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## **A SCOPE Education Services Research Publication**

# **Journal for Leadership and Instruction**

**AN INTERNATIONAL PEER-REVIEWED  
RESEARCH JOURNAL FOR  
EDUCATIONAL PROFESSIONALS**

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I want to thank the Editorial Board of the Journal for Leadership and Instruction for my opportunity to serve as Editor in Chief. Joining Kevin McGuire as Co-Editors this year are Roberta Gerold, Superintendent of Schools in Middle Country Central School District, New York and Anthony Annunziato, Associate Professor of Education Administration, St. John's University, Jamaica, New York.

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Finally, we hope that you find the articles that we publish valuable and useful for the continuous improvement of teaching, leading and learning.

Sincerely,

*Robert J. Manley*  
Editor-in-Chief



# Teaching, Academic Achievement, and Attitudes Toward Mathematics in the United States and Nigeria

By S. Marshall Perry, Ph.D., Michael Catapano, Ed.D.,  
and Olosunde Gbolagade Ramon, Ph.D.

## Abstract

This paper explores the relationships among attitudes toward mathematics, teaching, and academic achievement in mathematics. Based on the contextual and social nature of academic self-concept, two complementary studies are discussed. The first study from the north-eastern United States examined the relationships among these variables in 84 high school students. A second study from southwestern Nigeria examined how teaching approach can engender changes in student achievement and attitudes toward mathematics through the analysis of 36 preservice teachers associated with 830 students. Instruments used included the Program for International Student Assessment, the June 2012 New York State Integrated Algebra Regents Examination, the Student Mathematics Attitudes Questionnaire, and the Student Mathematics Achievement Test. Analytic methods included descriptive statistics, correlations, linear regression, and analysis of covariance. Together, the research supports the link between attitudes toward mathematics and academic achievement and suggests that teachers can improve student attitudes toward mathematics based on their teaching approach.

## Background

Mathematics is a necessary tool needed to be able to function effectively in the present technological age (Aremu, 1998). The present age of information and computer technology (ICT) owes a lot to mathematics (Akinsola and Tela, 2001). Fayemidagba (1991) stated that the teaching of mathematics is very important to all human existence because mathematics is all about finding solutions to problems. Several studies, including Olowojaiye (1998), Alli and Anakwe (1997), and Oyeniran (2007) have indicated the role mathematics can play in the study of other school subjects.

Mathematics educators in Nigeria (Abimbade, 1990; Oladeji, 1995; Esan, 1999; Akinsola, 2001) have carried out research on methods and ways of improving the teaching and learning of mathematics at both the primary, junior and senior secondary school levels for several years. Research centered on effective teaching and learning of

mathematics. Despite these efforts, the results of students' performance at both the West African senior secondary school certificate examination (WASSCE) and National examination council (NECO) have not improved significantly (Adetula, 1995; Olowojaiye, 2001). In 2002, the failure rate which was 36.1%; by 2008, it was still high at 25.1%.

The United States is also faced with challenges that can hinder the nation's ability to lead in the field of mathematics. The 2011 National Assessment of Educational Progress, The Nation's Report Card, reported that 27 percent of the eighth-grade students tested from the United States performed below the basic achievement level, while 35 percent were at or above the proficient achievement level. This level of proficiency does not meet the expectations of an international leader (NAEP, 2011).

The rationale to improve mathematics academic achievement in both Nigeria and the United States prompted the examination of two studies discussed in this article. Rather than emphasize instruction or educational policies, which can vary markedly by context, both studies consider the role of ATM. The Nigeria study considers how teacher approaches relate to attitudes toward mathematics (ATM) and the United States study emphasizes the relationship between ATM and academic achievement. The study frames ATM as one part of academic self-concept. Through a critical review of international empirical studies, Marsh and Yeung (1997) found support for causal effects of both academic self-concept and achievement upon the other. They therefore hypothesized "a 'reciprocal effects' model in which prior academic self-concept affects subsequent achievement and prior achievement affects subsequent academic self-concept" (p. 43). Because academic self-concept is maintained in a social context in which teachers can be significant others (e.g. Hoelter, 1984) it is important to consider not just student academic self-concept, but also the role of teachers or teacher approach. Summarizing prior research, Irvine (1990) cautioned that students who do not believe that their teachers like them may feel isolated and discouraged to the extent that they eventually fail.

Together, the two present studies explore the complex relationship between teaching, attitudes toward mathematics, and academic achievement. Prior research within each variable supports this examination, rather than examining the variables in isolation.

## Theoretical Framework

This paper concerns the relationships among teaching, academic achievement, and ATM. The literature surrounding the link between ATM and academic achievement does not paint a coherent picture. For example, in a meta-analysis of 113 studies, Ma and Kishor (1997) assessed the relationship between ATM and achievement in mathematics. The causal relationship between ATM and achievement in mathematics was not statistically significant, so researchers concluded that ATM has virtually no effect on achievement in mathematics (Ma & Kishor, 1997). Subsequent research has demonstrated that ATM can impact achievement in mathematics, however. Higbee and Thomas (1999) concluded that student attitudes toward themselves as learners and ATM are related to achievement. They found positive correlations between non-cognitive variables such as ATM and cognitive variables including a final grade in a developmental mathematics course. Lipnevich, MacCann, Krumm, Burrus, and Roberts (2011) studied middle-school students from the United States and Belarus. They found that ATM explained 25 percent of the variance in mathematics achievement in students from the United States and 28 percent of the variance in mathematics achievement in students from Belarus. Their results support Higbee and Thomas (1999) and highlighted the importance of non-cognitive variables in predicting academic achievement.

This paper frames ATM as one part of a broader academic self-concept, which includes self-efficacy, self-esteem, attitudes, and other aspects (Perry, 2007). Self-concept is one's reflexive consciousness, which includes perceptions, beliefs, and attitudes about one's self (Baumeister, 1999). To assert the complexity and scope of the self-concept, social psychologists have also defined it as "the totality of the individual's thoughts and feelings with reference to himself or herself as an object" (Gordon, 1982, p. 2). Academic self-concept could be considered "a person's evolving mental picture of herself - actual, desired and feared; past, present and future" within the academic domain (Perry, 2007, p. 9).

Prior research supports that academic self-concept and academic achievement are closely related. For example, Hamacheck (1995) found a strong simultaneous relationship between students' academic achievement and self-concept. The interactive and reciprocal academic self-concept seems to increase with accomplished higher achievement levels (Hamacheck, 1995). Similarly, students with positive academic self-concepts have achievable goals, are task-persistent, take school work more seriously, are capable of working more independently, have higher degrees of curiosity, prefer to undertake more challenging work, and experience fewer school failures than those students who have

low self-concepts (Hamacheck, 1995). Valentine, DuBois and Cooper (2004) identified self-concept as a multidimensional structure and measure. Their research demonstrated the prevalence of a strong connection between students' academic self-concept and their achievement (Valentine, DuBois & Cooper, 2004). Other researchers have similarly noted that students with a high self-perception are able to achieve more than those with a lower view of themselves (Marsh, Trautwein, Ludtke, Koller, & Baumert, 2005).

Although informed by prior achievement, academic self-concept is subjective and maintained within a social context. Mead (1934) asserted, "The individual experiences himself. . .not directly, but only indirectly, from the particular standpoints of other individual members of the same social group, or from the generalized standpoint of the social group as a whole to which he belongs" (1934, pp. 138-139). Moscovici (1998) connected the social origin of perceptions and beliefs in conjunction with the human tendency to perceive and explain things with the use of representations and concepts. When someone reasons, ideas and beliefs are induced within the interconnected framework of his or her social world, as this world has provided cultural tools and cues. In other words, no knowledge or way of thinking is discrete; instead, it is connected with other ideas or beliefs within a person's self-concept. For example, Markus, Mullally, and Kitayama (1997) considered thinking in light of selfways—a community's normative ideas about being a person and the social practices, situations, and restrictions of everyday life that represent and foster these ideas. This social nature of the academic self-concept supports its examination in different contexts; this paper considers aspects of academic self-concept in the United States and Nigeria.

Research has demonstrated a correlation between people's self-concepts and how they believe significant others view them. For students, "significant others" may include teachers, parents, and friends (e.g., Hoelter, 1984). Therefore, researchers have noted that both school climate and individual teachers can have an effect upon aspects of academic self-concept. Researchers have framed and supported the effect of teachers and school climate as based upon students' subjective interpretations, rather than objective characteristics (Hoge, Smit, & Hanson, 1990). Because of the relationship teachers can have with student academic self-concept, the Nigeria study emphasizes the role of teachers and student achievement, while the United States study explores the relationship between academic achievement and student self-efficacy, anxiety, and ATM. These other aspects of the academic self-concept are discussed below.

Developed in the discipline of social psychology, self-efficacy strongly influences an individual's behavioral choices, performance, perseverance, and feelings in the attainment of goals (Bandura, 1994). Researchers have used the concept of mathematics self-efficacy to investigate and judge the competence of their subjects' ability to solve specific mathematical problems as well as their success in mathematics courses. Path analysis has demonstrated

mathematics self-efficacy to be more predictive of problem solving abilities than the perceived usefulness of mathematics, prior experience with mathematics, self-concept, and gender (Pajares & Miller, 1994). In their study using commonality analysis on matrix summaries available from prior studies on mathematics self-efficacy, Zeintek and Thompson (2010) found that mathematics self-efficacy consistently accounted for substantial unique variance in mathematics performance when other variables that contributed to mathematics performance were present.

The concept of mathematics anxiety has been the subject of various studies and has received much attention in the research literature. Mathematics anxiety usually arises from a lack of confidence when working in mathematical situations or solving mathematical problems (Stuart, 2000). This lack of confidence creates a state of discomfort that includes emotional and physiological responses such as fear, distress, sweaty palms, nervous stomach, difficulty breathing, and loss of ability to concentrate (Bursal & Paznokas, 2006; Hembree, 1990). These responses lead to avoidance of mathematics, which can lead to an increase in mathematics anxiety when required to complete mathematical problems. Mathematics anxiety has been found to be a significant impediment to mathematics achievement that affects a large portion of the population (Ashcraft & Moore, 2009).

Because teachers can be considered significant others in developing students' ATM, two different teaching approaches are contrasted. The notion that people build their own knowledge and their own representation of knowledge from their own experience and thought is called constructivism. This is different from a traditional direct instruction format, in which a teacher provides information to students. There are various strategies associated with constructivists' model learning which include problem-based learning, cooperative learning, concept mapping, advance organize, and interactive approach. The works of Stevenson (1988) and Ampiah (2002) supported that students taught with constructivist methods perform better than students taught with the traditional method, but research connecting constructivism to attitudes toward mathematics is less consistent.

## Methodology and Sample

The survey used in the United States study was designed to measure students' mathematics self-efficacy, mathematics anxiety and ATM. It consisted of 21 questions that were utilized in the 2003 administration of the Program for International Student Assessment (PISA) (OECD, 2005). The survey instrument utilized a four-point Likert type scale where eight items measured mathematics self-efficacy, five items measured mathematics anxiety and eight items measured ATM. The Cronbach alpha coefficients were .77 for mathematics self-efficacy, .87 for mathematics anxiety, and .86 for ATM. Correlation analysis was used to determine relationships among the variables, and linear regressions were calculated to determine if the variables predict performance.

The participants in the United States study were limited to tenth-grade students that had completed the June 2012 New York State Integrated Algebra Regents Examination (ARE) as ninth-grade students and were enrolled in two large suburban high schools within the same school district. There were 305 students that met the criteria for inclusion and invited to participate in this study. On the day of data collection, 84 of these students, 27.5 percent of the students invited to participate, were present and participated in this study. The demographics of the participants in this study were 49 percent male, 51 percent female, 75 percent Caucasian, 15.5 percent African American, 7.1 percent Hispanic, and 2.4 percent Asian. The participants in this study had a mean score of 82.9 on the ARE and scores on this examination ranged from 70-97.

