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# Embedded teacher leadership: support for a site-based model of professional development

DEBORAH S. YOST, ROBERT VOGEL and LING L. LIANG

Project Achieve is a professional development (PD) project that utilizes teacher leaders (TLs), former teachers who have been reassigned to provide school-based mentoring, instruction, lesson plan assistance and modelling of lessons for urban middle school teachers. A primary goal of Project Achieve is to evaluate the extent to which TLs were able to increase teaching skill to such an extent that it positively impacted student learning. The results of this comparative case study reveal that Project Achieve was successful in improving teaching performance and increasing student achievement.

## Introduction

There is an urgent need for research that focuses on increasing the skill and performance of all teachers, especially teachers who are new or possess marginal pedagogical skill. Professional development (PD) is intended to positively impact instruction to enhance student outcomes. It comes as a surprise, therefore, that most school districts do not evaluate the extent to which PD is working to improve student learning (Research Points 2005). The American Educational Research Association report (Research Points 2005) strongly suggests that research on the extent to which PD influences positive changes in instruction and student learning is needed. Thus, the purpose of this study is to present results of a teacher leader (TL) model of PD, entitled Project Achieve, and its impact on instructional expertise and student learning. The model explores some of the complex issues related to instructional leadership, distributed leadership, urban teacher professional development and the impact of increased instructional expertise on student achievement.

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*Deborah S. Yost*, PhD, is Professor of education and former Chairperson of the Department of Education, La Salle University, 1900, West Olney Avenue, Philadelphia, PA 19141, USA. Email: [yost@lasalle.edu](mailto:yost@lasalle.edu). She has authored and co-authored several articles on teacher development of in-service and pre-service teachers, and critical reflection. *Robert Vogel*, EdD, is Professor of education and former chairperson of the Department of Education, La Salle University, Philadelphia, PA, USA. Email: [vogel@lasalle.edu](mailto:vogel@lasalle.edu). He is director of the urban 'Writing Matters' programme, a writing programme that encourages writing proficiency in urban middle and high school students and recently co-authored a book entitled, *'Voices of Teens: Writers Matter'* published by the Middle School Association. *Ling L. Liang*, PhD, is an Associate Professor of science education, Department of Education, La Salle University, Philadelphia, PA, USA. Email: [liang@lasalle.edu](mailto:liang@lasalle.edu). She has a BS from Nanjing Normal University and a MS and PhD from Indiana University at Bloomington. Dr Liang's research interests include inquiry-based learning and teaching in science, integration of critical elements of nature of science in science instruction and science teacher self-efficacy.

Project Achieve was designed to increase TL's understanding of how to work with teachers using a site-based, collaborative model of PD in order for them, in turn, to provide full-time mentoring, professional development, lesson plan assistance, and modelling of lessons for their middle school colleagues. The middle school is located in a large urban, school district on the east coast of the USA. The extent to which Project Achieve was successful in moving urban teachers toward increased instructional competence in order to positively impact student learning was of great interest to us in our work in this urban middle school. Our university established a partnership with this school a year prior to the implementation of Project Achieve. Thus, our primary goals were to move content-area middle school teachers toward increased instructional expertise using the TL project and to study its effect on student achievement.

In the following section, we provide an overview of current research on instructional leadership and a rationale for using a site-based, collaborative approach to teacher development, which includes literature pertaining to teacher attrition and retention, professional development, and distributed leadership. This review is then followed by an overview of Project Achieve from its inception and a description of the design and results of the quantitative and qualitative aspects of the study. The discussion and implications sections provide a synthesis of the results and recommendations for the generalization of this model to other schools.

### **Related literature**

Definitions of leadership describe a wide range of practices from top-down hierarchies to shared responsibilities among principals and teachers (Gigante and Firestone 2007). These authors state that their conception of leadership encompasses 'the exercise of influence in the service of organizational productivity' (p. 303) which implies a more democratic view of leadership. Similarly, the term distributed leadership (Spillane *et al.* 2001) implies the sharing of authority among administrators and staff. Distributed leadership is closely aligned to the definition of teacher leadership proposed by Katzenmeyer and Moller (1996) which includes extending leadership practices to include teachers in the decision-making process. According to these authors, teacher leadership is work that teachers do to positively influence other teachers' instructional practice. Much of the recent literature has therefore focused its attention on the idea of teacher leaders and their impact on instructional practices in schools, which is the focus of this research study.

Our search revealed no empirical research studies that link a teacher leader model of professional development to increased instructional expertise *and* student achievement. However, prior studies have set the stage for further research. For example, two studies centred on exploring instructional leadership qualities and contextual elements that led to enhanced leadership. A qualitative study by Muijs and Harris (2006), which focused on the work of teacher leaders in the UK, highlighted salient aspects of quality instructional leadership such as shared decision-making, collaboration,

active participation, professional learning and active leadership. This study cited anecdotal evidence that TL efforts resulted in school improvements. Another qualitative study involving a purposeful sample of mathematics and science teacher leaders revealed context elements that led to the successful work of teacher leaders (Gigante and Firestone 2007). The results revealed that administrative support, establishment of trust between and among teachers/leaders, and an adequate amount of time to allow TLs to do their work were cited as crucial to the success of the TL project.

Two additional studies focused on teacher leadership and professional development. A qualitative study on teacher and teacher leader views on the impact of professional development sessions revealed positive feelings among teachers and their TL peers about being taught new concepts and skills in a professional learning community (Hickey and Harris 2005). A review of two qualitative studies on instructional leadership (Southworth 2002) concluded that effective leadership occurs under *learning community* conditions which centre on teachers' instructional growth. The conclusion drawn is that instructional leadership has the potential to induce greater teacher learning and expertise and, therefore, more emphasis should be placed on this form of PD. The study also revealed that because instructional leaders tend to learn on the job with little or no formal instruction, more formal preparation of these professionals is needed.

### *Teacher retention and instructional leadership*

Urban schools typically have greater attrition rates than their suburban counterparts largely due to the high poverty, crime and low socio-economic conditions that significantly impact student learning and achievement (Guarino *et al.* 2006). These authors posit that attrition is higher among more able teachers while lower ability teachers tend to remain in their schools. Teacher shortages often force urban schools to hire many teachers who do not possess appropriate credentials or lack sufficient teaching skills to make a positive impact on student learning. The reality of today's schools is that principals are forced to deal with good and bad as well as qualified and under-qualified teachers.

However, despite factors that impede urban students' access to high quality education, the PD literature provides an optimistic view of how school environments can be shaped to increase teacher quality and, concomitantly, positively impact student learning (Guarino *et al.* 2006). From an extensive review of the literature on teacher attrition and retention, these authors discovered that mentoring programmes, class size, the level of autonomy granted to teachers and the amount of administrative support teachers receive, all play a prominent role in teachers' desire to remain at their schools. This notion is verified by results of a qualitative study that revealed that unsupportive, urban school environments force quality teachers to transition to more supportive schools (Yost 2006). Moreover, the National Center for Educational Statistics (2004) reported that a lack of opportunity for quality professional development is one factor causing teachers to transfer to other schools.

