

Assessing the Effectiveness of Teacher Professional Development through

Charlotte Teachers Institute (CTI)

Anthony Ellis

University of North Carolina at Charlotte

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Abstract

Evaluating outcomes of professional development (PD) for teachers within Charlotte-Mecklenburg Schools (CMS) is an important goal related to teacher growth, a core education policy issue. Policymakers are seeking ways to improve outcomes for teachers aimed at increasing content knowledge, improving pedagogical practices in the classroom, and the accurate evaluation of student progress. The purpose of PD in CMS according to its mission statement is to: improve teaching and learning through research-based professional learning that coalesces with the district's strategic goals (CMS, 2017). Teachers ongoing development allows for a culture of learning to manifest and ultimately reach students in the classroom. In 2002, North Carolina passed Session Law 2002-178 which required that teachers during every five-year cycle receive continuing education credits (CEUs) which the legislature believed would allow teachers to increase their instruction abilities and ultimately improve their skills. Through the utilization of regression models and teacher-level responses from an annual questionnaire from the Charlotte Teachers Institute (CTI), I analyzed which independent variables were leading to the greatest impact on the two outcomes measuring teacher attitudes towards their (1) application of skills towards knowledge gained, and (2) confidence in students' abilities. After analyzing impact that attendance at a given number of seminar sessions has within CTI, I found the number of seminars attended to be valuable in producing beneficial results to teachers toward eliciting higher expectations in their students and greater knowledge gain and confidence. Acknowledging the importance of attendance to effective PD will provide greater cost efficiency to CMS by ensuring the design fits what teachers felt helped them improve their abilities the most.

## **Introduction**

The implementation of professional development (PD) for teachers within Charlotte-Mecklenburg Schools (CMS) offers a roadmap to evaluate whether teachers are experiencing the benefits intended. Currently, teachers expect to acquire 8 continuing education credits (CEUs) during a five-year cycle from distinct types of PD that classify as either: college or university courses, local in-service courses, and classes approved by the Local Education Agency (LEA). For teachers, one semester hour is equivalent to 1.5 units of credits. This policy originated from Session Law 2002-178 passed in October 2002 which sought to develop a statewide plan to improve the state's tracking of dropout data (Session Law, 2002-178). Further, Section 5(a) called for the adoption of a policy that required, "kindergarten through eighth grade teachers to take three renewal credits in reading methods courses during each five-year license renewal cycle" (Session Law, 2002-178). The purpose was to identify teachers in addition to superintendents and principals who needed further training to increase their instructional capacity to students. The goal was to develop a manner for these groups to meet the needs of all students including lesser privileged students in a cost-effective manner.

The purpose of PD for teachers is to provide them with a method to develop their own knowledge and skills. Teachers ongoing development allows for a culture of learning to manifest and ultimately reach students who are a key stakeholder. PD gives teachers a chance to study, reflect and practice elements relating to day-to-day teaching that grow from. The learning opportunities from PD offers continuing opportunities for subject-matter mastery as well as to spend time under the supervision of an experienced mentor. Learning about new research, curriculum resources and technological changes keep teachers informed of evolving changes to the profession. Measuring the effectiveness of PD from the vantage point of both teachers and

policymakers will encompass the framework of this paper while also offering a method to analyze the impacts of teacher responses in the dataset.

### **Research Questions**

- Does the number of seminars attended affect teachers attitudes towards their application skills towards knowledge gained?
- Does the number of seminars attended impact teachers' expectations towards their students?

The primary question involves comparing individuals within Charlotte Teachers Institute (CTI) to analyze teachers' responses in the dataset regarding attitudes towards their application confidence regarding knowledge gained from the seminar subject and expectations they have for their students. In the post-seminar survey, teachers respond to a variety of questions which seek to address how they perceive their professional growth. There are additional elements within the analysis that analyze aspects of PD that seek to best prepare teachers for how to improve student achievement. Each of the two main outcomes listed divide into its own section to allow for an analysis of specific predictors that impact the outcome.

