49	46.0
School C	3	41-55	48.3
School D	5	41-51	43.3
Total for All Schools	25	36-72	50.4

Note. One participating kindergarten teacher at School A was on maternity leave for three months at the beginning of the school year, thereby missing professional development opportunities during those months. The substitute teacher employed at School A to replace the teacher on leave participated in PD opportunities until her employment ended. In addition, School A added one kindergarten classroom teacher mid-year due to increased student enrollment. This teacher participated in PD after she was employed. At School B, one participating teacher withdrew from the professional development program mid-year due to personal reasons. Because these four teachers did not participate in professional development for the entire school year, their participation in professional development is not included in this table, nor are their coaching hours included in the average.

Full-day follow-up sessions. Participating teachers also attended full-day follow-up sessions focused on elements of the CRIOP. Three training sessions totaling 17 hours were held before school began and during the fall semester. Attendance was high at these PD sessions. Table 5 describes the purpose of these professional development days and teachers’ attendance.

Table 5

Teacher Participation in Full-Day Professional Development Sessions

Full-Day Professional Development Sessions	Content of Training Session	Number of Teachers Attending	Percentage of Teachers Attending
Training 1	Inquiry-based learning; family collaboration	26	100
Training 2	English language learners and second language acquisition; academic language development; WIDA standards	27	100
Training 3	ELLs and assessment; provisions of Title 3; vocabulary instruction for ELLs; lesson planning and core content	22	88

Note. Percentage of teachers attending represents teachers who were full-year participants in the professional development program.

Revision of teacher preparation course syllabi. Seven teacher educators in the teacher preparation program at the sponsoring institution attended a 3-day professional development workshop and subsequently submitted revised course syllabi to evaluators. The teacher preparation courses were: Literacy Leadership in Schools Practicum; Final Clinical Practice – Field Component in LBD Special Education; Curriculum and Instruction for Students with Moderate to Severe Disabilities; Field Component in LBD I; Foundations of Environmental Education; Teaching Language Arts in the Elementary School; and Classroom Applications of Technology and Content Literacy.

An analysis of the syllabi revealed that course outcomes relating to English Language Learners were revised in four of the course syllabi. The implementation of elements of the CRIOP in lesson planning was included in two of the courses, and meeting the learning needs of

English Language Learners was added in four of the course syllabi. Examples of course objectives added or modified in these four syllabi include: explain advantages and disadvantages of various instructional strategies for meeting the needs of ELL and special needs learners and identify and implement explicit teaching strategies for diverse populations (racial, ethnic, and language diverse students).

Three of the course syllabi included revisions of the course content to include culturally responsive instruction or the CRIOP, and course topics devoted to teaching English Language Learners were included in six syllabi. Some examples of these course topics are: Integration of Literacy and CRIOP Standards into the Content Areas; English Language Learners and Culturally Responsive Teaching; Differentiation of Lesson Plans to Meet the Needs of these Learners; and Meeting the Needs of ELL Students through CRIOP. Five of the course syllabi listed course assignments or readings incorporating WIDA standards for English Language Learners. Content topics of three of the courses included implementing elements of the CRIOP or culturally responsive teaching.

Candidate assessments using the CRIOP were included in two course syllabi, with one of these assessments utilizing the curriculum, pedagogy, and sociopolitical consciousness pillars of the CRIOP as an evaluation guide for a lesson-planning project. Another course included the development of a five-day, content-based unit incorporating literacy and elements of the CRIOP, along with practice teaching to peers.

Most of the course syllabi did not include modifications related to clinical experiences. One course syllabus included an additional field experience assignment of selecting an English Language Learner within the school fieldwork site and assessing the student's needs using the WIDA standards.

Evaluation of Classroom Implementation

Implementation Measures, Data Collection, and Analysis

CRIOP. The CRIOP is a 7-item observational inventory used to measure culturally relevant classroom instruction that has been previously found to have Cronbach's alpha values of .88 and .94 (Malo-Juvera, Powell, & Cantrell, 2013). The fall administration CRIOP holistic had a Cronbach's alpha of .78, while the spring administration CRIOP holistic had a Cronbach's alpha of .76.

Evaluators conducted classroom observations using the CRIOP in the classrooms of 26 participating teachers in the fall of the school year and in 27 classrooms in the spring of the 2012-2013 school year. Fall observations took place in October and November, and spring observations were conducted in March, April, and May, at least five months after teachers'

initial observations. Classroom observations occurred during literacy or content-area instructional times and included whole-class and/or small-group instruction and student independent activities. Learning events, teacher-student interactions, cooperative groups, and peer conversations were included in the observations. Observations were conducted for at least 2.5 hours in each classroom, and researchers took field notes at five-minute intervals for the duration of the session.

Observers, training, and interrater reliability. Two CCLD field researchers conducted the CRIOP classroom observations. Field Researcher One is a former elementary classroom teacher, holds a masters' degree in literacy, is experienced in student teacher supervision, and is a full-time doctoral student. Field Researcher Two is a former elementary classroom teacher, holds a masters' degree in education, and is a full-time graduate student.

Fall observations were conducted by Field Researcher One, who spent one day during the summer with the project director for training using the CRIOP for classroom evaluations. The field researcher had read *Literacy for All Students: An Instructional Framework for Closing the Gap* (Powell & Rightmyer, 2011), which provides an introduction to the CRIOP, prior to the training session. Using videos of classroom teachers, the project director and field researcher used the CRIOP as an evaluation tool, discussed their observations, and compared their ratings. At the conclusion of the sessions, inter-observer agreement on the CRIOP for the project director and Field Researcher One was 80%.

Field Researcher One and Field Researcher Two conducted spring observations. Field Researcher Two had previously participated in CRIOP training as a kindergarten and first grade teacher, so she was familiar with the CRIOP and culturally responsive instruction. Field Researcher Two participated in a small-group training session for the CRIOP in February with the project director, two professors, and Field Researcher One. The five participants viewed videos of classroom teachers, used the CRIOP as an evaluation tool for each video, and compared and discussed their ratings. Subsequently, Field Researchers One and Two conducted two classroom observations together in participating teachers' classrooms. Researchers kept field notes, used the CRIOP for scoring the observations, and compared their ratings. A total of three paired observations were conducted.