There is a strong link between the PD and instructional leadership literature regarding how to positively influence teacher and student outcomes. Several articles purport that professional development enhances instruction and influences student achievement when professional learning communities are focused on a common goal (Johnson *et al.* 1996, Lieberman 2000, Mariage and Garmon 2003) and when it directly connects to teachers' work (Research Points 2005). This relates to instructional leadership research in that teachers report a greater comfort level in learning new skills when taught by their peers (Hickey and Harris 2005). Moreover, effective leadership influences teacher growth when it occurs in the context of the school community (Southworth 2002).

### *Distributed leadership and teacher supervision*

Similar to the research on professional development as a community learning enterprise, the literature on distributed leadership emerges with similar insights. Shared decision-making and distributed learning are cited as important elements of the distributed leadership model (Spillane *et al.* 2001). According to these authors, the purpose of distributed leadership is to create a climate of learning in which all stakeholders contribute to a central goal or mission. In schools in which improved instructional practice has been a central focus, teachers and staff work together in professional communities toward common goals. Current research suggests that when learning occurs in the context of professional communities and shared practice is emphasized, teacher application of new instructional strategies is enhanced (Brownell *et al.* 2004, Cochran-Smith 2004; Hammerness *et al.* 2005). This has been demonstrated in studies focusing on differentiating instruction, integrating technology, alternative assessments and instructional practices focusing on higher level thinking skills.

An important aspect of distributed leadership is the role of the supervisor. The climate generated by the supervisory process either enhances teacher self-efficacy and the motivation to reflect on the practice of teaching or it does the opposite (Bransford *et al.* 2005). These authors contend that traditional supervision evaluates teacher performance based on a checklist of observable competencies during brief isolated classroom visits, thus focusing on surface level issues. Because efficiency is so embedded in supervisory work, it becomes the dominant method of assessing teachers. Similarly, a shift in the school administrator's role from 'critic' to 'co-collaborator' enables teachers to focus on student learning rather than worrying about job security (Nolan and Francis 2006, Yost and Vogel 2007).

Our vision in developing and implementing the Project Achieve project rested on one major assumption: quality teaching positively impacts student learning. We also believed that the model's positive or negative impact on student achievement should be measured in order to analyse its impact. The purpose of this study, therefore, is to evaluate the extent to which Project Achieve was successful in: (1) increasing teachers' application of effective teaching strategies; and (2) increasing student learning as measured by curriculum-based and standardized achievement measures.

## An overview of Project Achieve

### *Background of the project: the pilot*

Project Achieve was conceived by two professors in collaboration with the principal of the Washington Middle School in which we had established a school university partnership (the names of the middle schools used in this study have been changed). The Project was funded by a small grant from a large metropolitan school district on the east coast of the USA. The ultimate purpose of the grant programme was to boost student learning and achievement in this urban school district based on a US federal government mandate entitled, ‘No Child Left Behind’ which called for increased proficiency in literacy and mathematics for all school students. The focus of our grant was based on a strong belief that teacher quality results in enhanced student learning. Therefore we initiated a pilot programme that emphasized collaborative, personalized and need-based professional development to increase instructional expertise.

The Project Achieve staff, in collaboration with the principal, designed and launched a coaching/mentoring model in order to enhance middle school teachers’ knowledge and use of strategies outlined in the Dimensions of Learning Model (Marzano 1992). We implemented the pilot programme during the 2004–2005 academic year. Prior to the beginning of the school year we organized a two-day summer workshop for teachers held at the university in which teachers were introduced to the following content: learning styles, Bloom’s taxonomy, developmental considerations in instructional planning, lesson planning, meaningful learning, graphic organizers and assessment (formative, summative and rubric development). Teachers were also exposed to data-based teaching. During every Friday of the school year, we conducted observations of classroom-based practice; held one-on-one conferences with teachers based on the observations, and led periodic grade team meetings with fifth and eighth grade teachers at the middle school.

Marzano’s Dimensions of Learning (MDL) model was used as a focus throughout the pilot year and beyond for one basic reason. In our observations of teachers during the pilot year we found that new and experienced teachers alike needed to attend to basic teaching and management strategies. MDL focuses primarily on basic teaching skills and also addresses the fundamental attitudes of teachers regarding their ability to create a positive climate of learning for *all* students. Many of these competencies coincide with central precepts of culturally relevant teaching including the need for teachers to: (1) know their students; (2) respect their students; and (3) teach their students in ways that focus on meaning and understanding, by balancing routine skill learning with novel activities, by providing a context for learning that connects to real life experience, and by influencing attitudes about learning (Robins *et al.* 2002). Major aspects of the MDL model are outlined below:

- *Attitudes*: Effective teachers understand that all learning activities are filtered through students’ attitudes and perceptions.
- *Knowledge application*: Effective teachers help students to acquire new knowledge by encouraging them to relate new knowledge with what they

already know and by providing them with opportunities to organize information in ways that facilitate learning.

- *Extension of knowledge:* Effective teachers help learners to refine and extend their knowledge by providing opportunities for them to use higher order thinking skills.
- *Using knowledge:* Effective teachers involve students in long-term, self-directed projects that require investigation, decision-making, research, problem-solving, and intervention.
- *Habits of mind:* Effective teachers should help their students develop sensitivity to feedback, desire for accuracy, persistence in the face of difficulty, and avoid impulsive actions

Our supervision of teachers followed the typical student teaching supervisory routine which focused on improved teaching performance over time. Since we were not part of the formal leadership team at the school, the teachers appeared at ease working with us towards the goal of enhanced instructional effectiveness. Quantitative data collected at the end of the first year revealed promising gains on curriculum-based and standardized test results, signifying that student learning had positively shifted in key areas (Yost and Vogel 2007). Positive changes in teaching practices were also obtained based on an analysis of pre-mid-post observation results and focus group discussions.

### *The Project Achieve Teacher Leader Project*

Positive results from the first year led to a change in our focus. Instead of Project Achieve staff working directly with teachers at Washington Middle School one day per week, we concentrated on developing the leadership skills of six appointed teacher leaders who were responsible for carrying out the PD plan implemented the year before with all content area teachers at the school on a full-time basis. The TLs all had classroom teaching experience prior to being appointed by the principal. Their responsibilities included coaching, in-service and mentoring of teachers. To launch this initiative, a two-day summer workshop was held off site for the TLs which covered the following topics: learning/leadership styles, effective mentoring/coaching models, data-driven decision-making using district-sponsored benchmark assessments, MDL model, collaborative reflection, school-improvement plan and the development of goals for the upcoming year to address the larger goal of school-wide, instructional effectiveness. Bi-weekly sessions were held with TLs by Project Achieve staff during the year. These sessions focused on the following topics:

- MDL observation checklist.
- Reliability check on the observation checklist.
- First observations of teachers/analysis of data.
- Conferencing with teachers.
- In-service workshops for teachers based on aggregate analysis of needs.