### **Literature Review**

One purpose of the literature review will be to analyze sources that provide analysis of effective PD methods, mediums that will allow teachers to improve and the background behind incorporating more development time for teachers. Policymakers are looking for a way to improve outcomes at this level which includes content knowledge, pedagogy in producing lesson plans to students, evaluation of student progress and various other forums. Analyzing this

important due to annual cost of PD. For example, in 2012, the federal government per Former Education Secretary Arnie Duncan reported spending up to \$2.5 billion a year on PD (Layton, 2015). This alone highlights the importance in demonstrated how teachers document their own benefits and whether it is impacting the three key frameworks. Evaluating sources in literature for how to improve teacher quality while capturing how the program translated is essential to conceptualizing methods for improvement. Measuring whether development programs geared towards teachers should enhance or decrease attendance based requirements for teachers in response to their responses in CTI's post-seminar questionnaire is an essential policy objective.

To begin, the book titled *Enhancing Professional Practice: A Framework for Teaching* by Charlotte Danielson addresses the complexities of teacher's work while also focusing on methods to improve their performance in the classroom through targeted PD. Danielson describes four mediums of improvement which include developing knowledge of content, demonstrating knowledge of students, and designing student assessments (Danielson, 2007, p. 32). Continuing to deepen content knowledge requires the ability to adjust quickly due to the rapid expansion of information especially in science and computer technology fields. With this, Danielson specifies that developments in PD relating to pedagogy helps in creating opportunities for educators to increase their knowledge while discovering innovative ways to engage students (Danielson, 2007). For CMS, expanding developments in information technology can allow an avenue of PD that some college and university based programs are already delving into. Another potential framework for improvement could be the creation of New Teacher Assessment and Support (INTSAC) developed by Danielson (2007) which seeks to develop standards for new teachers and creates a portfolio system to track such standards. The application of this type system can provide an overarching forum to group teachers together by type of development

suggested based on subject taught but also allow for the incorporation of new techniques to assess what they have gained. An example of implementation in CMS could be if they used this INTSAC type system for all teachers that complete a given number of CEU's to demonstrate their outcomes against teachers at another level of earned credits. Comparing their outcomes on application of confidence towards the current information technology and expectations of students can help in evaluating which type of PD is providing the greatest initial benefits to certain educators with similar backgrounds. Another key finding in the framework relating to effective PD as a policy objective is the process of understanding how students learn and develop. Although the process of this project entails looking at teacher-level responses, understanding the importance of constructing learning opportunities that support enhanced student learning remains the optimal goal. In doing such, the author uses the examples of communicating with a larger audience but also producing visual presentations that ensure teachers are effectively able to convey their ideas behind to improve student performance.

The next article titled *The Antecedents of Teacher Satisfaction with Professional Development* by Adam Nir and Ronit Bogler presents a unique hypothesis on methods of increasing the PD experience for teachers to elicit the greatest possible benefit for stakeholders. Their hypothesis states that the greater the control that teachers have over their professional learning processes then the greater teachers' satisfaction with their job and subsequent professional development processes (Nir & Bogler, 2008). This theory informs decision-makers that there are multiple developmental aspects that are important to address in the PD program outside of teaching additional information or if the program has an extensive duration. There are five influences on the satisfaction of teachers described which include the circumstances under which instruction takes place, a familiar environment, closeness to home of course instruction,

supervisory processes constructed to fit teachers' needs, and "specific, concrete and practical" information relating to day-to-day activities. Many of these considerations for what makes PD effective correspond to the idea of ensuring that PD connects back to teachers' classroom circumstances. To echo that point, Nir and Bogler further state that PD is most beneficial when administered on an individualized school-based approach that considers the specific curriculum linkage and classroom atmosphere at hand. In a sense, they seek to discover a closeness to home effect through teachers in relation to how they activate higher levels of content knowledge, creativity, leadership, and collaboration. The potential advantages of having school-based instruction programs gives teachers the ability to learn from one another as well as provide unique insights which can result in "organizational learning" (Nir & Bogler, 2008). Ultimately, school-based instruction in a familiar setting can create a dynamic among teachers that offers them constructive feedback and aid in connecting back to the intended goals of development for districts and key stakeholders.