Interrater reliability analysis was conducted for the two field researchers for this study using the CRIOP holistic pillars for analysis. Overall interrater reliability between the field researchers was Cohen's Kappa = 0.65 ($p < .001$). A Kappa of .65 is considered to be a substantial strength of agreement (Landis & Koch, 1977). Overall perfect interrater percent of agreement was 76%, while interrater percent of agreement within one point of disagreement was 100%.

Teacher interviews. Following each CRIOP classroom observation, field researchers conducted an audio-recorded interview with each participating classroom teacher. Using the CRIOP Post-Observation Teacher Interview Protocol and the CRIOP Family Collaboration Teacher Interview Protocol, researchers conducted semi-structured interviews. Researchers kept field notes during each interview. Questions asked during the CRIOP post-observation interview were:

- Was the lesson(s) that you taught today typical of your classroom instruction? If not, please describe how the lesson was different. Are there other lesson components that you usually include in your classroom that you didn't include in this lesson?
- What are your biggest successes with using Culturally Responsive Instruction with your students?
- What are your biggest challenges with using Culturally Responsive Instruction with your students?
- Is there anything else you'd like to add?

During the spring classroom observations, two additional questions were added to the post-observation interview protocol: (1) What are your judgments about the quality/effectiveness of the professional development sessions? School-based coaching?; (2) What aspects of the professional development were most helpful to you, and why? What aspects of the professional development were least helpful to you, and why?

The CRIOP Family Collaboration Interview Protocol comprised the following questions:

- Please tell me about the conversations you have had with the parents/caregivers of your students. Where did these meetings occur? What did you learn from those conversations?
- Have you used this information to plan for instruction, either for individual students or for the whole class? If so, how have you used it? If not, please explain.
- What methods do you typically use to communicate with parents/caregivers? How often does this communication occur? Please describe all of the methods you use (notes home, phone calls, home visits, social events, parent workshops, etc.).
- If you have conducted home visits, what is the purpose for the visits? What information do you gather? How do you use that information?
- Do parents/caregivers participate in classroom activities and events? If yes, describe how they participate.
- What else can you tell me about how you work with the families of the students in your class?

Teachers' interview responses were analyzed using a process of inductive coding. Evaluators read the data, categorized teachers' responses, and identified emerging themes. After the first round of coding, categories of improved student vocabulary, students' verbal responses, improved student writing, and improved student learning were collapsed, as teachers' examples of improved student achievement often overlapped among these areas. Themes were created for sub-categories of teachers' perceptions of their biggest successes and challenges of implementing culturally responsive instruction.

Classroom Implementation Results

Classroom practices. Statistical analyses were conducted to determine if teachers' culturally relevant instruction as measured by the CRIOP significantly increased post intervention. Of the original 26 teachers who were observed in the fall, 23 were observed in the spring, leaving an n of 23 for analyses.

Effect of professional development on teachers' CRIOP scores. Evaluators hypothesized that teachers who were given intervention would significantly increase their culturally relevant classroom instructional behaviors as measured by the CRIOP ($p < .05$). A repeated measures ANOVA was conducted using CRIOP fall and spring observations.

A one way repeated measures ANOVA was conducted to determine if teachers' scores on CRIOP observations increased significantly from fall observations ($\bar{x} = 16.35, s = 2.89$) to spring observations ($\bar{x} = 18.52, s = 3.25$). Results show that teachers' culturally relevant instruction as measured by CRIOP was significantly higher posttest, Wilks's $\Lambda = .67, F(1, 22) = 13.64, p = .001, \text{partial } \eta^2 = .38$.

Teacher perceptions about successes. During the CRIOP post-observation and family collaboration interviews, participating teachers expressed their perceptions of the effectiveness of implementing culturally responsive instruction (CRI) with their students. Teachers also reflected on their successes with culturally responsive practices. A number of themes emerged as teachers' responses were analyzed, compared, and coded. Teachers' interview responses revealed major themes of improved student learning, increased student engagement, and enhanced classroom relationships as a result of practicing culturally responsive instruction. Teachers also named heightened teacher learning and improved instructional practices as successful outcomes of culturally responsive instruction.

Improved student learning. When asked about culturally responsive instruction and their biggest successes with CRI, many teachers stated that their students' learning had improved. A number of teachers observed that using students' background knowledge and experiences in classroom instruction enhanced student learning. One participating first-grade

teacher described implementing culturally responsive instruction with her students as, “tapping into what they already know. Their knowledge is really the best tool to use as far as being culturally responsive.” A kindergarten teacher who talked about using her students’ cultural experiences in planning instruction observed:

Being culturally responsive is just really letting them build up the lesson on their own based on what they know . . . Just seeing their backgrounds helps me decide what I am going to teach. It is different than other years when I had this “a through z” plan. And it is okay that I have gotten off the beaten path, because I will tell you, their learning has grown ten-fold.

Another teacher stated, “I see more improvement in their learning. Students are more eager in improving their learning because of using culturally responsive instruction.”

Some participants related that incorporating students’ cultural backgrounds into planned learning experiences resulted in students independently making connections. In describing her students and culturally responsive instruction, a second-grade teacher commented, “Kids are making connections on their own. They see me making connections, comparing and contrasting and doing more of that. They are starting to do that on their own. They are making those connections themselves.”

During their interviews, many teachers expressed their beliefs that their students’ reading, writing, and speaking practices had improved as a result of implementing culturally responsive instruction. One kindergarten teacher participating in the professional development described the impact of culturally responsive practices on her students’ learning, language, and literacy:

It has allowed a lot more conversations to take place, and I feel my students’ social skills have multiplied. Some of my students at the beginning of the year couldn’t form sentences, let alone form a question. And now we are actually forming and writing questions. . . It’s not just that they are better at reading. They are better at writing as well, so it has extended their literacy . . .