For the Nigeria study, researchers employed pre-test/posttest control group quasi-experimental design with 2x2x2 factorial matrix to examine the relationship between teaching approach and student achievement and ATM. Thirty-six pre-service teachers of two colleges of education in the southwestern Nigeria and their 830 students were sampled for the study. The findings discussed in this paper represent a portion of a larger study on training in constructivist strategies for pre-service teachers.

Relevant measures included the Student Mathematics Attitude Questionnaire (SMAQ), a four point Likert type attitudinal scale with options of Strongly Agree, Agree, Disagree, and Strongly Disagree. Twenty times were constructed and validated by experts in field of education. Based on their comments, some items were modified. The instrument was also piloted. Study data collected obtained a Cronbach alpha coefficient for the internal consistency and reliability of 0.81. Another measure was the Student Mathematics Achievement Test (SMAT). This instrument contained thirty multiple choice items which covers mathematical concepts in the Junior secondary school II curriculum. To establish the content and face validity of the instrument, copies of the draft were given to experts in the field of education for necessary comments in regards to suitability, item difficulty and coverage. Based on their comments, certain modifications were made. The reliability index ( $KR_{20}$ ) value obtained was 0.83 and average item difficulty level obtained was 0.58 which showed that the test was neither too low nor difficult. So that researchers could determine if the training had differential effects by teacher gender, study respondents also reported their gender.

## Findings

The United States part of the study included correlational analysis to examine the relationships among variables and a linear regression analysis to determine the extent to which different variables predicted academic achievement as indicated by performance on the ARE. The correlations are summarized in **Table 1** as follows:

**Table 1:** Correlations Among Student Performance on the June 2012 New York State Integrated Algebra Regents Examination, Mathematics Self-Efficacy, Mathematics Anxiety, Attitudes Toward Mathematics, Gender, Race, and Overall Grade Point Average

		Score	MSE	MA	ATM	Gender	Race
Mathematics Self-Efficacy	r r <sup>2</sup> N	.428 18.3% 84					
Mathematics Anxiety	R r <sup>2</sup> N	-.204 4.2% 84	-.324 10.5% 84				
Attitudes Toward Mathematics	r r <sup>2</sup> N	.324 10.5% 84	.269 7.2% 84	-.492 24.2% 84			
Gender	r r <sup>2</sup> N	-.044 .19% 84	-.205 4.2% 84	.255 6.5% 84	-.086 .74% 84		
Race	r r <sup>2</sup> N	-.320 10.2% 84	-.112 1.3% 84	-.043 .18% 84	-.027 .07% 84	.014 .02% 84	
Overall Grade Point Average	r r <sup>2</sup> N	.579 33.5% 84	.463 21.4% 84	-.086 .74% 84	.215 4.6% 84	.050 .25% 84	-.331 11.0% 84

*Note.* Score = June 2012 New York State Integrated Algebra Regents Examination Score; MSE = Mathematics Self-Efficacy; MA = Mathematics Anxiety; ATM = Attitudes Toward Mathematics.

Researchers found that there was a moderate positive relationship among student performance on the ARE, and mathematics self-efficacy, ATM and overall grade point average. The results indicated that mathematics self-efficacy, ATM, and overall grade point average had the most impact on student scores on the ARE accounting for 18 percent, 11 percent and 34 percent of the variance respectively.

There was a weak inverse relationship between mathematics anxiety and student performance on the ARE. This indicated that students with higher levels of mathematics anxiety had lower scores on this examination than their classmates with lower levels of mathematics anxiety. This inverse relationship accounted for 4.2 percent of the variance in student performance on the ARE.

Overall grade point average and ATM showed a positive correlation with student performance on the ARE.

Overall grade point average alone accounted for 33.5 percent of the variance in student scores on the ARE. The variance increased by 4.2 percentage points when ATM was included.

Overall grade point average and ATM accounted for 37.7 percent of the variance in student scores on the ARE. The effect that overall grade point average and ATM had was found to be statistically significant,  $p = .000$  and  $p = .022$  respectively. This indicated that overall grade point average and ATM are very strong predictors of student performance on the ARE.

To determine the extent to which multiple variables predicted student performance on the ARE, researchers performed a stepwise linear regression. Variables tested included ATM, mathematics self-efficacy, mathematics anxiety, gender, race, and overall grade point average.

**Table 2:** Regression models to predict performance on Algebra Regents Examination

Model	R	R Square	R Square Change	Adjusted R Square	Std. Error of the Estimate
1	.579 <sup>a</sup>	.335		.327	4.59
2	.614 <sup>b</sup>	.377	.042	.362	4.47

a. Predictors: (Constant), Overall Grade Point Average  
b. Predictors: (Constant), Overall Grade Point Average, Attitudes Toward Mathematics

Of all the variables considered, only grade point average and ATM emerged as significant predictors of academic achievement as indicated by performance on the ARE (**Table 2**). Together, these variables describe nearly 38% of the variation in ARE scores. Grade point average is not surprising, given that it is another indicator of achievement. More notable is the inclusion of ATM in the model, as a better predictor than any other non-academic achievement variables. The coefficients of the second model are shown in **Table 3** below.

**Table 3** indicates that student scores on the ARE were expected to increase by 0.49 of a point when overall grade point average increased by one point and attitudes toward mathematics remained consistent. When ATM increased by one point and overall grade point average remained consistent, student scores were expected to increase by 0.24 of a point. The effect that overall grade point average and ATM had on regression model 2 was found to be statistically significant,  $p = .000$  and  $p = .022$  respectively. This indicated that overall grade point average

and ATM are significant predictors of student performance on the ARE.

The United States part of the study therefore supported the relationship between ATM and academic achievement. The Nigeria part of the study suggests that teaching approach can support the development of students' positive ATM. While the United States-based study emphasized the relationships among variable, the Nigeria study tested significant differences by teaching approach. The treatment group of pre-service teachers received interactive training in constructivism and the comparison group received more traditional training. Instead of employing independent samples t-tests, researchers employed Analyses of Covariance (ANCOVAs) to determine the effects of teacher training. This decision is due to students in the two teaching conditions differing significantly on the pretest. The table below summarizes the ANCOVA of post-test achievement on the SMAT, where treatment refers to the teaching approach (constructivist versus traditional).

**Table 3:** Coefficient values for overall grade point average and attitudes toward mathematics for regression model 2

	Unstandardized Coefficients		T	Sig.
	B	Std. Error		
(Constant)	35.6	7.01	5.08	.000
Overall Grade Point Average	.494	.083	5.94	.000
Attitudes Toward Mathematics	.242	.104	2.34	.022



**Table 4:** ANCOVA of student post-test achievement by treatment and gender

Source of variance	Hierarchical Sum of squares	Df	Means square	F	Sig.
Covariance pre-test	5.739	1	5.739	.225	.636
Main effects (combined)	39.599	5	1376.679	53.870	.000
Treatment	728.219	1	364.109	14.248	.000
Gender	499.219	1	499.219	19.535	.000
2 ways combined	1490.442	8	186.305	7.290	.000
Interaction treatment	93.273	2	46.637	1.825	.162
Model	8685.332	18	482.518	18.881	.000
Residual	20725.595	811	25.556		
<b>Total</b>	<b>29410.927</b>	<b>829</b>	<b>35.478</b>		

**Table 4** illustrates that there was a significant effect of treatment of student achievement in mathematics  $f(2,811) = 14.248, p = .000$ . On average, students of teachers who received the interactive training scored significantly higher on the post-test even when accounting for pre-test differences, with a mean achievement score of 26.62 versus the traditional group score mean of 11.45. Males scored significantly higher than females as well, with a mean of 13.19 versus the female mean of 12.03. This suggests that the constructivist approach in mathematics may help males more than females. While these findings are notable, the most central aspect of the study is the relationship between teaching approach and ATM. This is shown in the ANCOVA summary below (**Table 5**).

This table illustrates that the effect of treatment on students attitude towards mathematics is significant ( $F(2,4127) = 45.13, p = .000$ ). After controlling for prior achievement, the students of teachers trained in constructivist teaching had significantly more positive ATM, with scores of 60.98 versus 57.66. While a difference of three points might not seem meaningful, it was statistically significant. It supports the immediate role that teachers can play in supporting a

positive ATM, which the other study demonstrated was linked with academic achievement in mathematics.

### Discussion

The impact that ATM had on student performance in this study was found to be substantial in both the United States and Nigeria contexts. For the tenth-grade high school students in the United States study, ATM accounted for 11 percent of the variance in their scores on the ARE. This indicates the important influence positive ATM had on increasing mathematics performance. Furthermore, this impact on the variance demonstrates that ATM should be considered and included when examining methods to improve student performance in mathematics.

ATM and overall grade point average were found to be the best predictors of performance for all the participants on the ARE. ATM has been demonstrated to be a valid predictor of mathematics performance (Higbee & Thomas, 1999). In the present study ATM was found to be a better predictor of mathematics performance than mathematics self-efficacy. Similar conclusions are rare when

**Table 5:** ANCOVA of student attitude toward mathematics by treatment and teacher gender

Source of variance	Hierarchical Sum of squares	Df	Means square	F	Sig.
Covariance	914.425	1	914.425	9.998	.002
Main effects (combined)	11060.781	5	2212.156	24.186	.000
Treatment	8255.279	2	4127.640	45.128	.000
Gender	2183.940	1	2183.940	23.877	.000
2 ways interactive	926.196	2	463.098	5.063	.007
Model	21111.950	18	1172.886	12.823	.000
Residual	74178.316	811	91.465		
<b>Total</b>	<b>95290.266</b>	<b>829</b>			

mathematics self-efficacy and ATM have been included in the same study (Akay & Boz, 2010; Lee, 2009; Randhawa, Beamer, & Lundberg, 1993). This demonstrates, and confirms, that the variable ATM is a valid, useful predictor when using affective mathematics variables to predict student performance in mathematics.

The Nigeria-based research finds that that a teacher's attitude can be a factor in shaping a student's attitude toward mathematics. This is supported by prior research that concluded when students believe that their instructor is not happy teaching mathematics, and does not enjoy being with them in the classroom, the students will become less motivated to learn which fosters a negative attitude toward mathematics (Jackson & Leffingwell, 1999). ATM is not only formed by an instructor's attitudes, but by his or her teaching style as well. A learner will develop negative attitudes toward a discipline when a teacher's teaching style is inconsistent with the learner's learning style (Ertekin, Dilmac, & Yazici, 2009). A teacher's own attitude toward mathematics has an impact on the teaching styles he or she utilizes. This research suggests that constructivism, or supporting students in building their own representation of knowledge from their own experiences, might engender more positive student ATM.

From a larger perspective, teaching approach may have an effect on ATM, just as it can upon achievement. This research tentatively suggests that teachers may have both a direct effect upon student achievement and an indirect effect through attitudes toward a subject. Comparative international studies with identical measures would strengthen our understanding. Because both ATM and teaching approach share a relationship with achievement and each other, future research should continue explicating the relationship between teaching method, attitudes toward mathematics, and student achievement.

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# **Principal Professional Learning Community Behavior in Low Wealth High Schools with Higher and Lower Student Achievement as Measured by Mastery Scores on the New York State Eleventh Grade ELA Regents Exam**

**By Adrian Adams, Ed.D.**

## **Abstract**

This study was designed to analyze non-principal staff supervisors' perceptions of PLC efforts, encouragements, and activities in the six dimensions of a professional learning community (PLC) characterized as shared and supportive leadership, shared values and vision, collaborative culture, a focus on learning, supportive relationships, and supportive structures. By correlating that data with student achievement, this study sought to find which PLC dimensions and behaviors were associated with high student mastery, despite poverty.

A survey was completed by 33 assistant principals and department chairpersons from selected high schools classified by New York State as suburban or small city districts. The NYS Comprehensive School Report Card demographic data was used to select schools with low-wealth. The schools were further stratified into two groups which had either the lowest or highest percentages of students who attained mastery level, averaged over two years, on the New York State 11th Grade English Language Arts Regents exam.