The question of what make a PD program effective encapsulates many parts. The authors of *What makes professional development effective?* Garet et. al (2001) give credence to the fact that PD which focuses on changes in classroom behaviors tends to be the most impactful. In conducting a national evaluation of the Eisenhower Professional Development Program, they attempt to measure the relationship between features of PD and self-reported changes in teachers' knowledge, skills, and classroom practices (Garet, Porter, Desimone, Birman, & Suk Yoon, 2001). The Eisenhower program is a source of funding for professional development that allows several types of support for development activities. These activities include but are not limited to workshops and conferences, task force work, professional networks, and other realms. For their research design, they surveyed a representative sample of teachers who attended any

type of Eisenhower-assisted development activities while also gaining a sample from differing school districts. In gathering teacher responses, the study aimed at analyzing characteristics regarding the design of PD. For instance, core features such as the form of activity, duration of activity and degree to which the activity emphasized group participation as a prominent feature (Garet, Porter, Desimone, Birman, & Suk Yoon, 2001). The second phase involving *duration* plays a key role in my project as well. The authors categorize duration as, “the total number of contact hours that participants spend in the activity, as well as the span of time over which the activity takes place” (Garet, Porter, Desimone, Birman, & Suk Yoon, 2001, p. 920). To measure *collective participation*, they focus on three core features of PD. This aspect diverges from CMS which provides a breakdown based on who offers it (college, local in-service, workshops) versus information taught. The three types include (1) Focus on content, (2) Opportunities for active learning, and (3) coherence with other activities. Activities in the first group regarding content vary in the goals for student learning that they emphasize. While some activities focus on helping students gain a greater conceptual knowledge of the topic, others are more intently aimed at improving student performance on more basic skills such as using science kits or understanding how to use a unit textbook (Garet, Porter, Desimone, Birman, & Suk Yoon, 2001). Coherence to other learning is operationalized as the extent teachers see their PD as part of a clear program promoting teacher learning.

It is key that the breakdown of these measurements operationalize the intended focus towards assess whether teachers in CTI are displaying an increase in their application of skills as well as application of confidence in their students. Thus, if programs are focusing on multiple types of content then this might influence their responses and should set aside in the dataset when documenting which type of PD, the individual teacher received. In their results, the

researchers found duration to exert a considerable influence on the core features of PD. Duration as time spent and contact hours had a substantive positive influence in the opportunities for student learning and coherence with other learning activities. Although the effect of duration is not as great on content knowledge, the independent effect looms larger towards future research in this realm. This study supports the idea that more intensive and sustained PD is likeliest to have the greatest impact on teachers compared to shorter PD which is why it is essential to measure that impact that teachers attending more seminars within CTI had. (Garet, Porter, Desimone, Birman, & Suk Yoon, 2001).

*Professional Development as a Policy Pathway* by Michael Knapp delves into many questions confronting PD including the optimal investment levels, structures, content focus, accountability, and more. Knapp suggest that the relationship between professional learning and student learning opportunities intertwine (Knapp, 2003, p. 113). The reciprocal relationship among each suggest that what occurs in the classroom might work to impact the results or shape how teachers viewed their PD experience. In this way, teachers can learn through how they engage in the profession with their students. Despite this, the ability to assess the influence of PD conveys as difficult by Knapp and others due to the steady influence between strategies developed and the hoped-for effects on learning. One theory discussed is the idea of an “upstream of activities” that pushes policy actions at the state, district, or federal level towards both the implementation of strategies and other state districts which then impacts teachers professional learning (Knapp, 2003, p. 116). Having multiple links creates the question of gaining which array of opportunities professionals can utilize to stimulating further. High-quality professional development per Knapp and others calls upon a concentration of classroom teaching that emphasizes high learning, building pedagogical knowledge content, and aligns with reform

initiatives (Knapp, 2003, p. 119). In noting the types of PD, multiple potential policy tools such as district mandates, district inducements, district-initiated capacity building and district-oriented systemic change can assist development. The formation of capacity-building shapes how teachers can gain their PD. The inclusion of joint-partnerships and outside groups having the ability to produce directed learning opportunities offers an additional avenue. A case study of the New York City Community School District 2 offers a blueprint into how policy can affect implementation. They directed mandates over the type of PD and its content focus, built a series of capacity building structures and re-allocated authority over professional learning to allow schools greater authority. These strategies worked to shift the overall direction of PD while creating a district-wide vision for improvement as well as formulating ideas on “effective” PD at the school-level. The purpose of this case study is to demonstrate how policymaking can build a multilevel infrastructure for professional learning while concurrently boosting incentives for professional learning and enabling teachers (Knapp, 2003, p. 147).