The value of student collaboration was noted by a number of teachers as facilitating student learning. A fourth-grade teacher described the benefits of student collaboration as she elaborated on culturally responsive instruction as it provides:

. . . the ability for students to pull their background knowledge, especially like in science when we do a lot of experiments or hands-on activities. Some of them have been exposed to more things than others, so when they get to share their ideas, they come together. And it really helps to facilitate learning.

A number of teachers observed that students' academic vocabularies improved through implementing culturally responsive instruction. One teacher related that, "I feel like being mindful of vocabulary words and being very explicit and specific in vocabulary words has really paid off." A kindergarten teacher recounted how bridging the gap with parents of her ELL students had benefitted students' reading and speaking in English, as she stated:

My ESL students were really struggling at reading, so I tried to figure out a way to bridge that gap with parents and get help from home. The results have been amazing. A child who couldn't speak much English, she tripled her words in three months.

Increased student engagement. One of the primary benefits of practicing culturally responsive instruction named by many teachers was enhanced student engagement. Teachers remarked that their students were "more eager to learn and more excited to learn," and "the engagement was better" when students chose writing topics or participated in inquiry units. A second grade teacher described how allowing students to make choices affected student interest in her classroom:

I try to give them more of a free choice in how they go about working together in groups or come up with ways to learn what they want to learn. In the past, it has been more teacher driven. But this year I tried to let the students do more on their own. We kind of let them lead the discussions . . . We didn't want to stop the conversations because they were really into it.

Enhanced classroom relationships. Several teachers responded that classroom relationships among their students had improved through culturally responsive instruction. One first grade teacher stated that, "the biggest success I have had with being more culturally responsive is my classroom climate is wonderful. . . My ELLs feel like they are not only a part of the learning, but the teaching, and that makes them so proud."

Teachers also commented that their students wanted "to be more like a family . . . trying to build a little community," that "social skills have multiplied," and that their students have a "sense of community and trust." Student collaboration was described by a kindergarten teacher who remarked that she had seen "a lot of great group work in other classrooms and in our classroom."

One primary teacher described how her students supported each other in learning:

I have one student who speaks entirely Spanish, and when I have kids that can fill in with a Spanish word or 'tie in' . . . and they feel comfortable with doing that and empowered about helping her in her language. To me, that is a huge success. When one of the

other students helps her . . . it kind of gives me goosebumps, because it is great. They are really wanting to help her understand.

Heightened teacher learning. Another outcome from the CRIOP professional development mentioned by several teachers was that their own learning had improved. Among the comments that teachers gave were statements that as a result of the professional development, they “learned a lot”, that they had learned from their students’ backgrounds, and that the professional development helped “to identify different cultural responses that might affect how a student learns”. Another teacher stated that she got “great ideas” and new perspectives from the model lessons presented by school coaches.

Improved instructional practices. During the spring administration of the post-observation teacher interview, participating teachers were asked about their perceptions of the CRIOP professional development. Many teachers stated that through the professional development, they were “encouraged to try new things” and that the project director and school-based coach provided multiple instructional resources for classroom instruction and for help with individual students. Teachers expressed that the professional development was very helpful for instructional planning, for facilitating student engagement and learning, and for working with English language learners. As a result of participating in a CRIOP professional development session on language structure and working with English language learners, one kindergarten teacher described her growth in classroom instructional practices as she stated, “I feel like I have a better grasp on reading and writing right now.” Another primary teacher reflected that planning instruction that supports English language learners was also beneficial for the native English speakers in her classroom as she stated:

I really learned how to make sure that we use . . . the WIDA standards and correlate it with our standards to really hone in on those ESL students. And that was effective even for the other students, because those are skills that they need.

One teacher who stated that she learned best practices for “planning targeted and specific instruction” which she could “directly apply in the classroom” described the professional development as “very effective”. Several teachers reflected that the school-based coaching provided strategies they could readily implement. A number of teachers commented that grade-level planning with the project director or school-based coach was the most helpful aspect of the professional development.

Classroom modeling of lessons, discourse protocols, and learning inquiry activities provided by the CRIOP school-based coaches were described by many teachers as enhancing their classroom instruction. One primary teacher stated that when her CRIOP school-based coach models lessons, “shows us ideas, she has ideas. She will help us plan lessons to make

them more culturally responsive and to make them more engaging for the students, and that has been super helpful.” Another teacher related that, “I got such great ideas from the model lessons. I would always get a new perspective on how I could do this better.” A first grade teacher stated that the CRIOP school-based coach talked to her about “the different ways that the kids can interact with one another. . . She taught me different ways to interact with my students; more engaging ways that I would have never thought of.”

Teacher perceptions about challenges. During post-observation conferences, teachers were asked about the challenges they faced in implementing culturally responsive instruction and the elements of the CRIOP. Major themes included language barriers, parent involvement, understanding culturally responsive instruction, and instructional decision making related to standards-based lesson planning.

Language barriers. Several teachers in the professional development program stated that language barriers were their biggest challenge in implementing culturally responsive instruction in their classrooms. A number of teachers spoke about their difficulties in communicating with their ELL students. One kindergarten teacher mentioned that her ESL students didn’t volunteer information about their homes:

One of my ESL students is just very quiet and very soft spoken, so I really haven’t gotten to know a lot about her at home. Even if I sit with her. It is just that language. So, I probably should have mom take pictures so that she can describe things.

Another teacher described her biggest challenge as a lack of ability to negotiate the language barrier and knowing strategies to help her non-native English-speaking students:

My biggest challenge is, . . . with my Hispanic students especially. . . I don’t know how else to do this definitely. “I don’t know how else to help you understand this. . . . My resources are depleted. I don’t know what else I can do for you.” Sometimes it is a language barrier, but sometimes I just really don’t know any more strategies to help make that light bulb come on.

Teachers also related that the language barrier was a challenge when they were communicating with parents who are non-native English speakers. One first-grade teacher with many Spanish-speaking students in her classroom described her attempts to communicate with parents of her ELL students, “I can’t just zip a note. It has to go through the process of someone translating it. If I have parent teacher conferences, if I don’t have a translator, that is a problem.”