The data showed that shared and supportive leadership was the strongest and only significant predictor of supervisor placement in lower or higher achievement low-wealth high schools among these New York State school districts.

## **Introduction**

Principal efforts, encouragements, and activities were analyzed for the presence of Professional Learning Community (PLC) practices. Study data revealed that teachers in high schools found to be high performing on the NYS ELA Regents Exam, measured by mastery level student achievement, had significantly higher levels of agreement that PLC practices were present (Passi, 2010). Passi found that supportive structures, a focus on learning, collaborative cultures, and a shared vision were related to mastery level student achievement, according to the perception of teachers. This study sought to extend that teaching staff research by measuring how the school administrators and supervisors other than the school principal compare PLC practices in high and low mastery schools.

This study employed the PLC-R survey instrument developed by Olivier, Hipp and Huffman (2010) to measure professional learning community activities occurring in schools. The PLC-R survey was a revision of the original PLC survey designed to assist in determining the degree of PLC practices in a school within each of the six dimensions. Hord (1997) created a survey designed to identify schools as being professional learning communities. The survey was further refined and used as the baseline for leading a school learning community to implement continuous improvement (Hipp & Huffman, 2010).

This research endeavor surveyed the frequency with which the PLC efforts, encouragements, and activities were practiced by low wealth high school principals as observed and reported by staff supervisors. By correlating that data with student achievement, this study sought to find which PLC dimensions and behaviors were associated with high student mastery, despite poverty. The findings can focus the professional development for secondary school leadership on the most efficacious professional learning community principal behaviors that are predictive of higher English Language Arts Regents exam student mastery achievement in New York State low wealth high schools.

All subjects in this study were from schools with high levels of financial need among the student population. This study controls for poverty by using low wealth schools matched for school size and degree of poverty as measured by percentage of students qualifying for free lunch, and other forms of social services provided by government programs such as student participation in the free and reduced school lunch program.

The effects of poverty on student achievement are well researched. According to a study by Leithwood et al. (2010), "...socio-economic status explained more variation in student achievement across schools than did any other single variable" (p. 696). Rothstein (2004) described politicians as having almost universally concluded that poor school achievement is the result of failing schools with wrongly designed school policies. This political theater has its roots in the common American notion that bad teachers,

unfocused ineffectual leadership, lack of discipline, and weak curricula must be the cause of low achievement. When discussing under-achieving schools, the impact of poverty is the six hundred pound gorilla in the room that fails to be addressed (Berliner, 2005).

Schools with similar populations of children living in poverty, that display vastly different levels of mastery achievement, would seem to indicate that something is being done within those schools to mitigate the influence of poverty. Indeed, caring and motivational exchanges with students and parents have been shown to shrink the achievement gaps in schools with the majority of students living in poverty (Manley & Hawkins, 2013).

This study measured the professional learning community leadership behaviors exhibited by instructional leaders of high schools, the principals, as reported by the supervisors who served as instructional leaders within their respective disciplines. The supervisors' observation of the teachers' classroom behavior, in response to the professional learning community behaviors exhibited by the principal, gives a unique perspective to practices at these schools.

### **Purpose**

The purpose of this study was to contrast the professional learning community activities most frequently used by principals in low wealth high achievement schools with similar schools with low levels of mastery achievement. These low wealth schools were identified in New York State as schools in which 54 percent or more of the students received free and reduced lunch. Higher and lower achievement schools were ascertained by ranking the high poverty schools with the highest to the lowest attainment of mastery on the 11th grade New York State English Language Arts exam. The selection of high schools included the highest scoring 33 percent and the lowest scoring 33 percent of students attaining mastery level on the average of the 2013, and 2014, 11th grade New York State English Language Arts exams.

### **Impact of Principal Leadership**

Significant positive improvements in student learning can be made due to the activities of school leaders (Waters, Marzano, & McNulty, 2003). Many of those activities performed by principals do not directly drive student learning to ascertain new heights. Many of the effects of good principal leadership are indeed hard to quantify (Witziers, Bosker, & Kruger, 2003). This study sought to identify some of those school leader activities that relate to higher student achievement within six different dimensions: supportive leadership, shared values and vision, collaboration, a focus on learning, supportive relationships and supportive structures.

Part of the implications of this study include providing guidance to principals and their district level superiors, as to where to put additional time, professional development, and resources to aid principals in raising student

achievement. A significant difference here though, is that the perceptions in this study are coming from the lens of the fellow administrators and departmental supervisors who can see which of the principals' actions result in professional learning community behaviors. Specifically, which aspects of principals' daily practices should be the first to receive attention for maximum return on investment as measured by attainment of mastery level achievement on the English Language Arts Regents exam. Many more examples of this type of research exist relating to teachers. For instance, one large study (Hattie, 2009) was done to inform principals where to focus their efforts with respect to the actions of their teachers in order to improve achievement. Hattie outlines that leaders do not need to lecture teachers to adopt new theories of practice, but rather listen to the current theories of practice and collaboration within the school culture to see how those can be enhanced and impact current mind frames.

### **The Role of the Non-Principal Supervisor**

At the high school level, the departmental chairperson is the leadership link between the principal and the teachers within an academic discipline. Klar & Brewer (2013) have noted that there is a significant body of research on principals who are successful at increasing student learning by increasing their levels of instructional leadership. Klar & Brewer also note that fostering the capacities of department chairs to participate in instructional leadership has been associated with higher student achievement. A strength of the PLC model is its capacity to aid principals in distributing leadership and developing practices of learning communities within the administrative team that includes assistant principals and department chairs.

Given the non-instructional responsibilities that frequently place time demands on principals, there is a need for multiple individuals to assert instructional leadership (Fullan, 2002; Hallinger, 2005; Barnett & Agaard, 2007). In schools with high rates of poverty, non-instructional demands often pull principals away from instructional leadership. In high poverty schools there is a clear need for the instructional leadership support that assistant principals and department chairs can provide (Portin, 2000; Resnick & Glennan, 2002).

Kegan and Lahey (2009) noted that school leaders were increasingly asking people to do things they were never trained to do. For instance, departmental leaders were asked to develop teachers in disciplines where they themselves were mere novices.

In the absence of the necessary discipline specific content knowledge and corresponding techniques to teach it, the need for skilled assistant principals and chairpersons becomes magnified. These administrators need to build professional capital among teacher leaders (Hargreaves et al., 2014). As leaders within learning communities, high school supervisors of teachers function as important change agents for instructional leadership.



Chairs whose responsibilities are to supervise teachers perhaps best observe a principal's actions which support instructional improvement. Observations of teachers are performed in search of instructional improvements, and collegial conversations during post-observations enable chairpersons to assess the principal's leadership.

Henderson's (1993) case study revealed chairs that were successful at being agents of school change were goal oriented, had influence with other school administrators, had the technical expertise combined with the interpersonal skills to work effectively with teachers, and were facilitators of collaboration within teacher teams. Weller (2001) concluded that departmental "chairs are in an ideal position to facilitate instructional improvement because of their daily contact with teachers and their own instructional expertise" (p. 74). High school departmental chairs and assistant principals offer a unique perspective as they are charged with the execution of their principals' values (Manley & Hawkins, 2010). The chairs and assistant principals connect all stakeholders to administrative policy. Department chairs in particular typically have authoritarian coercive power and to be successful change agents they must utilize interpersonal and professional skills to earn support from several stakeholders. From an organizational structure standpoint, they must answer to their principals and support teachers in their charge. All the while they must be mindful to foster the group bonding necessary for bridging the department to the rest of the PLC stakeholders (Sergiovanni, 1994; Gaubatz & Ensminger, 2015).

### Method

The New York State School Report Card data were used to determine which supervisors were in schools that qualified for inclusion. The high schools throughout New York State were classified as suburban/small city. Rural and urban high schools were not included. Low wealth schools were identified as having a student population in which 54 percent or more of the students were reported to be living in poverty. The potential achievement levels on the New York State English Language Arts Regents examination are 1-4, with level 4 representing a numerical grade of 85 or better. Selected high achievement schools were those in the top one-third of percentages of test taking students attaining level 4 mastery achievement on the New York State English Language Arts Regents examination. Selected low achievement schools were those schools in the bottom one-third for mastery attainment. **Table 1.1** shows the percentage of students living in poverty for the dozen schools selected for both groups with 50 supervisor subjects each. High school assistant principals and departmental chairpersons in low wealth, higher and lower English Language Arts achieving high schools in New York State were administered the Professional Learning Communities Assessment- Revised (Olivier et al., 2010).

The response rate was very low despite presenting opportunities for supervisor subjects to respond in a variety of formats. The surveys were sent as emails, mailed as hard copies, and hand delivered to mailboxes in the dozen high schools that were in each of the two cohorts. This low response rate prevented a factor analysis from being done. However, the reliabilities for the six dimensions of a professional learning community: supportive

leadership, shared values and vision, collaborative culture, a focus on learning, supportive relationships, and supportive structures, were all above .80.

### Research Questions

1. How do supervisors in low wealth high schools with higher and lower achievement describe activities in six dimensions of a professional learning community: supportive leadership, shared values and vision, collaborative culture, a focus on learning, supportive relationships, and supportive structures?
2. How do supervisors in low wealth high schools with lower and higher achievement differ in six dimensions

Table 1.1					
Schools Included					
Lower Mastery Achievement			Higher Mastery Achievement		
School	%Poverty	%Mastery	School	%Poverty	%Mastery
A	61.0	16.5	Z	56.5	38.0
B	57.5	15.5	Y	58.0	36.5
C	54.0	13.5	X	56.5	36.0
D	75.0	13.5	W	63.5	33.0
E	73.0	12.0	V	54.5	33.0
F	63.5	12.0	U	67.5	28.5
G	68.5	11.0	T	54.5	27.5
H	68.0	11.0	S	68.0	25.0
I	60.0	5.5	R	71.0	24.5
J	66.0	4.5	Q	56.0	23.0

of a professional learning community: supportive leadership, shared values and vision, collaborative culture, a focus on learning, supportive relationships, and supportive structures?

3. What relationships exist among supervisors' descriptions of principals' actions in six dimensions of a professional learning community: supportive leadership, shared values and vision, collaborative culture, focus on learning, supportive relationships, supportive structures, and their placement in lower and higher achieving high schools?

4. How do supervisors' descriptions of principal professional learning community behaviors in the six dimensions of supportive leadership, shared values and vision, collaborative culture, a focus on learning, supportive relationships, and supportive structures predict their placement in a lower or higher student achievement school?

## Findings

The descriptive statistics of **Table 1.2** showed supervisors in the higher achieving schools reported greater agreement with their principal acting with shared and supportive leadership practices, implementing supportive structures, and upholding a focus on learning.

## Research Question Two

How do supervisors in low wealth high schools with lower and higher achievement differ in their descriptions of six dimensions within a professional learning community: supportive leadership, shared values and vision, collaborative culture, a focus on learning, supportive relationships, and supportive structures?

An independent samples t-test was performed. **Table 2.1** shows the differences in perception of supervisors in lower and higher achieving schools regarding the presence of six professional learning community dimensions: supportive leadership, shared values and vision, collaborative culture, a focus on learning, supportive relationships, and supportive structures.

As indicated in **Table 2.1**, the only variable with a significant difference between the low wealth high schools with lower achievement on the English Language Arts regents' exam, and the high schools with higher achievement, was the Supportive Leadership dimension. Supervisors rated supportive leadership significantly stronger in the higher mastery schools.

An item frequency analysis was conducted to identify variables containing items with a large difference, herein defined as 20 percent or greater between the 2 Likert choices indicating degrees of disagreement, and the 2 Likert choices indicating degrees of agreement.

Within the Shared and Supportive Leadership variable, **Table 2.2** shows frequency distributions for item 1 "staff members are consistently involved in discussing and making decisions about most school issues." **Table 2.2** showed that 60 percent of the supervisors in lower achieving schools disagreed to strongly disagreed with that statement, compared to only 26 percent of supervisors in higher performing schools.