Meeting the challenge of diversity of knowledge as well as diversity of student levels requires PD that targets various realms. Authors Susan O’Hara and Robert Pritchard in *Meeting the Challenge of Diversity: Professional Development for Teacher Educators* seek to demonstrate this increasing need. The purpose in doing so connects with how PD programs are serving teachers’ needs at schools of varying performance levels in addition to Project-Lift schools which requires diversity in how to convey information. The challenge of whether to focus on the application of instruction versus prioritizing content knowledge or evaluation processes is an interesting dynamic that can diverge between who is receiving the development. As O’Hara states, the vital component of any successful teacher preparation requires identifying best practices with respect to preparing teachers in the department that they teach (O’Hara &

Pritchard, 2008). Due to the need for varied PD, two aspects of inclusion become essential. The first specifies that all teachers develop an understanding of the diverse cultural patterns and the historical impact. Secondly, the design of teaching methodologies aid in instructing learners from various cultural backgrounds (O'Hara & Pritchard, 2008). These methodologies can include methods that provide access to academic content in English, as well as access to learning additional languages. While bridging the diversity of knowledge challenge might not seem as a key policy objective at first, it offers a roadmap towards measuring and evaluating action steps for how to improve teacher quality. If the goal is potentially assessing whether development programs should increase (or decrease) the current instruction time, then it is influential to learn how teachers tasked with educating diverse groups of students view their PD experience. Therefore, in the dataset from CTI, it is essential that the intended students for instruction listed allows for a comprehensive breakdown. The framework when analyzing teacher responses requires examining the students as “stakeholders”. Recognizing the differences among them is necessary because it can analyze whether students are at differing learning capabilities. The empowerment of students and use of technology by teachers and students can offer another way to assess the application of skills gained from PD.

CTI's development program provides an innovative partnership with both UNC Charlotte and Davidson (Charlotte Teachers Institute, 2016). CTI is a collaborative partnership program including CMS, UNC Charlotte, and Davidson that allows teachers the opportunity to attend intensive semester-long seminars with collegiate and CMS instructors. Each year is the beginning of a new seminar program for teachers that are attending for their first-time or have prior experience. This program is unique because it does not fit directly into the three types of specified PD mentioned but instead allows CMS teachers to take a prominent position while

developing leadership skills and taking an active role in recruiting fellows. Teacher representatives also assist in selecting topics that they believe will interest teachers (Charlotte Teachers Institute, 2016). Through this they offer five distinct goals and outcomes that they seek for fellows to gain. The five goals include: (1) Empowering teachers through an effective professional and leadership development program, (2) Increasing teacher retention, (3) Expanding and deepening teachers overall subject knowledge, (4) Encouraging curriculum development, and (5) Building strong educational communities. In one year, each seminar session lasted over the course of spring and fall sections of the school year and in totality CTI fellows are expected to accumulate 30 hours of development time including that spent on homework assignments and additional activities. For this project, questionnaire data from 2009-2013, and 2015 offers a valuable tool to connect teacher-level variables with individuals within CMS who have participated in another program or none previously. The *Collective Pedagogical Teacher Culture and Mathematics Achievement: Differences by Race, Ethnicity, and Socioeconomic Status* (2013) study examined the effects of organizational cultures on students' achievement pathway while identifying the impact of socioeconomic dynamics. They found both strong community orientation and teacher collaboration to be separate but key factors for reducing racial and socioeconomic gaps in achievement (Moller, et al., 2013). The impact of teacher collaboration through CTI and other development programs ultimately impacts student success since analyses by Moller et al. (2013) show students' math performance can grow by altering the organizational culture of schools.

## **Hypothesis**

When comparing individuals within CTI, those who gain more direct experience in the program will express a higher confidence in their application of skills, and greater expectations

of their student's abilities. The causal mechanism of time spent in seminar allows teachers the ability to gain greater knowledge of both pedagogy and subject matter which in turn will boost their response to how the PD benefitted them. Someone who attends more seminar meetings within a given year will view their commitment to the profession at a higher level than one who engages in fewer opportunities. The number of seminars attended offers a method to examine the opportunities teachers had to grow their wealth of knowledge and other benefits as part of their PD experience.