Another teacher described her challenges of communicating with the families of her non-native English-speaking students:

I don't speak Spanish, and I don't know how to say things. . . . I wanted to bridge the gap between parents, because it is hard to communicate when you have a language barrier there. So, I wanted to try to figure out, "How am I going to connect with them? How am I going to call them and tell them that their child did this?"

One kindergarten teacher recounted that her biggest challenge with implementing culturally responsive instruction was involving parents in their child's learning:

I found that the biggest challenge is pushing . . . homework. Sometimes I don't know how to explain . . . the homework. The parents have no idea how to help the students, and homework doesn't always translate right over into English. I want parents more involved, but I don't know how to get them involved and get it translated over into English.

Parental involvement. Encouraging family involvement was mentioned by a number of teachers as their biggest challenge in implementing culturally responsive instructional practices. One kindergarten teacher related that, "I want parents more involved, but I don't know how to get them involved." A first-grade teacher gave the following description of her challenge with implementing culturally responsive instruction:

Probably the biggest thing would be that family component, and getting families in here and bringing some of that history into the classroom. I think for some of them, they work, and then the families having little ones, they can't bring them in or don't have anyone to watch them.

Understanding culturally responsive instruction. During the interviews, several teachers stated that their biggest challenge with implementing culturally responsive instruction is a lack of understanding of culturally responsive practices. Some teachers expressed their uncertainty that they were using culturally responsive instruction effectively, while others described their lack of understanding of different cultures and how to help students understand cultural differences. One teacher related her concern about understanding students' cultural backgrounds as she stated:

I think one of my biggest challenges would be just trying to understand that everyone comes from something different . . . I don't ever want to offend anybody, and that is just a challenge because you don't want to overstep your boundaries. So it is just a challenge knowing that everyone is different and how you need to reach everyone of those kids in the classroom. You know? That is a big responsibility on someone's shoulders.

Instructional decision making. A challenge that many teachers expressed during their interviews was feeling they had the freedom to integrate culturally responsive instructional practices into their core content and standards based lessons. Teachers often expressed frustration with curricular constraints. During her interview, a first-grade teacher responded to a question about the biggest challenge of incorporating culturally responsive instruction:

I think the biggest problem is just trying to incorporate it in every lesson. That is very difficult, mostly because of the tight bonds around curriculum. I think that that is one of the most difficult things . . . I have gotten better with that throughout the year. At the beginning of the year, I felt like I was up against a wall. But now I am seeing I can put it here, and it will make sense.

The pressures to incorporate standards into lessons, the expectations for state testing, and the resulting limitations to implementing culturally responsive instruction were described by one participating teacher during her interview:

We haven't used it [culturally responsive instruction] like we'd like to. . . . I think if we can truly do the culturally responsive instruction, . . . I think they [students] would do much better. I think they would come out better readers, which would give our . . . school system better scores. . . I think to get it truly in place is the biggest challenge and having the flexibility in the classroom to make some decisions . . . about how a student needs to receive . . . instruction. . . It's a huge challenge, feeling like they trust you enough to do that.

A number of teachers expressed the perception that school administrators questioned the inclusion of culturally responsive instruction in lesson planning, which resulted in decreased implementation of culturally responsive practices. One teacher stated that administrative responses to plans for culturally responsive instruction affected teacher enthusiasm for implementation:

We would come back to administrative meetings and have it [culturally responsive lesson] questioned as to how we're going to be testing that; how is that measurable. When you're excited about implementing it [culturally responsive instruction] and then get in your team meeting, and it's questioned, that's been kind of defeating. Not kind of; that's been defeating.

Another teacher described the difficulties that teachers at her school encountered when attempting to incorporate culturally responsive instruction while meeting the expectations of school administrators for writing lesson plans:

A problem we have is an expectation of how our lesson plans should be written, per administration. I feel like it's been hard to mesh them [culturally responsive instruction]; to mesh what our expectation is, per administration, plus to get the CRIOP in there. I think there needs to be, "This is what administration wants, and this is what CRIOP is, and this is what it should look like; this is what your lesson plans should look like." Because we have to type them all up in a certain format.

Evaluation of Outcomes

Project objectives included increasing ELL student achievement in participating schools and increasing teachers' sense of efficacy for implementing culturally responsive practices for teachers who participate in the professional development model. The evaluation examined the progress toward meeting those objectives during the first year of the project.

Outcome Measures, Data Collection, and Analyses

Teacher surveys. The Culturally Responsive Teaching Survey (CRTS) consists of two scales designed to assess teachers' self-efficacy for implementing culturally responsive instruction and their beliefs regarding expected outcomes of culturally responsive teaching practices (Siwatu, 2007). The Culturally Responsive Teaching Self-Efficacy Scale (CRTSE) includes 40 items developed to measure teachers' confidence in their abilities to utilize culturally responsive teaching practices. Teachers are asked to give a rating for each item with a response of 0 (no confidence at all) to 100 (completely confident) on a 100-point Likert-type scale. Samples of items from the instrument relate to teacher's confidence to "use students' cultural background to help make learning meaningful," "model classroom tasks to enhance English Language Learners' understanding," and "use examples that are familiar to students from diverse cultural backgrounds" (Siwatu, 2007).

The other component of the CRTS is the Culturally Responsive Teaching Outcome Expectancy Scale (CRTOE), a 26-item measure of teachers' beliefs regarding culturally responsive instructional practices and student outcomes (Siwatu, 2007). Teachers use a 100-point scale to rate their beliefs that a given behavior will have a positive outcome by indicating their level of confidence on a 100-point scale ranging from 0 (entirely uncertain) to 100 (entirely certain). Some examples of items from the CRTOE are "providing English Language Learners with visual aids will enhance their understanding of assignments" and "helping students from diverse cultural backgrounds succeed in school will increase their confidence in their academic ability" (Siwatu, 2007). Factor analysis confirmed reliability of the two measures comprising the survey. Internal reliability of the CRTSE was .96, as estimated by Cronbach's alpha, and reliability of the CRTOE was .95, as estimated by Cronbach's alpha (Siwatu, 2007).