- Team meetings with teachers related to an analysis of needs.
- Designing lesson planning meetings—voluntary meetings for teachers.
- Demonstration lessons for teachers.
- How to develop in-service workshops based on needs of the district and needs of Washington Middle School teachers.
- How to be diplomatic with teachers.
- Regaining faculty focus on student learning.
- Analysis of broad themes emerging from mid-observation results.
- Planning future in-service and team meeting sessions.
- Group dynamics.

We coached and mentored this group of TLs throughout the year as they gradually developed the confidence and skills to work with the most challenging teachers. We also collected data throughout the year related to the content of the TL sessions, their primary concerns and triumphs. Through this analysis of data we discovered that there was a huge learning curve in their transition from teachers to instructional leaders. These data were synthesized into a model for instructional leadership training (see Yost *et al.* 2009).

During this school year, the TLs devoted 100% of their time to coaching, mentoring, modelling lessons and providing professional development to the literacy, mathematics and special education teachers at the school. They also held lesson-planning sessions, organized standardized and benchmark testing, and assisted teachers in gathering and ordering necessary instructional materials. A large focus of their work was visiting classrooms and conducting informal and formal observations of teachers using MDL competencies (see Figure 1). The TLs shared the competencies with the teachers and used this as a framework for later discussions with them about their instruction.

Another focus of the TLs' work was to encourage teacher reflection and problem-solving by showing teachers how to analyse and use benchmark test results to improve future instruction. Since benchmark tests were administered to all students in the district every five weeks in the areas of literacy and mathematics based on instructional goals, with one week in-between for re-teaching of important content, teachers and their TLs met to analyse the benchmark data and identify areas in need of improvement. The following sections provide an overview of the research methods, participants and design of the study.

## Methods

### *Research design*

A comparative case study research design was used to evaluate the extent to which Project Achieve met its goals during the 2005–2006 academic year. The study involved two urban, middle schools, Washington Middle School and Cecil Middle School, each serving fifth to eighth grade students. Washington Middle School implemented the TL model while



<p><b>Attitudes (classroom atmosphere)</b></p> <p>The classroom atmosphere encourages focused learning.</p> <p>The classroom atmosphere is orderly and has an established routine.</p> <p>Students are engaged in learning.</p>
<p><b>Knowledge acquisition (lesson structure)</b></p> <p>Students experience a lesson introduction that connects to prior knowledge or experience with the content of the lesson (lesson set induction).</p> <p>Students have an opportunity to revisit lesson objectives at the end of the lesson (closure).</p> <p>Students are engaged in a variety of instructional methods to achieve lesson activities. Note strategies used in lesson.</p>
<p><b>Extension of knowledge (advancing knowledge during the lesson)</b></p> <p>Students have opportunities to learn how to learn (i.e., test preparation, how to complete assigned tasks – how to write essays, take tests, complete homework, etc.) during the lesson.</p> <p>Students are asked a variety of questions (basic to inferential, etc.) during the lesson.</p> <p>Students are engaged in higher order thinking (e.g., application, analysis, synthesis, evaluation) during the lesson.</p>
<p><b>Using knowledge (application of knowledge)</b></p> <p>Students are encouraged to consider multiple points of view.</p> <p>Students are self-directed in their own learning during practice or extension activities.</p> <p>Students work on assignments that connect to real life experience.</p>
<p><b>Habits of mind (motivation variables)</b></p> <p>Students are encouraged to focus on accuracy rather than completion.</p> <p>Students are encouraged to persevere when confronted with challenging material.</p> <p>Students are motivated to achieve to higher academic levels.</p>

**Figure 1. Sample questions in the teacher leader observation protocol**

Cecil used only district-sponsored PD. The following research questions guided the study:

- (1) Does the TL project lead to increased competency in teaching the core curriculum as observed by the teacher leaders?
- (2) Does the TL project have differential impacts on student learning as measured by benchmark tests (curriculum-based test) and PSSA results (standardized test) in reading and mathematics, in comparison to a traditional teacher professional development model?

The importance of a study of this nature has been cited in the recent literature, most notably the 2005 Research Points bulletin published by the American Educational Research Association which asserts that an effective evaluation of PD ‘includes an examination of actual classroom practices, the training’s impact on teacher behavior, and its effect on student learning’ (p. 4). The document posed a challenge to researchers to evaluate the effectiveness of PD efforts on student learning. The study described in this paper attempts to address this issue by evaluating a TL PD project on teacher growth and its impact on student learning through a comparative case study with a qualitative component.

### *Participants*

*Teacher leaders.* All Washington Middle School's six TLs were trained in the Project Achieve teacher leader model and participated in the study. Four of the six were newly appointed to the TL position just prior to the 2005–2006 academic year. They were appointed to this position based on their excellent teaching at the school, according to the principal, as well as having expertise in either mathematics or reading. The new TL group was comprised of two females (one Caucasian and one African-American) both with backgrounds in literacy and two males (Caucasian) with backgrounds in mathematics instruction. The remaining two leaders (Caucasian) served as TLs over the past six years in the areas of literacy and technology.

*Teachers.* In September 2005, 42 teachers were assigned to teach reading, social studies, mathematics and special education. As in many urban schools, there was great turnover within this group over the year with approximately 17% of that number leaving or being asked to leave the school due to poor teaching performance between October and March. Teachers were primarily assigned to teach two subjects: English and social studies or mathematics and science during the 2005–2006 school year. Self-contained special education teachers taught all subjects. The school contained two emotional support and three learning support self-contained classrooms.

Thirty-one percent of the teachers classified themselves as African-American, while the remaining 69% were Caucasian. Thirty-two percent of the teachers were male and 68% female. The average age of this group was 32. The majority of teachers at Washington Middle School had fewer than five years teaching experience (63%), with the number of teachers with no prior teaching experience comprising 29% of this population. The majority of teachers were elementary certified (66%), with 42% teaching in their area of certification.

*Students.* The study took place in a large middle school (over 1100 students in grades 5 to 8) in a large, east coast, urban school district (Washington Middle School). The comparison middle school (Cecil Middle School) was selected based on similar demographics to the host school. Both are situated in the north region of the district and, at that time, were the only two schools in the region with a middle school 5 to 8 structure (as opposed to K-8). The racial breakdown of both populations is similar in that the population of Washington Middle School was comprised of 68% African-American, 14% Latino, 15% Asian and 3% Caucasian students while the population at Cecil showed a higher percentage of Latino (56%) as well as 33% African-American, 8% Asian and 3% Caucasian students. Overall, students of colour comprised approximately 97% of the population at Washington and Cecil Middle Schools, with Caucasian students a minority at 3%, respectively. At both schools 100% of students qualified for the free and reduced lunch programme, indicating that students at both schools resided in low income homes.