**Table 2.3** displays the frequency distributions for item 2 "principal incorporates advice from staff members to make decisions." In higher achieving schools, 78 percent of supervisors agreed or strongly agreed with that statement compared to only 30 percent of supervisors in lower achieving schools.

**Table 1.2**

### Group Descriptive Statistics

	Type	N	Mean	Std. Dev.	St. Err. Mean	Response Range	Item Mean
Support Lead	Lower	10	25.8000	10.06424	3.18259	13-42	2.35
	Higher	23	33.3913	6.87379	1.43328	29-35	3.04
Vision	Lower	10	26.0000	6.14636	1.94365	15-34	2.89
	Higher	23	26.6957	6.38489	1.33134	27-33	2.97
Collaborative	Lower	10	27.5000	8.00347	2.53092	12-39	2.75
	Higher	23	28.9565	7.11898	1.48441	26-32	2.90
Focus	Lower	10	17.1000	5.91514	1.87053	8-28	2.44
	Higher	23	19.5217	4.50121	.93857	22-33	2.79
Relationships	Lower	10	14.3000	3.33500	1.05462	9-18	2.86
	Higher	23	14.9130	3.52798	.73563	28-30	2.98
Structures	Lower	10	26.6000	6.63660	2.09868	18-38	2.66
	Higher	23	30.3043	6.67039	1.39087	28-35	3.03

**Table 2.1***Independent Samples Test*

	Achievement	N	Mean	t	df	Sig.(2-tailed)
Support Lead	Lower	10	25.80	-2.526	31	.017
	Higher	23	33.39			
Vision	Lower	10	26.00	-.291	31	.773
	Higher	23	26.69			
Collaborative	Lower	10	27.50	-.521	31	.606
	Higher	23	28.95			
Focus	Lower	10	17.10	-1.291	31	.206
	Higher	23	19.52			
Relationships	Lower	10	14.30	-.466	31	.644
	Higher	23	14.91			
Structures	Lower	10	26.60	-1.468	31	.152
	Higher	23	30.30			

**Table 2.2***Frequency Distributions Question 1: Staff Involved in Decisions*

Achievement	Response	Frequency	Percent	Cumulative Percent
Lower	1.0	5	50.0	50.0
	2.00	1	10.0	60.0
	3.00	3	30.0	90.0
	4.00	1	10.0	100.0
Total		10	100.0	100.0
Higher	1.00	1	4.3	4.3
	2.00	5	21.7	26.1
	3.00	11	47.8	73.9
	4.00	6	26.1	100.0
Total		23	100.0	100.0

**Table 2.3***Frequency Distributions Question 2: Principal Incorporates Advice*

Achievement	Response	Frequency	Percent	Cumulative Percent
Lower	1.00	3	30.0	30.0
	2.00	4	40.0	70.0
	3.00	2	20.0	90.0
	4.00	1	10.0	100.0
Total		10	100.0	100.0
Higher	1.00	0	0	0
	2.00	5	21.7	21.7
	3.00	8	34.8	56.5
	4.00	10	43.5	100.0
Total		23	100.0	100.0

**Table 2.4***Frequency Distributions Question 5: Opportunities for staff to Initiate Change*

Achievement	Response	Frequency	Percent	Cumulative Percent
Lower	1.0	4	40.0	40.0
	2.00	2	20.0	60.0
	3.00	3	30.0	90.0
	4.00	1	10.0	100.0
Total		10	100.0	100.0
Higher	1.00	0	0	0
	2.00	4	17.4	17.4
	3.00	14	60.9	78.3
	4.00	5	21.7	100.0
Total		23	100.0	100.0

As shown in **Table 2.4**, only 40 percent of supervisors in lower achieving schools agreed or strongly agreed with item 5 that "opportunities are provided for staff members to initiate change" compared to 83 percent of supervisors in higher achieving schools.

As for the other five variables, shared values and vision, collaborative culture, a focus on learning, supportive relationships, and supportive structures, none of the perceived differences were significant. The supportive structure variable had mean scores of 27 for lower achieving schools and 30 for higher achieving schools. That difference approached significance at  $p = .152$ , relative to the other variables.

The respondents in the higher mastery achievement schools distinguished their schools as having staff involved in decisions and having school leaders who incorporated staff advice in decisions. The higher achieving school principals offered more opportunities for staff to make changes, and had more supportive structures in place to provide a professional learning community environment.

Supportive leadership was the dimension most highly correlated with higher achieving, low-wealth schools. A Spearman correlation analysis was conducted, **Table 3.1**, to reveal relationships between all the variables. Supportive leadership was most related to higher achieving schools accounting for 12.7 percent of the binary relationship. Supportive leadership had the most highly positive correlation with the other dimensions at .738 for collaboration, .738 for vision, .705 for focus on learning, .570 for supportive relationships, and .754 for supportive structures. All of those correlations were significant,  $p < .01$ . The variable least correlated with supportive leadership, relationships ( $r = .570$ ), was still a strong positive relationship.

A stepwise logistic regression was used to determine the degree to which the variables were able to predict the placement of respondent supervisors into either a higher

or lower achieving low wealth high school. **Table 4.1** showed that model 1 added the predictive variable supportive leadership to the constant. Model 1 was able to account for 75.8 percent of the variance in the school placement of supervisors. Higher shared and supportive leadership predicted placement in higher achieving schools.

## Conclusions

These high schools had similar levels of poverty and yet, the levels of mastery that their students achieved on the English Language Arts Grade 11 Regents exam differed significantly. One has to conclude that school leadership makes a difference specifically in providing supportive leadership and promoting a shared vision for the purpose of the school.

The research literature emphasizes the power of collaboration, yet the quality of the dialogue, inquiry, plans of action and evaluations of results seem to be elements of collaboration most often ignored. School leaders have to raise the quality of dialogue in all collaborative teams and evaluate their outcomes. A central tactical component here is to professionally develop assistant principals and department chairs because they are likely to take the collaborative policies and turn those into collaborative practice (Gaubatz & Ensminger, 2015).

Bolman and Deal (2008) Senge (2006) and Reeves (2005) emphasize the importance of supportive leadership at school. In the case of these high needs schools, the principal's capacity to provide supportive leadership was the only variable that differed significantly between higher and lower achieving schools.

Supportive leadership behaviors that were most distinctive in higher achieving schools included having staff involved in decisions, principals taking advice from staff, and staff being able to initiate change. Administrative support has been found to be a significant predictor of teachers' job

satisfaction which is an important factor in raising student achievement (Tickle, Chang, & Kim, 2011; Ingersoll, 2001). School leaders should focus on developing the capacity of teachers to be involved in decisions, listen to teacher advice and help teachers initiate changes in practices related to teaching, learning, and supportive structures at school.

Hattie (2009) conducted a meta-analysis of over 800 studies on variables that impacted student achievement. He found that leaders giving constructive feedback to teachers

regarding the teaching and learning within their classrooms had more impact on student achievement than any other measured activity in those schools. Further, Hattie reported that these leaders provided a continuous loop of feedback that gave teachers a chance to add to their pedagogical knowledge and improve learning. In essence, the more skilled leaders are at supporting teachers' acquisition of instructional decision making in their tool kit, and the more teachers reflect on their teaching, the better the teachers are able to serve their diverse learners (Manley & Hawkins, 2010).

**Table 3.1**

*Correlation Matrix*

		Type	SupprtLdr	Vision	Collabortv	Focus	Relations
Type	rho	1.000					
	r <sup>2</sup>						
	N						
SupprtLdr	rho	.357*					
	r <sup>2</sup>	12.7					
	N	33					
Vision	rho	.108	.738**				
	r <sup>2</sup>	11.6	54.5				
	N	33	33				
Collabortv	rho	.073	.738**	.681**			
	r <sup>2</sup>	.5	54.5	46.4			
	N	33	33	33			
Focus	rho	.219	.705**	.658**	.713**		
	r <sup>2</sup>	4.8	49.7	43.3	50.8		
	N	33	33	33	33		
Relations	rho	.129	.570**	.729**	.728**	.599**	
	r <sup>2</sup>	1.7	32.5	53.1	53	35.9	
	N	33	33	33	33	33	
Structures	rho	.250	.754**	.801**	.656**	.561**	.710**
	r <sup>2</sup>	6.3	56.9	64.2	43	31.5	50.4
	N	33	33	33	33	33	33

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

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

**Table 4.1**

*Classification Table<sup>a</sup>*

Observed		Predicted Type		Percentage Correct
		Lower	Higher	
Type	Lower	4	6	4.0
	Higher	2	21	91.3
Step 1				
		Overall Percentage		75.8

a. Variable entered on Step 1: Shared & Supportive Leadership



Supportive leadership was significantly related to all other variables; shared vision, collaboration, a focus on learning, supportive relationships, and supportive structures. The most critical constructs that comprised supportive leadership were the principals' capacity to share leadership, decision making, and the initiation of change with teachers. Highly effective principals develop the professional capital of their teachers (Hargreaves & Fullan, 2012). To raise student mastery, principals, supervisors, and teachers must be involved in continuous dialogue and inquiry about current practices, desired results for each student, the implementation of action plans, student gaps in mastery, and the analysis of results. The principal is the responsible agent for effective shared leadership at the school.

## Recommendations

If New York State school districts are trying to achieve improved ELA Regents exam scores, then one of the most impactful uses of time, money and energy would be to professionally develop principals in the knowledge of and ability to provide supportive leadership. Supervisors of departments should be developed in the practices of supportive leadership, shared vision, and supportive structures that enhance professional capital at the high school (Hargreaves & Fullan, 2012). Staff should be encouraged to take chances to teach to the collective vision of the school created by the contributions of all stakeholders.

A shared vision that addresses teaching, learning and collaborative discussions and inquiry within the school can contribute to higher achievement. Principals must be professionally developed to lead with inquiry. Principals must be supported when they begin leading stakeholders in the collective creation of shared values and vision for their school.

Supportive structures should address providing the time to develop staff and facilitate ongoing collaborative work. For example, a schedule that allows for collective learning and shared practice should be in place. Allocation of resources such as technology, instructional materials, experts in the field, should be prioritized to support continuous learning.

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# A Case Study of Data Use, Project-Based Learning, and Language Development for ELLs

By Annette Shideler, Ed.D.

As of the 2014/15 school year, Nassau County had 12,165 English Language Learners (ELLs) K - 12 and Suffolk County had 16,252. Teachers, both mainstream and English as a New Language (ENL), are cognizant of the many languages and learning ability levels of ELLs. They struggle to address the challenges presented by this population of students. Districts with large or small ELL populations, face similar challenges: how can mainstream content be made comprehensible to ELLs to develop core content concepts; language skills; and empower students to learn the tools of technology?

Teachers are conscious of the many factors they have to balance on a daily basis: getting "through" the textbook; incorporating Common Core State Standards (CCSS); integrating with fidelity New York State curriculum modules; keeping accurate grade and attendance records; and being mindful of IEP and 504 special education regulations. It was with this in mind that I focused on the notion of systematizing a way for teachers to become intentional. By intentional, I mean knowing which of the ELA performance indicators are deemed most critical (i.e. most frequently tested); and, which of these are the most difficult for ELL students to master (as determined by test score data), and armed with the knowledge of which performance indicators ELLs readily master (as determined by test score data), teachers prioritize their classroom time.

Collaboratively developing strategies for teaching these newly identified, difficult performance indicators permits ELL teachers to be intentional in what they teach, how they teach it and in their alignment of teaching/learning time. This intentional approach parallels the Explicit Direct Instruction approach put forth by Hollingsworth, and Ybarra 2013 and strives to balance the use of standardized test data to determine critical ELA performance indicators in apportioning class time to teach listening, speaking, reading and writing concepts, and skills with technology.