Teachers participating in the CRIOP professional development program completed the CRTS at the beginning of the training and again at the end of the school year. Reliability analyses were conducted for the CRTSE survey and the CRTOE survey. The fall administration CRTSE survey had a Cronbach's alpha of .97, while the spring administration CRTSE survey had a Cronbach's alpha of .97. The fall administration CRTOE survey had a Cronbach's alpha of .97, while the spring administration CRTOE survey had a Cronbach's alpha of .98.

Measures of Academic Progress (MAP). The Measures of Academic Progress (MAP) assessment, developed by the Northwest Evaluation Association (NWEA), is an adaptive computerized assessment aligned to state testing standards for reading and mathematics (2013). The test may be given to students during the fall, winter, and spring of the academic year and may be utilized to track student performance and progress. Student performance is reported through an RIT score, percentile, and a Lexile range.

Research conducted by NWEA reports that the test accurately predicted students' performance on the Kentucky Performance Rating for Academic Progress (K-PREP) state tests in reading and mathematics with 77-83% accuracy for students in grades 3- 8 (2013). However, evidence of the validity and reliability of the instrument is lacking for grades K – 2. MAP assessments were administered to students at two participating schools during the 2012-2013 academic school year.

Achievement data for students enrolled in participating teachers' classrooms in these schools were collected for the fall and spring administrations of MAP tests.

ThinkLink. The ThinkLink assessment, developed and distributed by Discovery Education, is a grade-level evaluation tool linked with state standards for reading, math, and content areas (Discovery Education, 2007). Students' scores on the assessment are reported for the number of correct responses, the percentage of correct responses, and the achievement level (novice, apprentice, proficient, or distinguished) likely correlated with earned scores. The test may be administered three times during the school year and student progress may be tracked. Internal research by the developers reports that tests have content validity and "reliabilities of .85 or greater as measured by Cronbach's alpha" (Smith & Shrago, 2006). However, additional evidence through peer-reviewed research is lacking.

The ThinkLink assessment was administered at two of the schools participating in the professional development program. At these schools, students at every grade level participated in testing in the fall, winter, and spring of the school year, and achievement data for students enrolled in participating teachers' classrooms were collected from the fall and spring tests.

Outcome Results

Teacher efficacy. Results from participants' responses from two administrations, fall and spring, of the Culturally Responsive Teacher Survey (CRTS; Siwatu, 2007) were analyzed. Teachers' self-efficacy for implementing culturally responsive instruction was measured by the Culturally Responsive Teaching Self-Efficacy Scale (CRTSE). The other component of the CRTS, the Culturally Responsive Teaching Outcome Expectancy Scale (CRTOE), measured participants' beliefs regarding culturally responsive instructional practices and student outcomes (Siwatu, 2007).

Statistical analyses were conducted to determine if intervention may have had any significant effect on teachers' scores on the CRTSE and CRTOE inventories. Of the original 27 teachers who completed fall administrations of the CRTSE and CRTOE inventories, two did not complete the spring administrations, leaving an n of 25 for analyses. Teacher efficacy for implementing culturally responsive instruction as measured by CRTSE increased for 21 of the 25 full-year teacher participants (84%). Repeated measures ANOVAs were utilized in order to provide effect sizes for any significant findings.

Effect of professional development on teachers' CRTSE scores. Evaluators hypothesized that teachers who participated in the professional development would show significantly higher spring self-efficacy survey scores ($p < .05$). A repeated measures ANOVA was conducted using summed fall CRTSE surveys as a pretest and summed spring CRTSE surveys as a posttest.

A one way repeated measures ANOVA was conducted to determine if teachers' summed scores on CRTSE surveys increased significantly from fall pretests ($\bar{x} = 2846.88$, $s = 544.43$) to spring posttests ($\bar{x} = 3266.08$, $s = 422.41$). Results show that CRTSE scores were significantly higher posttest, Wilks's $\Lambda = .50$, $F(1, 24) = 23.95$, $p < .001$, partial $\eta^2 = .50$ (see Table 6).

Effect of professional development on teachers' CRTOE scores. Evaluators hypothesized that teachers who participated in the professional development would show significantly higher posttest CRTOE survey scores ($p < .05$). A repeated measures ANOVA was conducted using fall CRTOE survey scores as pretests and spring CRTOE survey scores as posttests.

A one way repeated measures ANOVA was conducted to determine if teachers' summed scores on CRTOE surveys increased significantly from fall pretests ($\bar{x} = 2262.60$, $s = 267.66$) to spring posttests ($\bar{x} = 2326.52$, $s = 298.63$). Results show that posttest CRTOE scores were not significantly higher than pretests, Wilks's $\Lambda = .95$, $F(1, 24) = 1.17$, $p = .29$ (see Table 6).

Table 6

CRTSE and CRTOE Survey Scores

Survey	Fall		Spring		Change
	Mean	Standard Deviation	Mean	Standard Deviation	Mean
CRTSE	2846.88	544.43	3266.08	422.41	419.20*
CRTOE	2262.60	267.66	2326.52	298.63	63.92

* is significant at $p < .001$.

Student achievement. Participants in this study consisted of 589 students (boys $n = 295$, 50.1%; girls $n = 288$, 48.9%, missing data $n = 6$) at four elementary schools (see Table 7). Of the 589 students, 474 (80.5%) received free or reduced lunch, and 147 (25% of total sample; 72 boys, 49%; 75 girls, 51%) were classified as English Language Learners (ELLs). Information on student grade level and ethnicity may be found in Tables 8 and 9. Information on ELLs' grade level membership may be found in Table 10.