A fairly even distribution of students was found among the various special programmes at both schools. Students enrolled in gifted and talented

programmes comprised 4% of the student population at each school. Students with limited English language skills represented 23% of the population at Washington Middle School and 22% of the population at Cecil Middle School, with 16% and 14% of students receiving special education at these schools, respectively. Students receiving bilingual services at Washington Middle School accounted for 7% of the population, while 5% of students at Cecil Middle School received these services.

### *Teacher professional development at Washington Middle School and Cecil Middle School*

District-sponsored PD for both schools included several mandatory, full-day sessions and numerous half-day sessions throughout the year. The director of curriculum/professional development and staff for the district-developed scripted PD focused largely on standardized test preparation and other programmes, such as Read-180 which is a comprehensive, computer-based reading enhancement programme. Other district-mandated PD focused on using technology related to the benchmark assessments and other tasks such as formal 'walk-throughs' (administrators walking through classrooms unannounced), posting of lesson goals, and room decoration. Teachers at both schools were exposed to the same district-sponsored PD. Washington Middle School teachers, however, were provided with additional PD based on an analysis of their instructional needs by the TLs. This is explained in more detail in subsequent sections.

### **Data analysis**

To answer the first research question relating to the extent to which the TL project leads to increased instructional expertise, a quantitative analysis of teacher observation data was performed. In addition, focus group data were qualitatively analysed to discover teachers' and TLs' views on the model's efficacy.

### *Teacher observations*

An observation protocol was created based on Marzano's Dimensions of Learning model by the first author (see Figure 1). Formal observations were taken of participating teachers by the TLs three times over the school year (October, January and May) after the TLs were trained to use the instrument and an inter-observer reliability coefficient was established. Data were analysed using two-way repeated measures, analysis of variance procedures.

Observations of teaching behaviour required the observer to note whether an instance of the behaviour listed on the observation instrument either occurred or did not occur during the lesson. Thus the observer placed a check in one column if the teaching behaviour was observed (often noting what was observed) and a check in another box if the teaching skill was not

observed at all during the lesson. Total scores were obtained for each teacher over the three observations. Observations averaged 45 minutes.

An inter-observer reliability check was performed after three separate, lengthy meetings were held in late September and early October with the TLs to clarify and to come to a general consensus on the observation form's terms. A reliability check was performed on the TLs observation of a 45-minute teaching episode captured on video tape. The reliability coefficient of 0.83 was calculated based on the extent to which their observations matched. A reliability coefficient of 0.83 is an acceptable rating due to the complexity of the instrument and the number of people involved in conducting observations. Subsequent meetings to discuss the instrument were held throughout the year to share the results of the observations and to clarify terms.

TLs used the observation instrument not only to collect data on teachers' progress in demonstrating pedagogical skill in the classroom setting over time, but also to identify areas in need of PD during both formal (data collection) and informal classroom visitations. This information was used to create informational sessions via personal conferences, grade team meetings or school-wide in service sessions.

#### *Focus group discussions*

At the end of the year, separate group focus discussions were held with the TLs and teachers to ascertain their views on the aims of Project Achieve, and the strengths and weaknesses of the project. Project Achieve staff were present at both sessions; administrative personnel did not attend these sessions. We developed a set of questions which were posed to the group and took notes as the participants answered each question. The data were qualitatively analysed using open coding (Corbin and Strauss 2008, Strauss and Corbin 1990). Coding involves three basic processes:

- (1) Unitizing data (categorizing discrete pieces of information).
- (2) Emergent categorization (the units of data are then sorted and categorized into larger themes).
- (3) Negative case analysis (the use and presentation of data that conflicts with the majority opinion).

#### *Student achievement*

To answer the second question relating to the extent to which the TL project had a differential impact on student learning compared to a traditional model of teacher professional development, the host school's benchmark and the Pennsylvania System of School Assessment (PSSA) scores were measured against students' performance at the comparison middle school using two-way analysis of covariance (ANCOVA) procedures. The October benchmark scores were used as the covariate, since this test was taken by Washington Middle School and Cecil Middle School students prior to the full implementation of the TL project.

## Results

In this section, we present findings related to the two study research questions: (1) impact of the intervention (TL project) on teaching practices; and (2) impact of the intervention on student learning.

### *Enhanced teaching competency as an outcome of the TL project*

*Observations of teaching performance.* A two-way repeated measures analysis of variance was performed on the observation data. Observation results revealed that the time factor of pre-, mid- and post-observations within subjects was found to be statistically significant ( $p < 0.01$  (see Table 1). The data were initially examined using both Mauchly's 'Test of sphericity' and Levine's 'Test of equality of error variances' to test population homogeneity, satisfying the ANOVA procedure assumption. Pair-wise comparisons using the Bonferroni test indicated that the entire group of teachers across all grade levels demonstrated statistically significant improvements from pre- to mid-observations ( $p < 0.05$ ) and from mid- to post-observations ( $p < 0.01$ ).

A significant interaction between time and grade levels ( $p < 0.05$ ) was also observed. This is due to the fact that the seventh grade teachers made significant improvements in their use of research-based strategies during the pre- and mid-observations, but declined during the post observations (see Table 2). Overall, the seventh grade teachers demonstrated significant improvements from pre- to post-observations ( $p < 0.05$ ).

*Pre-post analysis of growth in teaching as measured by TL observations.* Application of teaching strategies as outlined by the MDL model showed steady improvements over the year as measured by the pre-mid-post observations. The largest area of growth for all teachers (39% change from pre- to post-observations) was observed in 'extension of knowledge,' which focuses on

**Table 1. Two-way repeated measures analysis of variance for observations of classroom teaching practice**

Source	<i>df</i>	<i>F</i>	Partial eta squared
Between subjects			
Grade level	3	0.73	0.11
Error-between	18	(398.53)	
Total	21		
Within subjects			
Time (pre-, mid- and post-)	2	18.38**	0.51
Time × grade level	6	2.48*	0.29
Error-within	36	(186.54)	
Total	44		

Note. Values enclosed in parentheses represent mean square errors.

\* $p < 0.05$ , two-tailed. \*\* $p < 0.01$ , two-tailed.

**Table 2. Mean percent scores of TL observations of classroom teaching practice**

Grade level	<i>n</i>	Pre		Mid		Post	
		M	SD	M	SD	M	SD
5	4	61.85	11.16	63.39	6.44	87.37	5.20
6	6	53.37	9.11	64.88	5.25	96.43	4.25
7	4	51.79	11.16	76.79	6.44	66.07	5.20
8	8	64.82	7.89	74.93	4.55	86.06	3.68

teachers' ability to extend lessons to include higher-order thinking, such as through the use of questioning and tapping higher-level reasoning in lesson objectives. The second highest area of growth was found in 'using knowledge' (29% change from pre- to post-observations). The 'using knowledge' category centres on a student's ability to personalize their learning through teacher-led connections to real life experience, student decision-making and self-directed learning. The remaining growth areas evidenced in the data analysis include the following: 'habits of mind' (27% growth); 'knowledge acquisition' (23% growth) and 'attitudes' (20% growth). Overall, teachers made positive teaching gains based on their application of all competency areas in the Dimensions of Learning Model based on observations of teaching performance by TLs.