## The Process

Data-driven decision making is one of the strategies most widely endorsed as an effective way to improve education (Mandinach, 2015). Armed with data, teachers make informed decisions. Effective data literacy for teachers is hindered by the poor quality of the data, the lack of time

necessary to evaluate data and a lack of cultural collaboration with beliefs in self-reflection and continuous improvement (Ronka et al. 2010; Gill et al. 2014). When teachers analyze data to inform their instruction, they identify the errors that need to be targeted instructionally. They prioritize their curriculum by identifying those skills in need of remediation. Subsequently, scores need to be cross-referenced with standardized test questions, and performance trend analysis. By cross-referencing multiple data points, we assure the validity of the interpretation.

An analysis of Common Core Performance Indicators (PI) with trend charts and maps can help determine which standards are the most frequently tested and therefore considered to be most important in terms of NYS curriculum (Figures 2 & 3). Indeed, upon review of the PIs which are most frequently tested over the three year span of the trend analysis, the following four anchor standards were consistently at the top of the list:

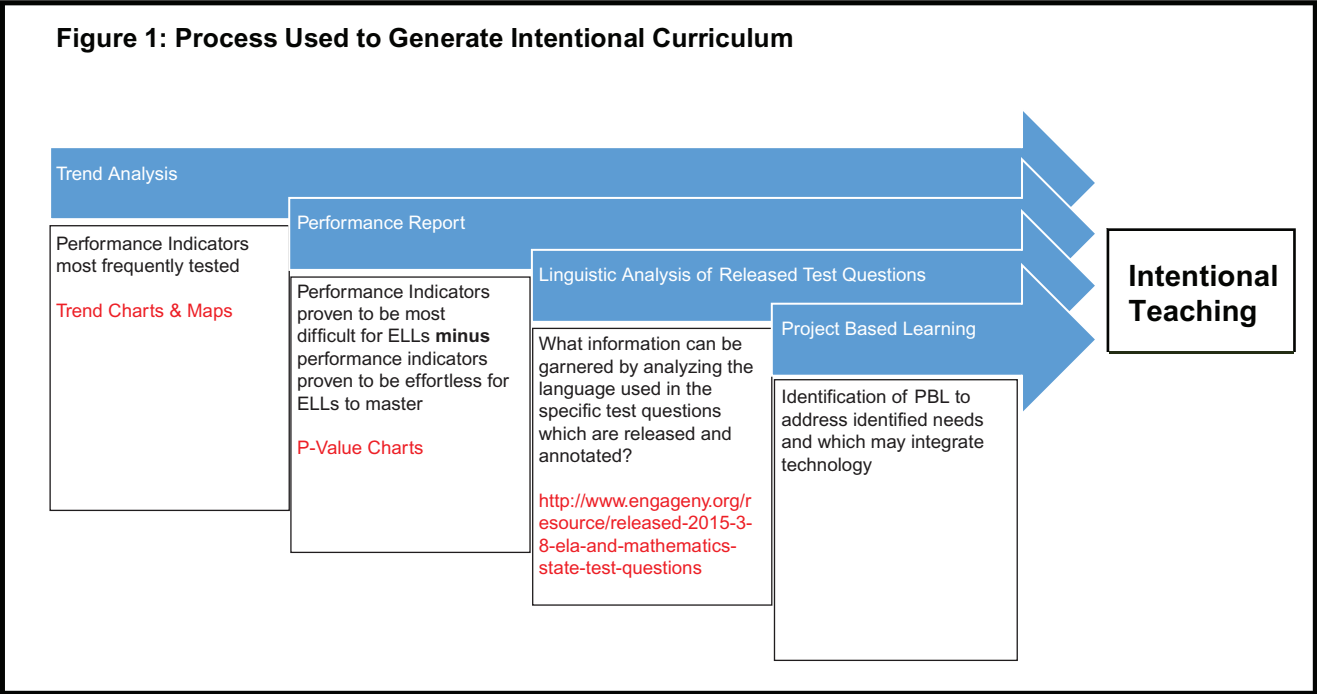
- Read closely to determine what the text says explicitly and make logical inferences from it...
- Determine central ideas or themes of a text and analyze their development...
- Interpret words and phrases as they are used in text...
- Assess how point of view or purpose shapes the content and style of a text...

In Suffolk County, the Regional Information Center (RIC) provides multi-tiered data analysis of standardized test data to districts and regional educational leaders. Of the many reports they are able to compile, the P-Value report (a sample is provided in Figure 4. It was recently renamed to Performance Report with Gap Analysis.) compares the totality of the sub group sitting for an exam against the totality of the group taking the test and enables valid comparison of the results of groups of students. While Figure 4 addresses P-Value scores for the anchor standards and, as such, is a gross measure of the difference of mastery of the anchor standard between the two student groups, gaps of over 20 points are evident. These gaps are the signals of areas particularly difficult for the ELL student. Another report, also provided by the RIC, allows 'drilling deeper' which enables direct comparison on a test question by test question basis,

of the percentages of ENL students versus their mainstream peers who answer each question correctly.

Armed with the knowledge of which questions ELL students have most difficulty answering correctly and knowing which Performance Indicator (PI) that question was designed to address, the most difficult PIs become evident. This represents two of the three pieces of the puzzle. The last piece is to analyze the linguistic demand that might impede ELL students' success in this arena and to design 'intentional' curriculum to explicitly scaffold appropriate learning activities (Figure 1).

successful as a teacher. The problem however is that even though recounting stories is a common core state standard, it only represents 5% on the 2014 3rd grade ELA exam and only 7% on the same 2013 exam. Whereas, asking and answering questions to demonstrate understanding of a text, referring explicitly to the text as the basis for answers, which Ms. A rarely teaches because it is so difficult to teach to ELLs, is one of the most widely tested ELA standards. Since this standard appears both in Reading Informational Text, and Reading for Literature, one can argue that it represents 32% of the 2014 3rd grade ELA exam (refer to Figure 3).



It is normal for teachers to want to repeat previous activities they feel successful teaching. For example, Ms. A, a 3rd grade ENL classroom teacher, loves teaching sequencing. Her students love it when Ms. A teaches sequencing. They have really learned sequencing. The students feel successful as students and Ms. A feels

Mrs. A's curriculum is out of alignment. When teachers are able to become sufficiently data literate and have access to multiple points of data, their analysis within the context of their classroom curriculum becomes an integral part of instruction in the class.

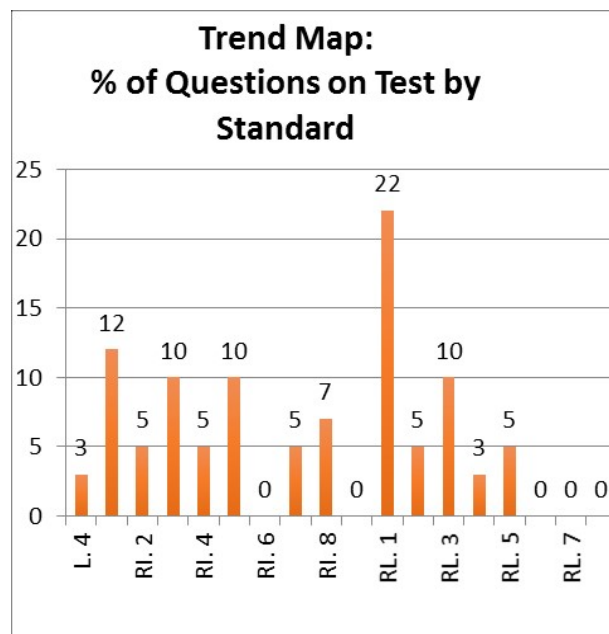
**Figure 2: Sample of Data Available in Trend Charts**

Anchor Standard	Standard #	Grade 3 ELA	Item #s	Item #s	Item #s
Reading Standards for Informational Text			2013	2014	2015
Key Ideas and Details	Standard 1	Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers.	1, 5, 27, 29, 34, 37, CR46	7, 9, *27, *32,	14, 17, 31*, 36*
	Standard 2	Determine the main idea of a text; recount the key details and explain how they support the main idea.	6, 30, CR39, Essay47	*35	34*, 37*, CR45*
		Describe the relationship between a series of historical events			

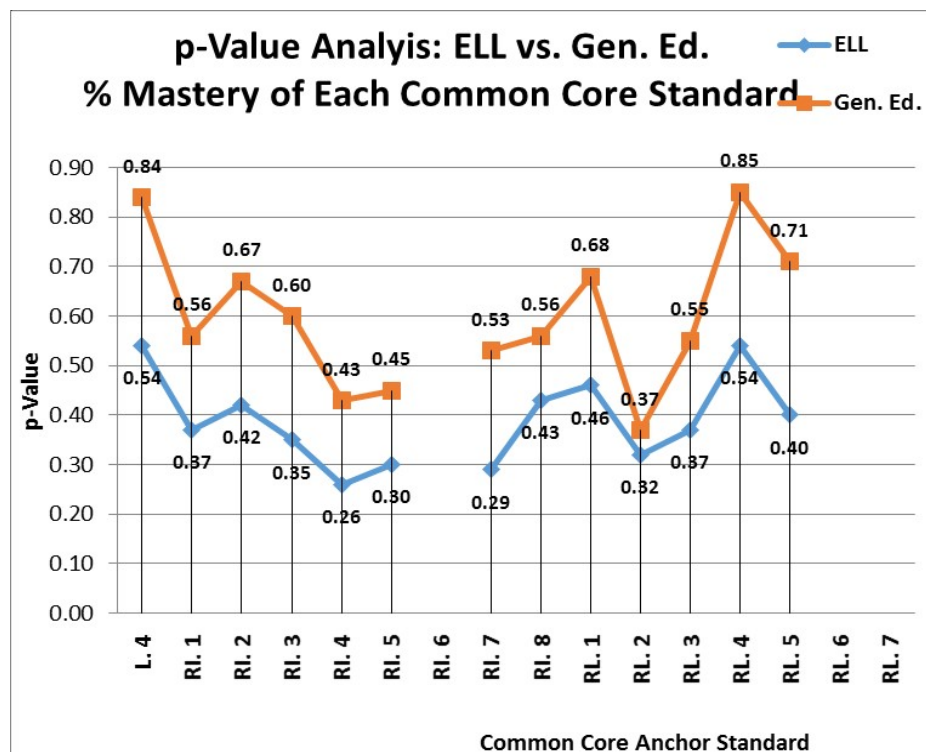
In this case analysis, our approach has been to use data to create intentional curriculum. The data help establish priorities based upon Performance Indicators (PIs). The intentional approach has teachers analyze data, identify the specific performance indicators (PI) proven to be difficult, and isolate the linguistic demands to design a project-based learning (PBL) unit that exemplifies four strands. The first and foremost strand is that the PBL be based on mainstream content area curriculum. Secondly the project must also focus on the academic skills required for the identified PI. The third strand focuses on the language development needed based on analysis of the language demands of the actual standardized test questions. Lastly, the PBL must also integrate technology to enhance learning. In this case, integration of all four strands in the creation of essays and multimedia with iPads were embedded into an integrated iBooks using iBookAuthor.

The process, while multi-stepped, is straightforward. With access to Trend Analysis data we were able to determine which performance indicators were most frequently tested throughout multiple years (refer to Figure 2). Clearly, NYSED determined that these performance indicators were more essential and therefore more frequently tested. Armed with this data, we reviewed the P-Value scores of individual school districts, the consortium and/

**Figure 3: 2014 Trend Map of Total 3<sup>rd</sup> Grade ELA Test provided by Eastern Suffolk BOCES RIC**



**Figure 4: P-Value Chart comparing 2014 3<sup>rd</sup> Grade ELLs to Gen. Edu. Students on ELA test scores. Data made available by Eastern Suffolk BOCES RIC**



or all ELL students in Suffolk County. By comparing district data with county data, we were able to determine whether the low scores (or for that matter the higher scores) were due to the strength or weakness of the particular school district curriculum. The last step was to put both sets of data side by side to determine which performance indicators were both most heavily tested (Figure 3) and which were most difficult for the ELLs of the school district and/or ELLs in general (Figure 4).

Using this process for the English Language Arts exams 3-8, we identified specific curriculum indicators evidenced to be most difficult. Skills such as inferring, point of view, finding supporting evidence and determining main idea are difficult skills for most ELL students. The curriculum of NYSED is such that each performance indicator spirals and becomes more difficult through the grades.