Table 7

Number of Students at School Sites

Statistic	School				Total
	School 1	School 2	School 3	School 4	
Frequency	325	44	89	131	589
Percentage	55.2%	7.5%	15.1%	22.2%	100%

Table 8

Students by Grade

Statistic	Grade					Total
	Kinder	First	Second	Third	Fourth	
Frequency	134	199	148	22	86	589
Percentage	22.8%	33.8%	25.1%	3.7%	14.6%	100%

Table 9

Student Characteristics by Ethnicity

Statistic	Ethnicity						Total
	Caucasian	African American	Hispanic	Asian American	Other	Missing	
Frequency	213	159	174	2	33	8	589
Percentage	36.2%	27.0%	29.5%	0.3%	5.6%	1.4%	100%

Table 10

ELL Students by Grade

Statistic	Grade					Total
	Kinder	First	Second	Third	Fourth	
Frequency	48	46	38	8	7	147
Percentage	32.7%	31.3%	25.9%	1.6%	1.4%	100%

Student achievement and teacher professional development. In order to investigate any relationships between teachers' participation in the culturally responsive instruction professional development program and student achievement, numerous analyses were conducted to measure learning gains for all students and for English Language Learners. During the school year, students ($n = 589$) were administered standardized tests to measure reading ability and mathematical ability. Tests were administered three times during the school year; fall, winter, and spring. For analyses, fall administrations will function as pretests and spring administrations will function as posttests. Students took two different types of standardized tests, the Measures of Academic Progress Test in both reading and mathematics, and the Discovery Education Assessments, also known as ThinkLink assessments, in both reading and mathematics. For various reasons endemic to public education, such as student mobility and absenteeism, not all students took each test administration. See Tables 11 and 12 for descriptive data of students by test.

Table 11

Number of Students Taking MAP Tests by Administration

Test	Fall		Spring	
	MAP Reading	MAP Math	MAP Reading	MAP Math
Student n	430	428	438	436

Table 12

Number of Students Taking ThinkLink Tests by Administration

Test	Fall		Spring	
	ThinkLink Reading	ThinkLink Math	ThinkLink Reading	ThinkLink Math
Student n	126	65	126	64

MAP reading performance. A one way repeated measures ANOVA was conducted to determine if students' scores ($n = 412$) on MAP reading tests increased significantly from fall administrations ($\bar{x} = 156.50$, $s = 17.10$) to spring administrations ($\bar{x} = 172.28$, $s = 16.57$). Results show that students' MAP reading scores were significantly higher at spring administration, Wilks's $\Lambda = .32$, $F(1, 411) = 889.26$, $p < .001$, partial $\eta^2 = .68$.

ThinkLink reading performance. A one way repeated measures ANOVA was conducted to determine if students' scores ($n = 120$) on ThinkLink reading tests increased significantly from fall administrations ($\bar{x} = 17.58$, $s = 7.13$) to spring administrations ($\bar{x} = 21.41$, $s = 7.06$). Results show that students' ThinkLink reading scores were significantly higher at spring administration, Wilks's $\Lambda = .64$, $F(1, 119) = 67.63$, $p < .001$, partial $\eta^2 = .36$.

MAP mathematics performance. A one way repeated measures ANOVA was conducted to determine if students' scores ($n = 410$) on MAP mathematics tests increased significantly from fall administrations ($\bar{x} = 156.95$, $s = 17.48$) to spring administrations ($\bar{x} = 176.39$, $s = 15.96$). Results show that students' MAP mathematics scores were significantly higher at spring administration, Wilks's $\Lambda = .18$, $F(1, 409) = 1877.85$, $p < .001$, partial $\eta^2 = .68$.

ThinkLink mathematics performance. A one way repeated measures ANOVA was conducted to determine if students' scores ($n = 62$) on ThinkLink mathematics tests increased

significantly from fall administrations ($\bar{x} = 15.18, s = 5.71$) to spring administrations ($\bar{x} = 17.18, s = 5.60$). Results show that students' ThinkLink mathematics scores were significantly higher at spring administration, Wilks's $\Lambda = .83, F(1, 61) = 12.36, p = .001, \text{partial } \eta^2 = .17$.

Achievement for ELLs. In order to investigate any relationships between intervention and ELL student performance, numerous analyses were conducted to measure learning gains for ELL students ($n = 147$).

English Language Learners' (ELL) reading performance. ELL Students in this study ($n = 147$) took two types of reading tests. The majority of ELL students completed the MAP reading tests ($n = 124$), while others ($n = 23$) completed the ThinkLink reading tests. One ELL student did not take both pretest and posttest MAP reading tests, leaving that group with 123 students for analysis. Six ELL students did not take both pretest and posttest ThinkLink Reading tests, leaving that group with 17 students for analysis.

English Language Learners' (ELL) MAP reading performance. A repeated measures ANOVA was conducted using fall MAP reading scores as a pretest and spring MAP reading scores as a posttest. A one way repeated measures ANOVA was conducted to determine if ELL students' ($n = 123$) reading ability increased significantly from fall MAP reading pretests ($\bar{x} = 151.33, s = 15.46$) to spring MAP reading posttests ($\bar{x} = 168.44, s = 15.47$). Results show that reading ability as measured by MAP reading tests was significantly higher posttest, Wilks's $\Lambda = .23, F(1, 122) = 404.77, p < .001, \text{partial } \eta^2 = .77$ (see Table 13 for scores and growth by grade).

Of the 122 students who took the MAP reading fall and spring tests, 98% ($n = 119$) gained in MAP reading performance from fall to spring administrations (change $\bar{x} = 17.11, s = 9.43$). Reading gains were observed across all grades: Kindergarten increase $\bar{x} = 20.91, s = 8.80$; first grade increase $\bar{x} = 15.19, s = 6.62$; second grade increase $\bar{x} = 14.40, s = 11.49$.