We also analysed data pertaining to years of teaching experience and growth in teaching. We sorted teachers into three categories: new (0–5 years), mid-level (6–12 years) and experienced (12+ years). The analysis revealed that the new and mid-level teachers made more gains in their application of MDL competencies than the more experienced teachers at the school. Averaging the positive change in teaching practice from pre- to post-observation phases, the data revealed that new teachers gained 32.8% overall across all categories and mid-level teachers gained 33.6%. Experienced teachers showed an average 10.8% gain from pre- to post-observation phases across all MDL categories.

The largest improvement in teaching practice, based on individual MDL categories, was demonstrated by the mid-level teachers in the area of 'using knowledge' (60% gain from [pre-24% to post-84%] observations). This category deals with teachers involving students in the decision making process and allowing students to engage in self-directed learning. The second largest gain was made by the new teachers in the area of 'extension of knowledge' (55% gain; pre-23% to post-78%). This area has to do with using visual organizers, as well as a focus on critical thinking and questioning. The third largest gain was made by new teachers in the area of 'habits of mind' (37% gain; pre-62% to post-98%). This category focuses on teachers providing students with positive and constructive feedback, encouraging perseverance, and motivating students to achieve higher levels of understanding.

The experienced teacher group made moderate gains in all categories except in the area of using knowledge where no gain was evidenced. However, the pre- to post-observations of this group revealed a fairly high application of these strategies from the onset (pre-80%; post-80%). The

highest gain (20% gain; pre-72% to post-92%) made by experienced teachers was found in the 'attitudes' category which connects to a teacher's ability to create a positive climate for learning. It should be noted that the experienced teachers scored on par with or higher in all of the pre-observation MDL categories compared to the other two teacher groups. So although they made moderate progress, this group generally showed a higher level of MDL application than the less experienced groups.

Overall, based on an analysis of instructional progress, all teachers made gains from pre- to post-observations especially in the areas of critical thinking and self-directed learning. Moreover, an analysis of data by level of experience revealed that new and mid-level teachers made the most progress compared to more experienced teachers. The experienced teachers showed moderate gains from pre- to post-observation, however, their pre-observation scores were generally higher than the less experienced groups.

### **Focus group discussions**

Separate focus group discussions were held with the TLs and participating teachers at the end of the year to evaluate the overall effect of the TL project.

#### *Teacher leader focus group*

Questions posed to the TLs during the one hour focus group session follow:

1. Discuss the overall impact of Project Achieve on your growth as a teacher leader this year.
2. Discuss your work with teachers this year. What have been your greatest accomplishments? Failures?
3. To what extent do you think you have impacted student learning through your work with teachers?
4. What surprised you the most about the role of teacher leader?
5. In what ways could we have better prepared you for your work as instructional leaders this year?

Several themes emerged from this analysis of data: TL growth, obstacles and successes. The first theme had to do with the TLs growth over the year. Four of the new TLs commented about how steep the learning curve was for them and how quickly it levelled off. As one commented: 'The uphill was really hard.' It was also difficult for many of them to watch 'bad' teaching and to know how to diplomatically address these issues with teachers. One TL commented, 'I learned that every classroom is not like your classroom.' All TLs agreed that teachers who were the weakest were weak in all of the Marzano's categories, but the newer teachers seemed to find their stride around mid-year. One TL commented that she saw a lot of 'hills and valleys' among teachers and a lot of common trends in her group. All six TLs commented on the need for a structure, such as having the Marzano's observation checklist that greatly assisted in their work. One TL stated that 'the

form made me aware of important elements related to good teaching'. Another TL noted that the observations helped him to focus on what he should be looking for—'important instructional elements'.

Others attributed their comfort level and ultimate growth in developing TL skills and content knowledge related to the group bi-weekly and individual sessions held by Project Achieve staff. One TL noted: 'Having time to sit down and talk about issues was crucial in my development as a TL.' Others noted that the session on group dynamics helped them to understand the nature of their group and how to deal with issues that arose among them during the year. Finally, the TLs noted that the autonomy they were afforded in their roles helped them to focus on what they needed to accomplish—to keep their eyes on the prize—student learning'.

The second theme had to do with obstacles they encountered in their work as TLs. All TLs commented on the difficulty, especially in the beginning of the year, of finding time to visit classrooms as they were distributing books and materials to students, developing in-service workshops scheduled in September and October by the district, and getting teachers prepared to administer the computer-based benchmark and standardized tests. One TL commented that he 'was unable to get into enough classrooms at the end of the year' due to end-of-year responsibilities that were given to him. In addition, several commented on the need to inform teachers earlier about the observation categories through professional development and team meetings. One TL commented that she developed a way to introduce the categories to teachers by having them use the observation form on her when she modelled lessons in their classrooms. Another noted that their role as 'quasi-administrators' was difficult. Relating to her relationship with the assistant principals (AP), one TL stated: 'The APs tried to dump stuff on us—teachers were upset.' This TL suggested that there is a need to co-ordinate with the APs so that they would better understand their work. It was also pointed out by another TL that APs should attend grade group meetings with the TLs.

The third theme related to the perceived success among the TLs. A majority of TLs noted that they made great strides in reaching teachers and, therefore, students as the year progressed. For example, one TL stated that he felt 'it was relatively easy to change the way teachers looked at and used technology'. He concluded that the workshops that were held for teachers really added to their comfort levels. A mathematics TL noted that the fifth and sixth grade students showed a lot of growth on their benchmark tests. 'The teachers started using the curriculum pre-class instructional frameworks on a weekly basis, which helped students understand content on a deeper level.' He also added that he coached a literacy teacher throughout the year since she was assigned to teach mathematics. The teacher told him that 'I'm not afraid of teaching math anymore!' In fact she told him that she would like to teach it again next year. Several TLs noted a positive change in the teachers over the year. For example, one TL noted: 'Teachers leave for all different reasons—challenging students, not understanding these kids ... but support does help.' Another TL stated: 'I have seen more teachers this year who want to come back than last year.' Other TLs noted that 'there is a need for teacher leaders' and 'staff development is the key'.



### *Teacher focus group*

Questions posed to teachers during their focus group session included the following:

1. What impact have your teacher leaders made on your growth as a teacher this year?
2. In what ways has their service benefited student learning?
3. If you had a choice to have district-mandated professional development or PD designed with your specific needs in mind, which would you choose? Why?
4. If this model were to be used again in this and other schools, what suggestions do you have for improvements?