## The Results

In working with elementary ELL teachers and secondary Special Education teachers in a district on Long Island, we identified the anchor standard Point of View as a common area of concern for both populations of students. Also, we implemented an integration of iPad technology for both groups as part of this teacher-training program. We decided to create an eBook focusing on point of view which involved integrating such multimedia as video, text and apps, such as *Educreation*.

In this case, the performance indicator (PI) Point of View for the third grade (RL/RI.3.6, W.3.1) calls for students to "distinguish their own point of view from that of the author, the narrator or those of the characters." In terms of writing, students are expected to write an opinion piece on a topic or text giving reasons that support a point of view.

We decided to ask K-3 elementary students to write stories of their favorite toys, which is a fairly straight-forward assignment. However, the heart of the assignment was that students had to write the same story as if they were the toys. Teachers taught linking words and phrases and the concepts of supporting your reasons for statements. Teachers and students discussed the novel assignment and developed oral facility with the linking words and the notion of answering the 'why' or 'what makes you say that' question. And then the students wrote...

**Vanda's Perspective:** "My favorite toy is my American Girl doll Elsa. I like to sleep with her. Other times I like to play with her. I like to dress her and I like to do new hair styles on her. I feel happy to have her with me, I also feel safe when I am with her. I love her very much, when I am sad she makes me feel much better. Elsa has brown hair, white skates, white tights and a pink skirt. I like that she is pretty. I do not like when my sister takes my doll and loses it. I like to dress her up in different clothes. I do not like with people move her without telling me. That is why she is my favorite toy."

**Elsa's Perspective:** "I am Vanda's favorite doll Elsa. I play dress up with Vanda. I stay in the closet when Vanda goes out with her friends. Sometimes I go with Vanda to her friend's house. I feel happy when people touch me. I get scared when Vanda put me in the closet. I feel scared when Vanda leaves me on the floor with her dog. Sometimes Vanda's sister puts me in the snow. Usually I live in the closet. I like when Vanda watches t.v. with me, she is my favorite girl."

By the fifth grade, students are expected to be able to describe how a narrator's or speaker's point of view influences how events are described (recognize and describe how an author's background and culture affect his or her perspective. Concurrently students should be able to "analyze multiple accounts of the same event or topic, noting important similarities and differences in the point of view they represent." By the eighth grade, students are

to determine an author's point of view or purpose in a text and analyze how the author acknowledges and responds to conflicting evidence or viewpoints. Students are to understand why an author writes as she does. This is a level of abstraction difficult for ELLs of almost any linguistic level.

As we can see from just this one example, the same strand gets progressively more abstract and difficult. The more abstract the requirements of the strand, the more complex the grammatical structure that is required to satisfy the standard. Our challenge therefore is to identify concrete tasks; teach the complex language structure and mandate that our ELL students employ the language structure to complete the task.

In the school year 2013/14, we conducted an analysis of data and determined that students needed to focus more on non-fiction, specifically asking and answering questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers (RI/RL 1 which counted for 32% of the 2014 ELA 3rd grade test).

Teachers of K-12 ELL students were asked to challenge their students to write Connecting Journeys essays which focused students on linking their pasts with their futures. Compelling honesty and the chance to be heard were the hallmarks of these narratives. The book was also intended to be a teaching tool. To that end, each student submitting an essay was to also submit 5 comprehension questions to which readers of their essays would be required to "demonstrate understanding of a text." The following is but one example:

"My name is Aida, but my Chinese friends call me Yi. Many Chinese believe that deciding a name for your child is very important because it relates to a person's fortune. So my parents took a long time to make my name up. At first they wanted to call me another name. However, one of my father's friends who was fortune teller told them to give me another name because the name they wanted would bring a bad fortune to me, so they changed it to Yi. That was how I got my name. I am always thinking about names for my future children. I want to give them a beautiful name.

I come from China. Many people asked me why I came here. There are so many reasons why I came to America, the biggest one is the air pollution in China. I think that a healthy environment is a basic reason that you choose to stay in a country. If a country's environment is dangerous for your health and threatens your survival, you have to leave. The second reason is the government of China.

Why is the environment so bad? It is because China has a corrupt government. They do not have a moral standard to do things. Everyone is selfish. The oil that they refine, the food that they produce, and even the water they filter is not good. Many babies died because they drank poisonous milk powder, the rate of lung cancer is increasing at a faster rate than ever before.

This is all because of the government. The third reason is the education. Chinese students are going to school to take tests. What we learn is not even the truth. The teachers do not teach us how to think independently. These are the three main reasons why I left China.

Although, I love China, it is my homeland. I am sad that it doesn't look good now. The sky is grey and the major rivers are not clear anymore. Five years ago, when the industries that cause pollution were not developed yet, there was a blue sky over my head. I could stand on the top floor of our apartment building and see the Summer Palace clearly. Now what I see is only the smog. I was forced to leave China, even though I love it there. I hope it can go back to the way it was. I know there are many people who want China to be a big modern country like it is now. However, we have to provide a better environment before we develop it. In the future, I want to be a UN ambassador, to help China get better, as a United Nation. Because I think that one person's strength is too weak to help an entire country. I hope one day the blue sky comes back, there would be more pandas in Sichuan, buildings in Shanghai could be built taller and taller and the national flag in Beijing could seem more red than it is now"

### **Questions:**

1. Why is deciding a name for your child so important in China?
2. Explain two reasons why A-wanted to come to America?
3. How has the environment in China changed during the last 5 years?
4. What is the problem with not teaching students how to think independently?
5. How can the Chinese government help to make the environment better?"

Excerpt From: *Tech service. Connecting Journeys 3. iBooks.*

The previous school year (2012/13) the same group of Consortia teachers engaged in a deep analysis of the Universal Declaration of Human Rights creating an eBook titled Human Rights Seen from the Eyes of Long Island's ELL Students. ELL students in 14 districts from across Long Island of different grades, and different language levels explored Human Rights on multiple levels. Using a dizzying diversity of media, students told us in autobiographical voices why certain of the Universal Human Rights struck more of a cord in their hearts than others.

Listen to one voice of a 1st grader:

"I think that the most important Human Right is the Freedom to Move. I believe this because if someone gets robbed they can go to another country to start a new life there and if you have family members there you can live with them. Also, you'll have money because your family can help you. That's why this is a good Human Right."

(This text is accompanied by a video of the child reading the text. His pride at reading the text perfectly is palpable.)

The creation of projects, such as eBooks, give students a voice where they didn't have one before. In a Southern Long Island school district, ELL students were being engaged with an abridged version of the story *The Swiss Family Robinson* (Wyss, 1812). In this case, NYSESLAT test scores for this particular Middle School had been too low for several years and the district called me in to work with the ENL teachers. We elected to write curriculum which was literature based. We wanted to engage in systematic, long term curriculum that could provide enough rigor to be a focal point for many activities. iPads, and also in this case iPods, were made available to these teachers while engaged in this literature curriculum.

*The Swiss Family Robinson* is all about surviving in a strange environment. Middle School ELL students of different levels were asked to consider advising newcomers to survive in this suburban area. When given free options as to their topics, students chose to write about how to stay out of gangs; what a bad idea it was to get pregnant when young, how to stay in the US legally, what companies are good to work for, what to do if you get physically lost in a store. We had no idea that Middle School children dealt with such profound issues. Students, who couldn't write, created videos (in both languages) to share their advice.

The Language Experience Approach (LEA) was the primary methodology to make the connection between speaking and reading. They wrote their essays; read them aloud for taping and, in some cases, created videos that could all be integrated into the eBook. Our students engaged with text when it was relevant to them; when it was comprehensible to them. Clearly this assignment made the bridge between the literature and the lives students were leading. The eBook was made available to students and their parents via smart phones.

Concurrently, with the same school, it was decided to create a curriculum unit based on *A Christmas Carol*. (Dickens, 1843). A local theatre group always had put on a wonderful show every year which would be a fitting culminating event for the unit. We had the support of the building principal who was pleased with the opportunity to expose the low economic students to live theater. We downloaded Disney episodes, which correlated to the chapters in the abridged text we were asking students to read. The teachers and I created mini multiple-choice question tests accessed via iPods using the free app named gFlash, so that students could demonstrate comprehension by mastering the questions. Our goal was to allow students to view the movies as often as they needed to achieve mastery of the multiple-choice questions. We changed the paradigm from watch the movie and then take the test to see what you missed; to watch the movie as often as you need to in order to be sure you have mastered all the content. The engagement of the students was profoundly different.

These same teachers and I also invited actors from the local theatre to speak ONLY with the ELL students in anticipation of viewing the live performance. The main actor, who had also been a High School ELA teacher, explained how A Christmas Carol had been written to highlight the abuse of child labor. He addressed the students, describing the living conditions of Industrial Revolution London with overcrowding and increased childhood diseases. When the forum opened to questions from the Middle School ELL students, it was our eyes that were opened. Students mentioned how they worked next to one of their parents, accomplished as much or more, and made half as much money. They shared how multiple families lived in the same house and each had limited, scheduled access to bathing facilities. They referenced how, as immigrants, they were moving to find work as was the case with the families in A Christmas Carol. They asked questions about gangs in the 1800s, as they (the students) were coping with them now. They told us of the same diseases mentioned in Christmas Carol showing up in their countries. We finished reading A Christmas Carol under a new light.

Using both initiatives, which were conducted in the same school year, the AMAO I increased by 9% and the school was in compliance; AMAO II also increased by 3% which put the school in compliance on this level as well. Perhaps more importantly, two weeks after the 'publication' of the eBook, the principal called me into her office. In a choked up voice, she said that previously the ELL students had walked through the Middle School halls with their heads down and the only time she saw them was for disciplinary reasons. Since the eBook and the Christmas Carol unit, she said that she saw the children walking through the halls with their heads up and they were joining sports clubs!

While Intentional curricula take time, they provide attempts to address all of NYS English Language Arts required curricula skills. P-value charts that compare ELL student performance to mainstream student performance of the county/district/school help identify those areas of particular concern. Cross referencing these results with trend analysis charts aid in the determination of the relative merit of time spent on a particular skill. We believe from Sheltered Instruction Observation Protocol (SIOP) methods that, particularly for ELL students, the relevance of the learning exercise determines the internalization of the skills and knowledge embedded in the activity.

In summary, my experiences with these teachers prove that they can develop successful, intentional syllabi. Beginning with a focus on standardized test trend analysis charts, in conjunction with P-Value data on student performance and project-based learning supporting specific curriculum objectives, ELL student performance levels have repeatedly been shown to significantly increase as a result of these strategic learning experiences.

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Dr. Annette Shideler is Director-TESOL Program, and Program Coordinator of the ESOL Supplementary Certificate Program, Linguistics Department at Stony Brook University, on Long Island, NY.

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All student names have been changed to protect their identities... any grammatical errors included in student excerpts were maintained to be true to the student's voice.

# A Case Study: Feeling Safe and Comfortable at School

By Rose A. Hall, Ed.D.

## Third Grader Equates "Feeling Safe" With School's Parent Involvement Efforts

During the 2013-2014 school year, a case study on parent involvement was conducted at an elementary school in Florida's Broward County, the 9th largest school district in our nation. The study's goal was to identify a systematic schema for evaluating parent involvement in the school lives of students that would allow researchers to examine the possible influences of parent involvement on the students' school success. The schema identified a number of possible influences that warranted further analysis, but it was a third grader in the study who was best able to articulate one of the most critical components necessary to ensure students experience school success and safety.

During a study interview, the third (3rd) grader was asked, "What's the best thing about your teacher getting to know your family?" Without hesitation, he responded, "I feel safe here now." When the interviewer prompted the student to elaborate, the child explained,

Well the teacher talks to my mother all the time and she knows my family. And the principal knows my name and the people in the office say hi to me because my mother comes here all the time and they know her. So I think they care about me and that's why I feel safe.