Table 13

ELL's MAP Reading Scores

Grade (number of students)	Fall		Spring		Change
	Mean	Standard Deviation	Mean	Standard Deviation	Mean Growth
Kinder (48)	136.28	7.94	156.52	11.03	20.24
First (42)	156.95	8.71	172.14	12.57	15.19
Second (37)	164.56	12.61	179.38	14.68	14.82

English Language Learners' (ELL) ThinkLink reading scores. A repeated measures ANOVA was conducted using fall ThinkLink reading scores as a pretest and spring ThinkLink reading scores as a posttest. A one way repeated measures ANOVA was conducted to determine if ELL students who took the ThinkLink reading tests ($n = 17$) reading ability increased significantly from fall pretests ($\bar{x} = 14.53$, $s = 5.48$) to spring posttests ($\bar{x} = 18.06$, $s = 6.64$). Results show that reading ability as measured by ThinkLink reading scores was significantly higher posttest, Wilks's $\Lambda = .64$, $F(1, 16) = 9.05$, $p = .008$, partial $\eta^2 = .36$.

Of the 17 students who took the ThinkLink Reading tests, one gained two ability levels, four gained one ability level, 11 remained at the same level, and one decreased one level between fall and spring administrations. In terms of change in scores between fall and spring administrations, 65% of students ($n = 11$) increased scores, 17.5% of students ($n = 3$) remained unchanged, and 17.5% of students ($n = 3$) decreased scores.

English Language Learners' (ELL) mathematics performance. ELL students in this study ($n = 147$) took two types of mathematics tests. The majority of ELL students completed the MAP mathematics test ($n = 124$), while others ($n = 23$) completed the ThinkLink Mathematics test. Ten ELL students did not take both pretest and posttest ThinkLink reading tests, leaving that group with 13 students for analysis.

English Language Learners' (ELL) MAP mathematics scores. A repeated measures ANOVA was conducted using fall MAP mathematics scores as a pretest and spring MAP mathematics scores as a posttest. A one way repeated measures ANOVA was conducted to determine if ELL students' ($n = 124$) mathematical ability increased significantly from fall MAP

pretests ($\bar{x} = 153.02, s = 18.32$) to spring MAP posttests ($\bar{x} = 174.40, s = 15.68$). Results show that mathematical ability as measured by MAP mathematics scores was significantly higher posttest, Wilks's $\Lambda = .16, F(1, 123) = 633.21, p < .001, \text{partial}\eta^2 = .84$ (see Table 14 for scores and growth by grade).

Of the 124 students who took the MAP Mathematics tests, 98% ($n = 122$) gained in MAP mathematical performance from fall to spring administrations (change $\bar{x} = 21.38, s = 9.46$).

Mathematical gains occurred across all grades: Kindergarten increase $\bar{x} = 26.97, s = 10.71$; first grade increase $\bar{x} = 19.91, s = 10.71$; second grade increase $\bar{x} = 15.94, s = 7.1$.

Table 14

ELL's MAP Mathematics Scores

Grade (number of students)	Fall		Spring		Change
	Mean	Standard Deviation	Mean	Standard Deviation	Mean Growth
Kinder (46)	133.89	9.27	160.45	12.36	26.56
First (42)	159.88	11.70	179.79	12.40	19.91
Second (36)	169.47	9.63	185.68	9.70	16.21

English Language Learners' (ELL) ThinkLink mathematics scores. A repeated measures ANOVA was conducted using fall ThinkLink Mathematics scores as a pretest and spring ThinkLink Mathematics scores as a posttest. A one way repeated measures ANOVA was conducted to determine if ELL students' ($n = 13$) mathematical ability increased significantly from fall ThinkLink mathematics tests ($\bar{x} = 13.92, s = 4.17$) to spring ThinkLink mathematics tests ($\bar{x} = 16.85, s = 5.18$). Results show that mathematical ability as measured by ThinkLink mathematics scores was significantly higher posttest, Wilks's $\Lambda = .58, F(1, 12) = 8.83, p = .01, \text{partial}\eta^2 = .42$.

Of the 13 students who took the ThinkLink Mathematics tests, two gained two ability levels, three gained one ability level, six remained at the same level, and one decreased one level between fall and spring administrations. In terms of change in scores between fall and spring administrations, 69% of students ($n = 9$) increased scores, 15.5% of students ($n = 2$) remained unchanged, and 15.5% of students ($n = 2$) decreased scores.

English Language Learners' (ELL) MAP growth gains. In order to get a clearer picture of how ELLs learning gains compared to expected growth, scoring data provided by Northwest Evaluation Association (2013), the company that creates MAP tests, was consulted. For each grade there are expected fall and spring test scores for each grade in both reading and mathematics. Growth targets were calculated by subtracting the fall administration expected score from the spring administration expected score. For comparisons of students in this study to calculated growth norms, see Table 15. ThinkLink scores and gains for ELLs are represented in Table 16.

Table 15

English Language Learners' MAP Reading and MAP Mathematics Growth

Grade	MAP Norm Reading Growth	Mean ELL Reading Growth	% making Norm Reading Growth	MAP Norm Math Growth	Mean ELL Math Growth	% making Norm Math Growth
Kinder	15.2	20.24	76%	15.4	26.56	87%
First	16.6	15.19	36%	16.2	19.91	74%
Second	13.7	14.82	57%	13.1	16.21	72%

Note. **Bold:** gains > one year's growth.

Table 16

English Language Learners' ThinkLink Reading and Math Growth

Test	Fall		Spring		Change
	Mean	Standard Deviation	Mean	Standard Deviation	Mean Growth
Reading	14.53	5.48	18.06	6.64	3.53
Math	13.92	4.17	16.85	5.18	2.93

Comparison of gains by gender, ethnicity, ELL, and free/reduced lunch. In order to determine whether or not learning gains were significantly higher for students due to sex (boy or girl), ethnicity (Caucasian, African American, Hispanic, Asian American, or Other), English language learner status (yes or no), and/or free reduced lunch (yes or no), a series of 2 (sex) x 5

(ethnicity) x 2 (ELL status) x 2 (free/reduced lunch status) ANCOVAs were conducted on MAP reading, MAP mathematics, ThinkLink reading, and ThinkLink mathematics tests.