## **Research Design**

### Dataset

For this project, I utilized six years of post-seminar questionnaire data from fellows that completed the CTI program from 2009-2013 and 2015. This data analyzed through SPSS software allowed for a complete analysis of multiple facets including the descriptive statistics of relationship assessed. The questionnaire data provided a large enough sample size with 503 fellows surveyed across six years. Although there are 503 fellows surveyed, the number of unique responses from those with "no prior experience" in the program is 298, while the number of fellows without prior experience is 205. Including both groupings in that dataset was essential to evaluating the potential impact because fellows within a given year might have attended a different number of seminars from any year prior. Each individual year included in the dataset varied in participants by year as well as fellows with prior experience. From 2009 through 2015 the number of participants per year: 48 (2009), 90 (2010), 82 (2011), 93 (2012), 98 (2013), and 92 (2015).

## Variables

**Outcome Variables.** Through the analysis of CTI's dataset, it was important to incorporate outcome variables predicated on literature regarding how to improve quality teaching and methods for PD to foster that developed. This path led to two outcome variables that assess attitudes towards teaching based on their: (1) application of skills towards knowledge gained, and (2) application of confidence in students' abilities. Application of skills, operationalized as "*Content Knowledge and Confidence*" features a Likert-scale organization from "1. strongly disagree" to "5. strongly agree" that includes five overall categories. Operationalizing variables such as these using the logit ordered regression was key to measuring teacher's level of agreeableness based on knowledge gained and subsequent confidence in their ability to teach it moving forward. Addressing whether individuals who completed CTI's semester-long program believed that they gained knowledge and the ability to teach the subject to their students or "stakeholders" provides a key barometer in ultimately improving student outcomes. The second outcome variable measuring if teacher's have "*higher expectations*" for their students to learn about the seminar subject is crucial because having increased expectations offers teachers the opportunity to enhance the level of support provided to students. Like the first outcome variable, *Higher Expectations* is operationalized as a Likert-scale response. Each outcome variable allowed for a unique analysis to measure teachers who had varying years of experience in the program when providing their attitudes based within each year.

**Independent Variables.** My main independent variable measured how many seminars individuals attended within one year. Teachers had the opportunity to attend up to a maximum 12 seminars sessions. After recoding the data, a continuous scale from 0 to 12 measured the number

of seminars each teacher attended in one year. For example, a teacher in 2009 could have attended a different number of seminars from what they attended the next year in 2010. Since CTI creates new seminar focuses each year, I hypothesized that attendance would be essential towards receiving the intended outcomes of the program. Developing further insight into the effect that the number of seminars attended guided the inclusion of multiple control variables to observe if different relationships emerge that varies from my stated hypothesis. Control variables provide a key framework within analysis to measure the relationship between the I.V. and D.V. while holding other elements constant. Through the analysis, I incorporated a group of control variables including what attracted individuals to the program, students intended to teach, PD requirements, and degrees received.

Many of the control variables used could have potentially worked as a main independent variable in further studies since these variables offered a substantial benefit through the two models.

**Table 1: Questionnaire Items**

<b>Variable</b>	<b>Question</b>
Higher Expectations	Please select the one response that best applies to each of the following statements. – As a result of the seminar, I have a higher expectation of my students’ ability to learn about the seminar subject
Content Knowledge and Confidence	Please select the one response that best applies to each of the following statements. – By participating in the seminar I gained knowledge of my subject and confidence in my ability to teach it
Seminars Attended	How many of the 12 required seminar meetings did you attend?
Attraction to Program: Work with UNCC/Davidson Faculty	Which of the following attracted you to participate in the Institute this year? – opportunity to work with UNC Charlotte/Davidson faculty members
Attraction to Program: Opportunity to Develop Curriculum Fit Needs	Which of the following attracted you to participate in the Institute this year? – opportunity to develop curriculum that fits my needs
Below Grade Level	For which of the following groups of students is your unit designed? – Below grade level students

Meet PD Requirements	How much has CTI helped you meet NC and/or CMS professional development requirements (e.g., Teacher Evaluation Process criteria)?
M.A. Ed Degree	What undergraduate and graduate degrees and teaching certificates do you hold? – M.A.Ed
M.S. Ed Degree	What undergraduate and graduate degrees and teaching certificates do you hold? – M.S.Ed

**Table 2. Descriptive statistics**

Program Veteran	N	Percent	Valid Percent	Cumulative Percent
No Experience	298	59.2	59.2	59.2
Experience	205	40.8	40.8	100.0
TOTAL	503	100.0		