This student's response highlights a hallmark of the study: other participants (i.e. teachers, parents and students) also expressed an increased sense of security once parent involvement became a more regular part of the students' school lives. They were vocal about various aspects of parent involvement (i.e. regular communication and increased rapport between all parties) making them feel safe enough to ask for assistance. Their responses revealed that, for them, parent involvement was an important vehicle on the road to school success.

## The Case Study: Parent Involvement and School Success

The study's premise was to establish the strength of the connection between parent involvement and school success. A strong connection would provide the impetus for school district leaders to make a greater investment in engaging low socioeconomic and minority students and

their families in the educational process. "Schools continue to struggle with increasing parental involvement with students of color and students of low socio-economic status" (Bower and Griffin, 2011.p.78)

The study provided a structural approach to action research and utilized Epstein's (2009) typology of parent involvement and Wehlage's (1989) school membership studies in an attempt to provide a balanced lens. Epstein's approach places more ownership on the parent and focuses on giving strategies from an outside vantage point. Wehlage, on the other hand, as the seminal researcher on school membership and its importance, places more ownership on the school system, and points out the varied misconceptions and impediments the school system brings. This approach suggests focus, remedies, and applications that act from the inside out. By applying both concepts in concert, Epstein with an external (parent) focus and Wehlage with an internal (school system) focus, the study's conceptual framework was established to evaluate parent involvement benefits.

The study monitored weekly contacts between teachers and parents (i.e. phone calls, written communication, and face to face meetings) to examine the possible benefits of increased parental involvement on students' attitudes towards school and student achievement. The study also identified the school system impediments (i.e. retention, labeling, and adjustment difficulties) that affect student attitudes and ultimately school performance. The literature on parent involvement reveals that it reinforces the importance of education to the student, promotes favorable attitudes towards education, enhances effective communication of student needs between the parent and teacher, and builds an additional layer of accountability (Fan & Chen, 2001: Hill & Taylor, 2004: Wong, 2008: McBride et al. 2009).

## The Process

Located in an urban community of minority and low socio-economic families, New Revolution elementary school was chosen as the site for the study. Two teachers volunteered to participate in our action research study. Based on the guidelines the district uses to identify students possessing risk factors for dropout prevention programs, the teachers

**Figure1: Teachers' Parent Contact Log**

WEEKLY PARENT CONTACT LOG (Date) _____						
Name	Monday	Tuesday	Wednesday	Thursday	Friday	Propose/ Outcome
1.						
2.						
3.						
4.						
5.						
6.						
7.						
8.						
9.						
10.						
Contact Key:	1. Phone (P)	2. In Person (IP)	3. Written (W)	4. Other (o)		

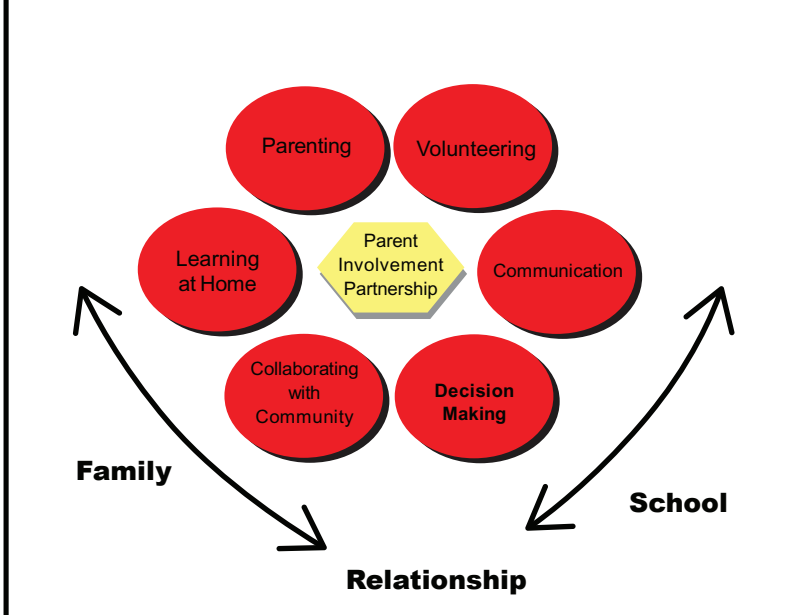
and an administrator identified a mixed group of males and females, ten students per third grade class, to participate in the study. The participants' demographics were diverse in ethnicity (i.e. African American, Arab, Bengali, Haitian, and South American), native languages (i.e. Arabic, Bengali, English, Creole, French, and Spanish), and levels of family education; however, the majority of participants (90%) came from low socio-economic households. The research period was three (3) months in duration. It began in February 2014 and ended in April 2014.

Before the study began, the teachers had been following the district's guidelines for parent involvement that required a mandatory parent contact once a quarter during the school year. Study parameters required the teachers to

increase their parent contact from quarterly to weekly. They were provided with contact logs (see **Figure 1**) to document all contact (i.e. phone calls, written communication, and face to face meetings). The contact logs identified the type of parent-teacher interaction and contained information on the purpose of the contact and its outcome. Teachers were also instructed to chart participating students' grades and behaviors for the duration of the study.

Using the data compiled, the researcher conducted a qualitative study that followed Epstein's (2007) protocol for conducting a school-based study focused on the effects of employing effective parent involvement strategies (see **Figure 2**).

**Figure 2: Epstein's Parent Involvement Conceptual Framework**



Epstein's (1993) Parent and Teacher Questionnaire (modified version) was the data collection instrument utilized to capture the outcome of the teachers' (school) and parents' (families) attempts to build meaningful relationships that would result in student school success. The data collected was analyzed to identify patterns, themes and discrepancies.

### Findings

The findings of this study are not representative of all races, cultures and school systems in the nation, but a small demonstration of parent involvement efforts in one elementary school between two classrooms in one school district. However, several reoccurring themes emerged as the teachers and parents increased communication and the relationships developed. This heightened level of connection increased student attendance, developed positive expectations and student feelings of security and care.

The teachers reported that 75% of their student grades improved gradually, not by leaps and bounds. Greater improvement was displayed in students' attitudes towards school, motivation, engagement, academic effort and positive classroom interaction and atmosphere. Epstein (2009) asserts that communication with parents helps motivate students and encourages parents to become more involved in their child's education.

A student's attendance is one of the key elements to school membership and school success (Wehlage, 1989). Based on their interview responses, 70% of parents were clear about their role and the teachers' expectations regarding their child's education and attendance. Based on student reports, 90% knew their parents and teachers' expectations about attending and were able to articulate it. This communal expectation was in line with the students' attendance records, which indicated that 80% of the sample group who had good attendance maintained it, while other students with lower attendance rates improved.

Parents reported that their initial fears of feeling overwhelmed and being perceived as unintelligent and/or uncaring did not materialize during their weekly teacher contact. Some parents even reported that they spoke with the teacher more than once a week. Parents also reported that increasing their involvement made students' willingness to take more academic risks and ownership for their classroom performance. They reported that their students were more confident that their teachers were invested in their school success. Wehlage contends that increased involvement from teachers garners a greater level of student engagement, increases awareness and compliance to school rules in ways that lead to feelings of school membership, which eventually lead to school success (1989).

## Conclusions

At the study's conclusion, the partnership between teachers and parents was still evolving as the teachers established a new level of respect for the many forms of non-traditional parent involvement strategies employed by the parents in an attempt to stay connected to their child's schooling. Since this type of involvement takes

place in the home for the most part, the school and teacher weren't always aware of it. In some cases, being aware of a custom or practice doesn't create value until the benefits are understood.

The importance of this concept on student school success was evident when the students were asked questions about their parents' level of involvement. Like school personnel, some students considered their parent(s) uninvolved with their schooling if their parent(s) was unable to participate in traditional ways, i.e. attend meetings, volunteer for field trips, help out in class or in fundraisers. Many students shared the view of educators about what behaviors constituted parent involvement. Both educators and students wanted a visual display of involvement from parents. Educating school personnel on how various cultures instill pride and promote the importance of education benefits both schools and families.

The study identified an important theme to involvement. There are many misconceptions held by teachers, parents and students about parent involvement. Teachers and parents thought that involvement would be time consuming and create additional work with minimal benefits. Both teachers and parents found involvement to be minimal work once incorporated into one's routine and parent involvement helped teachers reinforce old and new learning strategies and concepts. A pattern of parents receiving additional knowledge on teaching strategies for breaking down and simplifying homework/classwork for their child at home developed. Therefore, teachers, parents and students benefited in meaningful ways from increased parent involvement.

The overall study results reinforced the value of parent involvement among low socioeconomic and minority students as a factor that positively affected student school success for the study population. The development of relationships between parents and teachers was an important component in increasing their knowledge of and input in their children's educations. By developing their relationships with the parents, the teachers were able to aid in building trusting, respectful and caring relationships between students and their families. Parent involvement impacted all study participants in meaningful ways.



NSDC

National School Development Council

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## ***From the Field:***

### **From a Teacher's Perspective: A Message to the New York State Education Department on High Stakes Testing and Its Effect on Student Achievement**

**By Karen Lessler, Ed.D.**

Since compulsory education began, there has been the intention to educate people to self-govern, preserve liberty and grant equal opportunity to learn. Thomas Jefferson, for example, believed public education should give students a chance to show specific talents and be awarded the opportunity to pursue them through a public school system. However, what has developed over the years are cookie cutter standards and high stakes testing processes. Even as our society and workforce have changed over time, public school paradigms and policies in regards to high school graduation requirements have changed little. The U.S. shift to a global competitive economy has not managed to change policies on diploma requirements either.

I am a secondary social studies teacher in Kings Park, New York. I conducted a national study of the impact of high stakes testing on student achievement using Advanced Placement test results for each state to contrast student performance and high stakes testing practices. During my research of high stakes testing, I discovered that the 26 states that mandated exit exams for graduation did not see higher graduation rates, nor did they rank higher in Advanced Placement scores compared to states that did not require exit exams. Furthermore, my research did not find higher AP scores among the sub-groups when compared to states without exit exams. (Lessler, 2010)

States that require students to pass exit exams believe that they attribute greater meaning to a high school diploma and ensure graduates are prepared for college and careers. My research did not find that exit exams ensured students were better prepared for college and or careers.

Nineteen of the 26 states that mandate high school exit exams offer alternate pathways to graduation for general education students who have difficulty passing the regular exit exam and can demonstrate mastery of high school-level knowledge in other ways. Passing alternative assessments, according to the Center for Education Policy, "such as the SAT, and collecting a portfolio assessment of classroom work are the most common alternate pathways that states offer general education students." Four states offer "waivers or flexible cut scores that allow students to graduate if they failed the exit exam, but meet other graduation requirements and comply with very specific criteria, such as completing additional courses or scoring within a certain margin of the cut score on exit exams". The Center for Education Policy reports four states permit students "to use portfolios of coursework or end of course projects to

demonstrate their knowledge in lieu of passing exit exams", (Center for Education Policy, 2009).

The option to give students another avenue to demonstrate they have mastered course work not solely based on exit exams should be under consideration.

Exit exams should be one measure of assessment. Portfolio based assessments can enhance the evaluation process and give students a chance to show specific talents, demonstrate critical thinking, writing and comprehension skills. A portfolio and/or research paper can be a culmination of three or four years of high school work within a discipline. Students who engage in a long-term research project or portfolio should be able to have this option to demonstrate college and career readiness.

Research and/or portfolio assessment can better be aligned to college and career work, along with having real relevance for students. This work can be the foundation for their later pursuits, and give students a chance to enhance their skills through particular coursework they value and enjoy. Middle and high schools can provide a basic core curriculum and an expanded core curriculum allowing students to select their disciplines and still meet high standards within the areas of choice and perquisites work. Moreover by providing options or pathways to graduation, critical thinking, writing and comprehension skills become the disciplines most valued for careers.