The data analysis revealed two major themes: collaborative leadership and trust issues. The first theme related to the notion of collaborative leadership in that the majority of teachers characterized their TLs as being instrumental in helping them to become better teachers. Several of the new teachers noted that the modelling of lessons was extremely helpful in providing 'a vision of how you want the classroom to be'. Several expressed a desire to have more of the TLs' time for lesson modelling. In fact, one teacher shared that if the TLs perceived that you were a good teacher: 'You have to ask them to model a lesson for you. Even good teachers want this support.' Several teachers commented that the TLs provided 'practical and useful ideas' which were very helpful. One teacher commented that the group lesson planning sessions were very beneficial. Another teacher noted that the TLs frequently modelled instructional activities during grade team meetings in a professional and helpful manner. Several teachers shared that their TLs were 'diligent', showed 'perseverance', and 'collaborated well' with teachers. One noted that the TLs 'kept the flow going'. Several teachers stated that the test prep sessions were very helpful. Five teachers commented that their TLs provided 'great examples of plans to use in the classroom.' Another teacher remarked that the TLs and teachers 'do a lot together. [We] eat together.'

On the contrary, several special education teachers stated that the needs of students with special needs must be addressed in grade group meetings. One teacher further explained that 'there were no meetings on the topic during the year'. Several other special education teachers shared that they did not receive an equal amount of attention from the TLs compared with general education teachers. Finally, several teachers shared that the TLs were 'stretched too thin' and that they have too many responsibilities at the school.

The second theme emphasized the importance of establishing trust between teachers and TLs. Three teachers openly shared their fears that the TLs were running back to tell administrators about their teaching. One comment from a teacher illustrated this point: 'Don't send TLs out to gather information on us.' These teachers discussed the need for the TL role to be clarified and 'more clearly defined'. For example: 'What is it to be a coach? Where do we draw the line?' Another pointed out that she felt as if she 'were walking on eggshells'. All shared that the administration should know and be responsible for drawing that line.

It should be noted that there was a salient difference between the pilot model and the TL project in terms of the trust factor among teachers. During the pilot year the first and second authors worked exclusively with teachers in order to increase their teaching expertise. Since we were not part of the leadership team at the school and therefore not responsible for evaluating teacher competence in the classroom setting, teachers did not feel threatened by us. However in the TL project year, the principal, APs and TLs worked very closely with one another as they were striving to ensure that all students received a quality education. The fears that some of the teachers expressed, therefore, were true. The TLs periodically reported their findings to the principal for the purpose of obtaining more help for these teachers. This caused some morale problems among those teachers who were not making adequate gains in their teaching practice.

### *Limitations*

Due to the fact that the special education teachers felt that they did not get the same amount of attention or observations from the TLs as the general education teachers, a decision was made to use observation data from only the general education teacher group. The perceived neglect may have been due to scheduling problems at the school in which special education teachers were only sporadically invited to grade team meetings held once a week. In addition, none of the TLs had a background in special education, which may have inadvertently steered them toward the general education teacher population.

Another limitation of the study emerged as a result of having access only to a single group of teachers. This does not provide for full control of other confounding variables that may have contributed to the change observed in teacher knowledge and actions. To mitigate against threats to internal and external validity, the study design included both quantitative and qualitative data collection through observations (pre-mid-post) and end-of-year, separate focus group discussions with TLs and teachers.

### **Impact of the TL project on student learning**

To demonstrate the extent to which the TL project had a differential impact on student learning we compared the host school's scores on the benchmark and the Pennsylvania System of School Assessment (PSSA) with those of the matched comparison school, using ANCOVA procedures. Since Project Achieve staff worked directly with Grade 5 and 8 teachers during the 2004–2005 academic year and thus may have influenced student learning, sixth grade students were excluded from the 2005–2006 benchmark and PSSA data from both the host and comparison school.

### *Benchmark test analysis*

Benchmark tests are district-wide assessments given at certain times throughout the year to all schools in the district and measure the extent to which

**Table 3. Two-way analysis of covariance (ANCOVA) on reading benchmark scores (January 2006)**

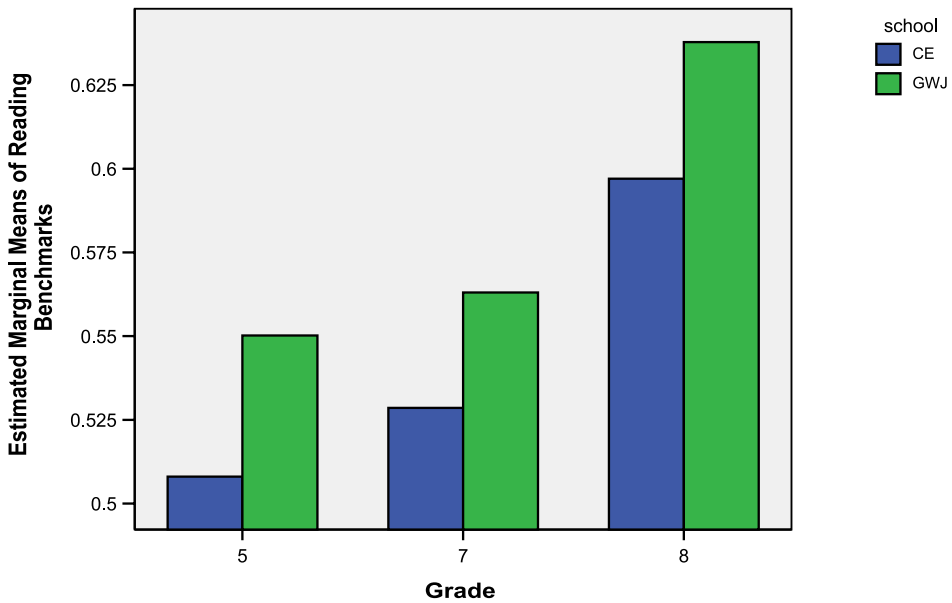
Source	<i>df</i>	<i>F</i>	Partial eta squared
Covariate (October reading scores)	1	472.35**	0.287
School	1	20.33**	0.020
Grade level	2	39.00**	0.060
School × grade level	2	0.078	0.000
Error	1176	(0.021)	

Note. Values enclosed in parentheses represent mean square errors.

\*\* $p < 0.01$ , two-tailed.

students have mastered the core curriculum in reading and mathematics using percentage scores. The student test scores in October (prior to the implementation of the TL project) and the scores in January (during the implementation of the TL project) were analysed. An ANCOVA was performed on the scores of both schools using the October benchmark scores as the covariate. Results of this analysis revealed a statistically significant difference ( $p < 0.01$ ) on the January reading benchmarks having adjusted for the prior differences between the two schools (see Table 3).

The results revealed a statistically significant difference in the Washington Middle School student performance in reading on the January benchmark test compared with reading scores at the Cecil Middle School, the comparison school, across all grade levels. Figure 2 shows the estimated



**Figure 2. Estimated marginal means of the reading benchmarks for January by school and by grade level. Note: CE, comparison school; Washington Middle School, host school. The means were adjusted with the October benchmark reading scores as the covariate**

marginal mean benchmark scores in reading for both schools. No statistically significant differences were found on the January mathematics benchmark scores between the two schools.