**Table 3. Descriptive Statistics**

	N	Minimum	Maximum	Mean	Std. Deviation
Higher Expectations	503	1.00	5.00	4.34	.838
Content Knowledge and Confidence	503	1.00	5.00	4.37	.855
Attraction to Program: Work with UNCC/Davidson Faculty	503	1.00	3.00	2.79	.461
Attraction to Program: Opportunity to Develop Curriculum Fit Needs	503	1.00	3.00	2.89	.333
Below Grade Level	503	0	1.00	.52	.500
Meet PD Requirements	447	1.00	4.00	3.60	.666
M.A. Ed Degree	503	0	1.00	.14	.351
M.S. Ed Degree	503	0	1.00	.04	.200
Valid N (Listwise)	447				

## Methods

Through this project, my goal was to utilize statistical analysis to determine if the main independent variable has a relationship with the dependent variable. To accomplish this I utilized

linear regression analysis because it allowed for the identification of the best set of predictors in sequential regression. To track sequential regression, SPSS can add the variables one at a time based specifically on the variance they account for. The first model assesses the direct impact that the number of seminars attended has on the two outcome variables while the second model measures what impact control variables have on the main relationship through linear multiple regression.

The first step towards analyzing teacher's attitudes on their application of skills and expectations for their students was to implement a multi-faceted process. To measure each outcome, I conducted a linear regression analysis with an initial model that allowed for analysis on the impact seminars attended has on each outcome. A key benefit towards this approach is that linear relationship implements a statistical model that allows that displays optimal results if relationship between the variables are in fact linear. In model two, I created a controlled comparison which incorporated variables such as attractions to the program, meeting PD requirements and others to understand if contributing variables influenced the relationship between seminars attended and the two outcomes. The next step was placing this data into multiple linear regression models to evaluate if a relationship occurred. Within the linear multiple regression analysis, the dependent variable tested against several independent variables to identify the best set of predictors once controlled for the control variables.

Controlled comparisons were a necessary measurement tool because it allowed for an identification of potential causal variables while observing how those variables would influence the dependent variable through statistical tests. Having the opportunity to hold the effect of alternative independent variables constant, allowed for a more accurate measurement towards the effect of the independent variable from the original hypothesis.

## Results

**Table 4. Content Knowledge and Confidence Results**

DV: Content Knowledge and Confidence				
	Model 1		Model 2	
	Coefficient	S.E.	Coefficient	S.E.
Seminars Attended	.199**	(.052)	.186***	(.051)
Attracted- Opportunity to work with teachers from other schools			.170*	(.086)
Attracted- Opportunity to develop curriculum that fits my needs			.236*	(.118)
Below Grade Level Students			.029	(.078)
Meet PD Requirements			.291***	(.059)
M.A. Ed Degree			.111	(.110)
M.S. Ed Degree			.184	(.193)
Constant	2.065***	(.605)	-.019	(.696)
Adjusted R square	.032			.117
n	444			444
* significant at .05				
** significant at .01				
*** significant at .001				

After placing the data into the linear regression sections through SPSS, I could analyze the effect my main independent variable had on the dependent variable when regressed alone as well as when other variables were present. In Model One, the results showed that the main independent variable of seminars attended was statistically significant. The relationship between seminars attendance and content knowledge gain shows that fellows in the program that increase the number of seminars attended by one seminar (Up to a maximum of 12) expect to yield a .199-unit increase in their content knowledge and confidence. Due to the significance and relationship of the main independent variable against the first outcome variable, I can reject the null hypothesis. Since the number of seminars attended was significant, a relationship exists between the two variables and is essential to examine for further analysis. Additionally, in Model

One the adjusted r square was .032 which indicated that 3.2 percent of the variation in y (knowledge and confidence) was explained by x (number of seminars attended). The results of Model two provide an interesting context when considering the initial results found in the first model. The seminars attended variable remains highly significant at the .001 level and again shows a positive relationship. Teachers that increase the number of seminars attended by one seminar expect to yield a .186-unit increase in their content knowledge and confidence. The first control variable examining whether the opportunity to work with teachers from other schools attracted teachers to the program yielding a significant positive result. Teachers who viewed working with other teachers as a factor in joining CTI yielded a greater increase in their content knowledge and confidence. Following the direction of the previous variable, the opportunity to develop curriculum that fits the need of teachers also showed a significant result with the dependent variable. Those who viewed the chance to develop curriculum to meet their needs also expressed higher levels of content knowledge and confidence after completing the program. The variable measuring teachers that anticipated teaching “below grade level” students was also analyzed in Model Two. Despite its inclusion, this variable failed to yield a significant result. Another highly significant control variable was the measurement of if teachers believed CTI helped them meet their PD requirements. Teachers that expressed a greater level of satisfaction with CTI aiding to meet their requirements also elicited a higher belief in their level of content knowledge gain and confidence. An increase in teachers Likert-scale response on the question of meeting PD requirements led to a .291-unit increase on their content knowledge and confidence. Ensuring that CTI helps to meet the requirements of every participant could assist in providing them with a higher level of belief that they are increasing their application of skills learned. In