MAP reading. A 2 x 5 x 2 x 2 ANCOVA was conducted using gender, ethnicity, English language learner status, and free/reduced lunch as fixed factors, fall MAP reading scores as a covariate, and spring MAP reading scores as a dependent variable. Results showed that there were no significant differences in spring MAP reading scores due to gender, ethnicity, English language learner status, or free/reduced lunch ($p > .05$).

MAP mathematics. A 2 x 5 x 2 x 2 ANCOVA was conducted using gender, ethnicity, English language learner status, and free/reduced lunch as fixed factors, fall MAP mathematics scores as a covariate, and spring MAP mathematics scores as a dependent variable. Results showed that there were no significant differences in spring MAP mathematics scores due to gender, ethnicity, English language learner status, or free/reduced lunch ($p > .05$).

ThinkLink reading. A 2 x 5 x 2 x 2 ANCOVA was conducted using gender, ethnicity, English language learner status, and free/reduced lunch as fixed factors, fall ThinkLink reading scores as a covariate, and spring ThinkLink reading scores as a dependent variable. Results showed that there were no significant differences in spring ThinkLink reading scores due to gender, ethnicity, English language learner status, or free/reduced lunch ($p > .05$).

ThinkLink mathematics. A 2 x 5 x 2 x 2 ANCOVA was conducted using gender, ethnicity, English language learner status, and free/reduced lunch as fixed factors, fall ThinkLink mathematics scores as a covariate, and spring ThinkLink mathematics scores as a dependent variable. Results showed that there were no significant differences in spring ThinkLink mathematics scores due to gender, ethnicity, English language learner status, or free/reduced lunch ($p > .05$).

High vs. low implementation of culturally responsive instruction. In order to determine whether or not implementation of culturally relevant curricula and pedagogy impacted student learning, teachers were separated by scores on the spring CRIOP observations ($\bar{x} = 18.4, s = 3.25$) into HIGH implementation and LOW implementation groups. HIGH implementation teachers ($n = 5$) were defined as those who had Holistic CRIOP spring observation scores at or above one standard deviation from the mean ($\bar{x} \geq 22$), while LOW implementation teachers ($n = 5$) were defined as those who had Holistic CRIOP Spring observation scores at or below one standard deviation from the mean ($\bar{x} \leq 15$). All teachers identified as HIGH and LOW only had students who took MAP reading and MAP mathematics tests; therefore, there are no analyses of ThinkLink tests in the following computations.

Reading performance HIGH vs. LOW CRIOP. Researchers hypothesized that students with teachers identified as HIGH implementers would have significantly higher reading performance on spring tests than students who had teachers identified as LOW implementers ($p < .05$). In order to determine if students with teachers identified as HIGH implementers scored significantly higher on Spring MAP reading tests than students with teachers identified as LOW implementers, a one way ANCOVA was conducted using spring MAP reading tests as a dependent variable, implementation level as fixed factor, and fall MAP Reading tests as a covariate. Results indicate that students with teachers identified as HIGH implementers scored significantly higher than students with teachers identified as LOW implementers on spring MAP reading tests $F(1, 188) = 3.06, p < .05, \eta^2 = .02$ (see Table 17 for adjusted means).

Table 17

MAP Reading HIGH and LOW Implementation Adjusted Means

Dependent variable: Spring MAP Reading Test		
Level	Mean	Std. Error
LOW	173.423 ^a	1.063
HIGH	176.129 ^a	1.115

^aCovariates appearing in the model are evaluated at the following values: Fall MAP Score Reading = 159.80.

Math performance HIGH vs. LOW CRIOP. Researchers hypothesized that students with teachers identified as HIGH implementers would have significantly higher mathematical performance on spring tests than students who had teachers identified as LOW implementers ($p < .05$). In order to determine if students with teachers identified as HIGH implementers scored significantly higher on spring MAP Mathematics tests than students with teachers identified as LOW implementers, a one way ANCOVA was conducted using spring MAP mathematics tests as a dependent variable, implementation level as fixed factor, and fall MAP mathematics tests as a covariate. Results indicate that students with teachers identified as HIGH implementers scored significantly higher than students with teachers identified as LOW implementers on spring MAP mathematics tests $F(1, 186) = 25.39, p < .001, \eta^2 = .12$ (see Table 18 for adjusted means).

Table 18

MAP Math HIGH and LOW Implementation Adjusted Means

Dependent variable: Spring MAP Math Test		
Level	Mean	Std. Error
LOW	176.817 ^a	.692
HIGH	181.936 ^a	.734

^aCovariates appearing in the model are evaluated at the following values: Fall MAP Score Math = 160.83.

Discussion and Conclusions

In the first year of this professional development project, project staff achieved high implementation of the professional development model. During the 2012-2013 school year, 27 elementary teachers participated in the culturally responsive instruction professional development program with high attendance and a robust number of hours of school-based coaching support. Instructors in the higher education institution have modified course content to include standards for English Language Learners and elements of the CRIOP.

Classroom observations and interviews indicate teachers' learning and implementation of new practices gained through the professional development model. Increases in implementation from the fall observation to the spring observation show growth in development over time, and illustrate the power of school-based coaching and mentoring for supporting teachers as they try new approaches in their work with students. Despite challenges that serve as barriers to implementation, teachers perceived positive outcomes for students related to their implementation of the practices they learned through the professional development model.

Outcome results for participating teachers and their students are positive in the first year of the project. Results on the CRTSE indicate participating teachers experienced significant increases in their sense of efficacy for culturally responsive instruction after participating in the project. In the areas of reading and mathematics, students in participating teachers' classrooms made significant gains across the year. There were no significant differences in the progress of English Language Learners and students who were not English Language Learners, which can be interpreted as positive given that English Language Learners did not seem to fall behind in those subject areas. In fact, test results indicate a number of students made greater than one year's gain over the course of the year. Although it is impossible to attribute student progress to the professional development project in the absence of a comparison group, the student

achievement data do serve as supportive documentation of participating teachers' efforts to meet the needs of their English Language Learners over the course of the year they participated in the professional development model, and they provide validation of project staff's efforts to support those teachers.

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