### *PSSA analysis*

The PSSA is a standardized test used by the state of Pennsylvania to measure students' progress in the areas of reading, mathematics and writing. Data in the form of raw scores were collected from the two participating schools and analysed with ANCOVA. It was found that the Washington Middle School's PSSA scores were significantly higher in both reading ( $p < 0.01$ ) and math ( $p < 0.05$ ) across the grade levels, compared with Cecil Middle School's PSSA scores in March 2006 (see Table 4 and Figures 3 and 4). However, the effect size for either reading or math scores appeared to be small, suggesting the need for longitudinal follow-up studies.

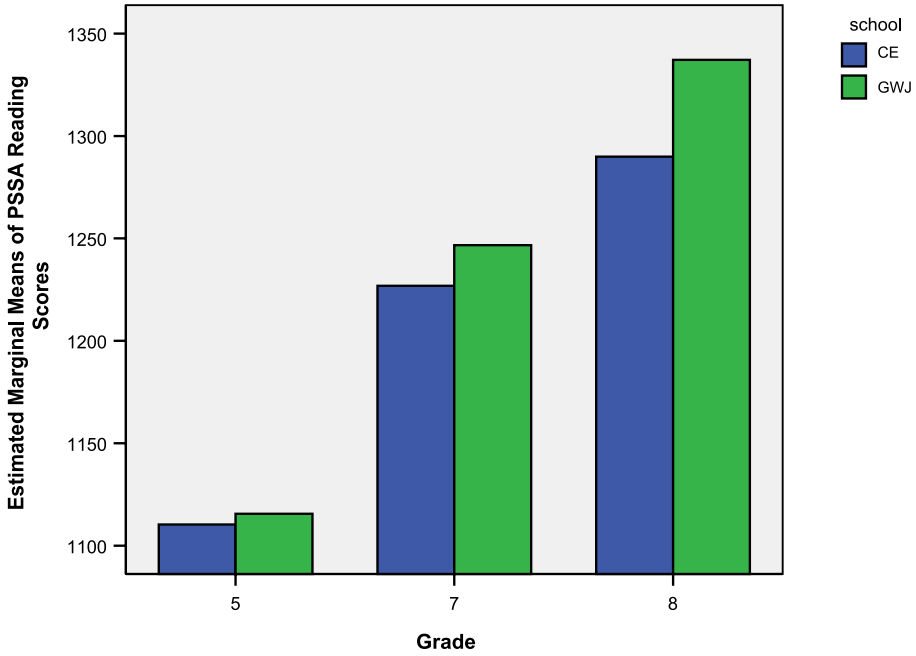
In Pennsylvania the PSSA scores are used to determine whether a school has achieved adequate yearly progress (AYP) based on a specific formula conceived by the state in its efforts to comply with the mandates of 'No Child Left Behind'. Although the benchmark comparisons revealed only one statistically significant difference between the host and comparison school based on the January reading benchmark, it is very encouraging that positive differences were found between the two schools on both the reading and mathematics PSSA tests, which were given in March 2006. It should also be noted that the host school was able to attain its AYP goals for the 2005–2006 academic year, while the comparison school was not able to achieve AYP for that year.

**Table 4. Two-way analysis of covariance (ANCOVA) on PSSA reading and maths scores (March 2006)**

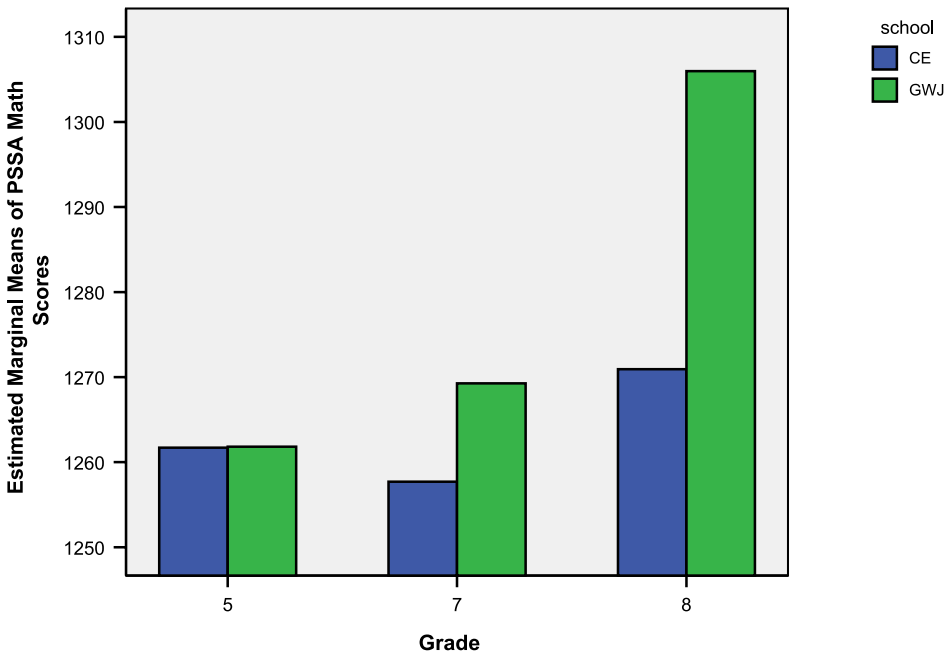
Source	<i>df</i>	<i>F</i>	Partial eta squared
<b>Reading scores</b>			
Covariate (October reading scores)	1	640.70**	0.339
School	1	7.10**	0.006
Grade level	2	157.28**	0.201
School × grade level	2	1.86	0.003
Error	1250	(24720.67)	
<b>Maths scores</b>			
Covariate (October maths scores)	1	1014.72**	0.449
School	1	3.95*	0.003
Grade level	2	4.86**	0.008
School × grade level	2	1.68	0.003
Error	1246	(18726.31)	

Note. Values enclosed in parentheses represent mean square errors.

\* $p < 0.05$ , two-tailed. \*\* $p < 0.01$ , two-tailed.



**Figure 3.** Estimated marginal means of the PSSA reading scores by school and by grade level. Note: CE, comparison school; Washington Middle School, host school. The means were adjusted with the October benchmark reading scores as the covariate



**Figure 4.** Estimated marginal means of the PSSA maths scores by school and by grade level. Note: CE, comparison school; Washington Middle School, host school. The means were adjusted with the

## Discussion

The purpose of Project Achieve was to create a collaborative environment whereby teacher leaders would have an opportunity to positively influence instructional practices in an urban middle school, and to evaluate the extent to which the project impacted student learning. Student achievement data between a comparison middle school, in which a traditional model of PD was used, and the host school were analysed to determine the extent to which the schools' curriculum-based and standardized scores were different. Although a valid, causal conclusion cannot be made due to other variables that may have influenced both the growth in teachers' use of research-based teaching strategies as well as differences in reading and mathematics PSSA achievement, the results provide strong, preliminary support for the use of teacher leaders as a primary method of enhancing instructional practice.