Model Two, the adjusted r square was higher than that in the first model as well. Therefore, that R square of .117 indicated that 11.7 percent of the variation in y is explained by x.

**Table 5. Higher Expectations Results**

DV: Higher Expectations				
	<b>Model 1</b>		<b>Model 2</b>	
	<b>Coefficient</b>	<b>S.E.</b>	<b>Coefficient</b>	<b>S.E.</b>
Seminars Attended	.187***	(.052)	.182***	(.050)
Attracted- Opportunity to work with teachers from other schools			.083	(.085)
Attracted- Opportunity to develop curriculum that fits my needs			.150	(.116)
Below Grade Level Students			.054	(.076)
Meet PD Requirements			.275***	(.058)
M.A. Ed Degree			.061	(.108)
M.S. Ed Degree			.246	(.190)
Constant	2.065***	(.605)	.542	(.682)
Adjusted R square	.030			.096
n	444			444
* significant at .05				
** significant at .01				
*** significant at .001				

The next regression analysis measured the impact seminars attended had on the expectation level teachers have for their students after completing the program. Expectations for students as shown in the literature is a key element in helping to enhance student outcomes. Through Model One, the number of seminars has a significant impact at the .001 level while showing that every additional seminar attended elicits a .187-unit increase in the expectations that teachers have for their students. Like the first analysis, the significance and relationship of the main independent variable against the outcome variable allows me to reject the null hypothesis. Further, in Model One the adjusted r square was .030 which indicated that 3.0 percent of the variation in y (application of skills operationalized as content knowledge and

confidence) is explained by x (number of seminars attended). Model two shows the main independent variable of seminars attended to be highly significant at the .001 level. Every additional seminar attended results in a .182-unit increase in teacher's expectations on their student's ability to learn about the seminar subject. Additionally, teachers that expressed a greater satisfaction in the program meeting their PD requirements showed a higher level of expectations for their students. Those that intended to teach their units to below grade level students did not yield a significant result. Additionally, the variables assessing degrees received and elements that attracted them to the program were also insignificant. Model Two had an adjusted R square of .096 indicated that 9.6 percent of the variation in y is explained by x which still leaves over 90 percent of the variation.

## **Discussion**

### **Implications**

The importance of PD to improving quality teaching and ultimately student outcomes is an essential task for CMS and other counties across the country. Ensuring that teachers received the requisite instruction to fit the needs of both themselves and the students they teach is an aspect that CTI seeks to ensure. Research found in the Yoon et al. (2007) study exemplify how PD follows a parallel track towards: teacher knowledge and skills, classroom learning and finally student achievement. PD affects student achievement first if development enhances teachers' knowledge and skills, the increased knowledge improve classroom learning and finally if improved teaching raises student achievement (Yoon, et al., 2007). Studies that had greater than 14 hours of PD showed a positive and significant impact on student achievement which yields credence to the intensity of CTI's seminar program. CTI's five goals include: (1) Empowering

teachers through an effective professional and leadership development program, (2) Increasing teacher retention, (3) Expanding and deepening teachers overall subject knowledge, (4)

Encouraging curriculum development, and (5) Building strong educational communities.

Through these elements and a well-outlined logic model, teachers are empowered to build upon the qualities learned in each seminar to then incorporate that material into their everyday classroom. The main independent variable assessing the number of seminars attended is key because for teachers to receive the full dosage of the program, attendance becomes an essential aspect. The results shown through the studies of Garet et al. (2001) regarding the importance of duration to an effective development program display how significant attendance is to each seminar while translating for teachers within CTI. The results from both analyses measuring content knowledge and confidence and higher expectations show the cumulative positive impact attendance can have on key outcomes. Improving teacher quality is an essential aspect that leads towards bettering student outcomes. Therefore, ensuring that teachers attend as the maximum number of scheduled seminars offered will allow teachers to improve skills that will assist them in serving their students.