Standards do not have to be compromised. Curriculum development is critical to this story. Embedded in all high school courses, there should be rigor along with critical thinking, writing and verbal skill sets for students. Students should have choice. They should see the relevance to their learning experience. They should focus on their talents. More students will have a greater chance to meet with success; more students would be authentically ready for college and careers if learning and measurements were aligned to students' interests and talents.

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Karen Lessler is a teacher in Kings Park, New York, and President of the Middle Country CSD Board of Education.



## From the Field:

### Boy, Am I Tired!! Sleep....Why you need it!

By Dr. Chrystyne Olivieri, DNP

#### History of Sleep

Psychiatrist Thomas Wehr studied sleep from the late 1970's through the 1990's. He performed sleep studies to determine a normal human sleep pattern. He discovered that when participants were subjected to 14 hours of darkness in each 24 hour period for over a month, a natural sleep pattern emerged. It consisted of sleeping for four hours, then wakefulness for one to two hours. Then subjects fell back into another four hours of sleep (Wehr, 1992).

This was supported by anthropologist and historian Roger Ekirch in 2001. After more than a decade of sleep research into old and ancient writings, he discovered over 500 references of historical evidence that humans naturally sleep in two distinct cycles, separated by about two hours of mid-night wakefulness (Ekirch, 2015). Despite this evidence, most people continue to believe in the idea that we must sleep for eight continuous hours for optimal health.

Ekirch found that these historical references stated that during mid-night wakeful periods, people would rise to a fully awake state. They would eat, smoke, read, go to the toilet, pray and have sex. Some of the references would even suggest that this mid-night wakeful period was the best time to have sex to encourage conception. These references to a bi-phasic sleep pattern became less common approaching the late 17th century. Ekirch attributes this shift to improvements in lighting, both indoor and outdoor as well as to coffee.

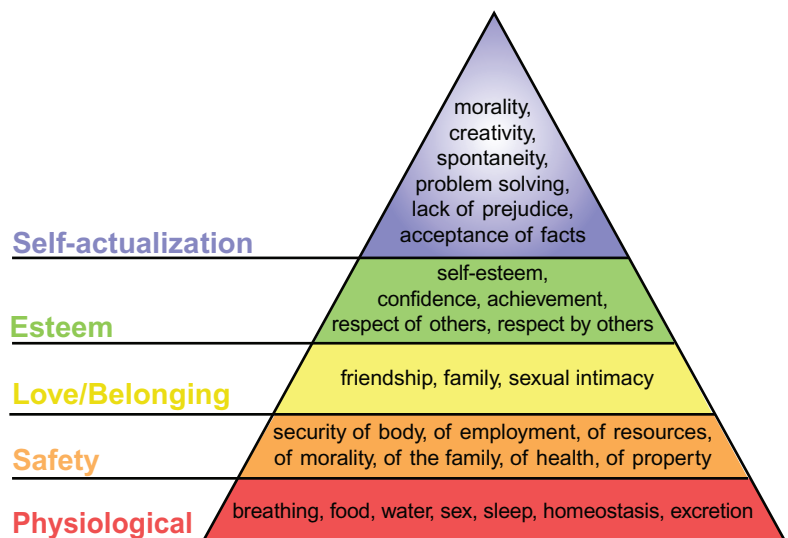
Since the Industrial Revolution and the widespread use of artificial light, more people became adapted to the eight-hour sleep cycle. However Ekirch believes this may be the basis for many common sleep problems which are rooted in the human body's natural preference for the biphasic sleep cycle. Perhaps waking up during the middle of the night is a normal part of human physiology.

This was the conclusion made by sleep psychologist Gregg Jacobs. He evaluated sleep cycles in those with "insomnia". He believes that human beings slept a certain way for most of human evolution for a reason. Waking during the night should be considered normal. However, the commonly held belief that night time wakefulness is indicative of insomnia, requiring pharmacological interventions is often anxiety provoking for those in modern civilized cultures. It is this very anxiety which will cause more anxiety for future sleep eventually affecting daytime wakefulness (Jacobs et al., 1993).

#### Physiology of Sleep

Sleep is essential to a healthy human being. It is among the basic necessities of life, located at the bottom of Maslow's Hierarchy of Needs (**Figure 1**). It is a dynamic activity, necessary to maintain mood, memory and cognitive performance. It plays an important role in normal endocrine and immune function. Recent studies are finding a growing link between sleep disorders and obesity, diabetes, hypertension and depression (Irwin, 2015).

**Figure 1 Maslow's Hierarchy of Needs**



Sleep disorders are strongly associated with the development of acute and chronic medical conditions. Everything from asthma and arthritis to cardiovascular disease and diabetes (Smolensky, Di Milia, Ohayon, & Philip, 2011). When adequate sleep is not achieved on a regular basis, bad things happen. Poor sleep has been linked to daytime drowsiness causing 846 auto fatalities in 2014. Between 2005 and 2009, there were about 83,000 auto crashes each year related to drowsy driving (National Highway Traffic Administration).

In May 2013, the U.S. Food and Drug Administration has issued a warning about impaired driving the day after using Ambien CR, a common narcotic prescription sleeping pill both 6.25mg and 12.5mg dosing. This report also included dosing recommendations that 5mg for women should be the maximum as impaired driving and increased auto accidents are more likely with higher dosing.

Sleep is such a misunderstood health issue that it is rarely a topic discussed during a medical office visit. That is unfortunate because it is estimated that 50-70 million Americans report having some form of sleep disorder (Centers for Disease Control and Prevention). The loss of sleep is considered to be cumulative with a sleep debt that must be repaid. Human circadian rhythms refers to the cyclic fluctuations in body temperature, hormone levels and sleep which occur over 24 hours. These internal rhythms in physiology and behavior are imbedded within our physical environment and our work/social schedules. Exposure to light is one of the most profound rhythms which help induce sleep and wakefulness and is hardwired within human physiology. Melatonin, a brain hormone linked to sleep and wakefulness, is released or reabsorbed in response to light (Ferracioli-Oda, Qawasmi, & Bloch, 2013). Sleep disorders occur when our natural circadian rhythms are disrupted, such as with jet lag and shift work (Martinez & do Carmo Sfreddo Lenz, 2010). This will likely disrupt our physical performance and mental acuity.

There are two main types of sleep: REM (Rapid Eye Movement) sleep and NREM (Non-REM) sleep. These stages are measured using an electroencephalogram (EEG). Non-REM sleep consists of four stages:

Stage I: Drowsiness or the transition from being awake to falling asleep. All the physiological processes slow down. Brain and muscles function slows, twitching may occur.

Stage II: Light sleep when eye movements stop. Brain function becomes slower and muscles become more relaxed. Heart rate slows and body temperature decreases.

Stage III and IV: This is a deeper stage of sleep with slower brain waves, lower blood pressure and body temperature. Hormones are released such as growth hormone, essential for tissue growth and repair. The body becomes immobile. This slow wave sleep makes arousal

most difficult. Being awakened during this stage may cause one to be disoriented for several minutes.

REM sleep is a much more active period of sleep with intense brain waves. Breathing may be rapid, irregular or shallow and eyes move rapidly. Limb muscles are basically paralyzed. This is also the stage where dreams occur (National Sleep Foundation).

### Sleep and Aging

It is important to have a balance of both types of sleep to achieve a restful and restorative sleep. Although sleep quality does become more fragile as we age, our need for sleep does not diminish. Some of the factors which can interfere with sleep as we age include physical and mental health problems, polypharmacy, functional status, primary sleep disorders and changes in circadian sleep-wake patterns. Lifestyle regularity is one of the best ways to ensure a lifetime of good sleep. The maintenance of routine behaviors as we age has been found to be associated with fewer sleep problems. Decreased light exposure signaling melatonin release is one of the most powerful factors associated with sleep onset and quality. Aging may change natural circadian rhythms which make routine behaviors even more important to preserve natural, restorative sleep cycles (Zisberg, Gur-Yaish, & Shochat, 2010).

Menopause is also associated with the onset of sleep disturbances for women. Menopause is also a time of life associated with vasomotor hot flashes, anxiety and depressive disorders (Joffe, Massler, & Sharkey, 2010). Night-time hot flashes disrupt the thermoregulation system which is tightly associated with sleep. It is primarily the hormonal fluctuations, particularly of estradiol, follicle-stimulating hormone, progesterone and testosterone which affect the sleep quality. In many cases, the use of hormone replacement can solve the problem (Ameratunga, Goldin, & Hickey, 2012).

Another primary sleep disorder is obstructive sleep apnea (OSA). This is more common with aging and can contribute to sleep problems. It is highly associated with overweight and obese men and women, however it can occur in those that are not significantly overweight. It is also associated with snoring. Sleep apnea occurs when the airway collapses due to loss of muscle tone of the pharyngeal airway causing temporary interruptions in breathing. Anyone can snore, but not all who snore have sleep apnea. Sleep apnea causes intermittent hypoxia (reduced oxygenation in the blood) and often leads to weight gain, insulin resistance and diabetes (Pamidi, Aronsohn, & Tasali, 2010). It also leads to hypertension, cardiovascular disease, heart attack and stroke (Gottlieb et al., 2010). Many with sleep apnea have chronic daytime sleepiness related to poor nighttime sleep quality.

Weight loss is very helpful to relieve the severity of OSA, however it is not curative. Prevention of weight gain is always easier than treatment of the obesity related diseases. The most effective treatment is continuous positive airway

pressure or CPAP (Dempsey, Veasey, Morgan, & O'Donnell, 2010). Using CPAP every night provides a mild air pressure to keep the airway open with every breath. It also has been shown to reduce the risk of developing cardiovascular diseases (Martínez-García et al., 2012). This must be prescribed by a medical doctor or nurse practitioner and is usually only prescribed after doing a sleep study test to determine severity of OSA.

## Sleep and Children

Obesity even in children is a factor that influences sleep. Obese children have been found to have more disrupted sleep patterns. This is associated with altered insulin sensitivity, inflammation and oxidation of low-density lipoprotein: all metabolic risk factors for diabetes and cardiovascular disease. Those children who sleep less hours due to later bedtimes or busy schedules exhibited the greatest risk (Spruyt, Molfese, & Gozal, 2011).

Sleep cycles have been studied in all age groups of children. Research has found that there are many biologically based sleep regulatory changes that occur specifically during adolescence. During puberty, sleep-wake cycles can be delayed by as much as two hours. They are associated with a delay in evening melatonin secretion and a profound shift in circadian rhythms. This delay in sleep cycles can reduce total sleep time due to school and activity schedules. Often adolescents have difficulty falling asleep before 11pm with the ideal wake time around 8am (Owens, Belon, & Moss, 2010). A large number of studies have now documented that the average adolescent is chronically sleep deprived. It has been suggested that a modest 25 to 30 minute delay in school start time could have a significant impact in student performance through adolescence (Boergers, Gable, & Owens, 2014).

## Improving Sleep Quality

Sleep hygiene is the process of using routine behaviors to encourage restorative sleep and full daytime alertness. It is based in establishing a set of lifestyle patterns which will promote sleep naturally. This is based on human physiological needs throughout human evolution and our natural circadian rhythms. Sleep hygiene practices include:

- Avoid naps as this will disrupt normal sleep/wake cycles
- Avoid stimulating drugs like caffeine, nicotine and alcohol. Chocolate has caffeine. Although alcohol may initially induce sleepiness, as it metabolizes it will result in arousal
- Exercise daily - the human body was meant to be active and that activity will result in better sleep.

Reserve the most vigorous activities for early in the day and more relaxing exercise like yoga in the evening

- Avoid eating too close to bedtime - if possible, maintain several hours after your last meal or snack before you go to bed
- Encourage low light as you get close to bedtime. Nighttime light exposure discourages melatonin, the sleep hormone
- Establish a regular and relaxing bedtime routine. Try to go to bed the same time every night
- Try to keep your bedroom a nice place to sleep. Use soothing colors and relaxing patterns. Try not to use your bed to do anything but sleep and have sex. Keep the room not too hot or cold
- Remove technology from the bedside - keep cell phones in another room and remove any ambient light from other devices from view (National Sleep Foundation).

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