The results clearly show that Washington Middle School teachers who participated in the study made significant gains in their use of research-based strategies based on the MDL model. Descriptive statistics on the observational growth in teaching during the TL project year revealed that more growth was made in the areas of 'extension of knowledge' and 'using knowledge' than in the other competency categories although gains were made in every area. Growth in 'extending and using knowledge' signifies that teachers were increasingly more able to develop lessons that focused on higher level thinking, which also allowed students to be more self-directed in their learning. Growth was also evident in the categories of 'attitudes, knowledge acquisition, and habits of mind' from pre- to post-observations signifying that teachers were more able to establish a positive climate for learning, focus on lesson planning elements, and provide appropriate feedback to students to assist in their learning. The data also revealed that new and mid-level teachers made the most gains based on MDL model categories, while more experienced teachers made moderate instructional gains. These positive trends in teaching practice were thought to also influence student learning and achievement over the year.

Positive results were obtained on student achievement indices. Students at Washington Middle School made significant gains on the January reading benchmark test as well as the PSSA reading and mathematics tests across all grades when compared to Cecil Middle School. The fact that Washington Middle School attained AYP based upon the PSSA results during the 2005–2006 academic year is a noteworthy achievement, since the school did not achieve its AYP goals in prior years. Cecil Middle School did not meet its AYP goals at the time of the study nor previously.

The notion of distributed leadership as fostering learning communities to enhance teacher instructional performance is a viable concept based on this research. Teacher leaders, due to their presence and instructional focus, were able to foster a learning community atmosphere in their school. The teacher leaders synergistically elevated the attention of everyone—the leadership team, teachers, and students—to focus on the goal of increasing student learning and achievement. The professional development literature supports the idea that adult learning should be situated in the context of teachers' work and that mentoring and coaching increases learning to a

significant degree. With a collaborative learning focus, we found that much can be achieved for teachers and their students.

During the pilot year in which we observed and mentored teachers, we were greatly surprised by the lack of basic teaching skills demonstrated by the majority of the teachers at Washington Middle School. For example, more than half of the teachers did not routinely use an introduction or closure, allow adequate time for students to practise the content or skill, use visual organizers, emphasize higher order thinking or connect lessons to real-life experience in their lessons. Using the MDL model as a starting point for enhancing teachers' instructional effectiveness was an important first step. Although the MDL model connects to several key concepts in the culturally proficient teaching literature noted earlier, it is recommended that this content be included as an important aspect of professional development for all teachers. Despite where the teachers as a group began this journey, however, all made significant progress during the pilot and the teacher leader project year.

An idea highlighted in the literature review was that teacher retention and recruitment is positively influenced by instructional leadership models because of its community learning focus (Muijs and Harris 2006). A similar result was obtained in this study in that the TLs observed that many teachers planned to return to the school the following year. Similarly, the results of the literature review by Guarino *et al.* (2006) revealed that increased administrative support was cited as having a positive impact on their decision to remain at their schools. It follows that a teacher leader project which is designed to improve teaching performance through quality mentoring and coaching, that similar results would be achieved. Bandura's (1982) research on self-efficacy supports the contention that people strive harder when they see positive results in their work. We discovered that both new and experienced teachers have a strong desire to improve their teaching practice, yet many teachers do not have sufficient skills or understanding in order to achieve their goals. Given the challenge of staffing tough, urban schools, any model that decreases teacher attrition and, at the same time, increases teaching competence and student learning should be seriously considered.

The results provide compelling evidence that the establishment of site-based, teacher leader professional learning project is a viable strategy to improve the teaching skills of both new and experienced teachers. It is vital that all schools, especially urban schools, consider teacher leaders as a catalyst for quality professional development to improve the teaching performance of *all* teachers.

### **Implications**

If one believes that good teaching increases student learning, then all efforts should be made to create PD that will lead to enhanced teaching skills. It is a fact that all schools must deal with tenured teachers who do not possess adequate knowledge or teaching skill or competent teachers who leave the school for better professional opportunities. The MDL model provided a structure from which the teacher leaders were able to establish learning

communities which met teachers' basic and more advanced pedagogical needs. In addition, using the MDL model enabled the entire school to focus on effective teaching strategies and which also established a common ground for communication and collaboration. With the entire school focused on research-based teaching strategies and student achievement through data analysis of benchmark test performance, a new level of professional collaboration at this urban middle school was attained. More importantly, student learning and achievement markedly increased during the Project Achieve TL project implementation year.

The Project Achieve teacher leader project described in this study is aligned to the professional development literature in that it is site-based, collaborative, focused on learning over time, and responsive to the needs of the teachers. The model is also linked to the literature on distributed leadership in that teachers and the leadership team focused on the goal of student learning and achievement through learning communities. Focus group discussions with teachers clearly demonstrated that this model was helpful in fostering their professional growth, as long as it remained non-punitive and non-threatening. TLs learned a great deal about leadership skills and ability to influence instructional effectiveness. Students learned that they could achieve greater scores on their benchmark tests through hard work.

While this model was very effective in this urban school, we also believe that it can be generalized to other school communities. Thus the following recommendations are offered for future consideration:

- Trust is essential between teacher leaders and their teaching peers. Although some teachers in this study perceived, rightly so, that the TLs were communicating on a regular basis with the administrative team, we do not believe this reporting is necessary. The results strongly support the development of a collaborative, stress-free learning environment that is focused on the goal of student learning. Therefore, we encourage school administrators to let the TLs do their jobs without undue interference.
- The teacher leader model described here was established as a data-based programme in that TLs and teachers analysed data from curriculum-based tests to develop PD and instruction, respectively. Students, under the guidance of their teachers, focused attention to their individual progress on the benchmark tests. Data-based decision making was an important element related to the success of the TL project since teachers' instructional efficacy and, commensurately, student achievement scores significantly increased in this study.
- It is important to adequately prepare teacher leaders for their roles. This is a crucial aspect that relates to the eventual success or failure of this endeavour. TLs need coaching, especially in understanding the elements of 'good' teaching and ways that they can positively influence their teaching partners towards that end.
- The project focused solely on the MDL model first to acclimate and then to educate teachers about basic instructional and other important variables that positively impact student learning. However, the MDL model should be viewed as only a starting point for groups of teachers who may need to revisit basic instructional strategies. Although we did not infuse



specific content relating to culturally proficient teaching in the PD, we believe this content would not only complement MDL competencies but add considerably to teachers' knowledge base. The important point here is that whatever model is adopted, the model must be based on the assessed needs of the teachers. Tailoring PD content to meet our teacher's needs was a significant aspect of Project Achieve and its eventual success.

With the recent interest in the literature on teachers as leaders, additional research is needed to provide a solid rationale for its inclusion in PD efforts. This study provides some initial and compelling evidence that Project Achieve which focused on site-based, personalized professional development did make a difference in teacher instructional efficacy and student achievement in literacy and mathematics.

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