The results also show that teachers who view the program as helping to meet their PD requirements are more likely to express an increase in expectations for their students in addition to a gain in content knowledge and confidence.

### **Limitations**

Through my analysis of the impact seminars attended impact on each dependent outcome, there were limitations that developed in the process. First, the questionnaire was anonymous which meant in that I could not connect individual responses across years to see an

individual change over time in terms of their views of the program. This element would have been in measuring if teachers with experience in the program deviated in the number of seminars they attended and what possible reasons there could be for that trend. Additionally, since this is an analysis of CTI's professional development from the vantage point of teachers that have just completed the program, there is not student achievement data to connect back to the teachers to assess whether participating in CTI had an impact directly on student scores. Additionally, each teachers' school is not incorporated in the questionnaire which makes it difficult when looking at the variable on their intention to teach "below grade level" students since that will vary depending on where (or who) they teach. Having teachers school data would enable me to divide them into distinct groups to see if teachers in certain schools are exhibiting varying outcomes based on the seminars attended in conjunction with the application of skills and expectations of their student's outcomes.

Another key limitation of was not being able to use the North Carolina Teachers Working Conditions Survey. The survey included a professional development section with 13 questions geared towards evaluating various measures of teachers' PD experience. The purpose would have been to analyze these variables by using a regression model for each of the outcome variables to measure the best set of predictors from the NC Working Conditions survey of all teacher responses in CMS.

### **Future Research**

Many of analysis conducted provide the framework to future research development of teachers within CTI and other development programs. Obtaining district-level PD data from programs with differing qualities, duration and goals are essential to gathering a uniformed look

at how attendance impacts teachers' attitudes towards the goals measured. Also, identifying the impacts of subject-matter taught can allow an avenue for whether development programs should direct their focus patterns towards groups in many ways. Demonstrating how groups of teachers vary across school level, subject and educational background can aid in assessing how outcome responses shift and whether changes made lead to greater outcomes for teachers. Another step within CTI's dataset includes measuring the effect that specifically being a new fellow had in accordance with their attitudes regarding the application of skills and expectations for students. Measuring how new teachers develop will allow policymakers to steer and provide incentives for teachers to participate in programs that fit the needs of similar teachers.

## **Conclusion**

Policymakers when constructing an outline for effective PD for teachers should realize the importance of ensuring that all teachers acquire the tools to not only improve their abilities but to connect with other individuals in their shoes to learn of potential best practices. Ultimately, the tasks of improving student outcomes does not fall solely on teachers but instead the infrastructure that allows teachers to continue sustained growth whether that be regarding content focus, opportunities for varied learning or other elements. Development allows teachers a forum to expand their knowledge, skills and ideas while immersed in a culture tasked with nurturing their growth. CTI has taken on the task of fostering teacher growth while offering a specialized program that seeks to empower and allow teachers to learn about new material. Teachers within CTI respond positively towards their development which proves the program to be worthwhile to professional development. The process of gaining additional information begins with ensuring that teachers attend every possible seminar meeting which will enable them to obtain the most of what CTI and other development programs can offer them. Teachers

ongoing development relies on building a culture of learning to manifest and reach students who will always remain the key stakeholder.

A potential future alternative for CTI would be to test the individual responses of teachers who have just completed the program with that of CTI alumni and other teachers who are not already alumni. Creating this comparison grouping can assess the impact that teachers feel they have gained in CTI based on current or past experiences. Examining the experiences of CTI alumni can further measure the level to which they used the content gained from the seminar in various instruction forums with their students following the completion of the program.

Students, teachers, parents, and others serve as influential stakeholders in teachers continued development. The purpose of CMS' mission to improve teachers work knowledge and skills through research-based programs is geared towards ultimately providing them the tools to improve student learning (CMS, 2017). As shown through CTI, teachers that yield the expressed benefits of the program are the ones who attend as many seminars as possible which coincides with the Yoon, et al. (2007) study that finds the total number of PD received in one year to impact student achievement outcomes. Attendance at seminar meetings and other means are encouraged for all teachers since research shows that greater program duration along with other attributes can lead to positive student achievement. The number of hours devoted towards development through seminars as seen in CTI, workshops or other realms has the opportunity to enhance teachers' overall growth.

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