

# Exploring the Relationship between Professional Development, Instructional Leadership and Student Achievement Using District-wide Survey Data

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## Why Did You Do This Study?

Educators and researchers often debate about the value of professional development.

Professional development is a major aspect of instructional leadership.

In the same way we would expect teachers to be responsive and continually reflect on the needs of students, school and leaders should do the same with respect to teachers.

When I die, I hope it is at a faculty meeting or teacher inservice because the transition from life to death would be so subtle



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### Is Professional Development Pointless?

Several researchers (and many teachers) believe that professional development is a waste of time. But this may be a function of the *quality* rather than quantity of professional development offered.

# What are Your Research Questions?

- ✓ **What is the (direct) relationship between teachers' perception of high quality professional development and student outcomes on the PSSA/Keystone Exams?**
- ✓ **Does principals' perception of how often they provide instructional support influence (mediate) this relationship?**
- ✓ **Does principals' perception of how often they use data in decision making influence (mediate) this relationship?**
- ✓ **Does principals' perception of their professional development needs influence (mediate) this relationship?**

# What Data Did You Use?

- ❖ The SDP has a comprehensive survey for principals, teachers, parents, and students that attempts to measure the quality of teaching and learning in the district's schools.
- ❖ Because this study looks at perceptions of professional development quality, only the teacher and principal survey data was used.
- ❖ Since the research question focuses on the *mediating* effects of principal leadership, teacher responses needed to be averaged (weighted) to turn ordinal data into continuous data.
- ❖ Study is cross-sectional (over a period of four years); the number of cases (school per year) is 767 (88%). Pairwise deletion (WLSMV) so schools with missing data on all measures were dropped from analysis.
- ❖ Outcomes (PSSA/Keystone scores) were already provided at the school level as well as SPR classification for each school for each year.

# Wording of Teacher and Principal Survey Questions Used in Study

- **Teacher Q21d: How often were your professional development activities explicitly supported and/or encouraged by your principal or other school leaders?**  
*Scale: Never - Most or all of the time (4 point scale)*
- **Principal Q1: Please estimate how much time you typically spend on the following activities?**  
*Scale: NA - More than 30hrs/wk. (7 point scale)*
- **Principal Q11: To what extent do you use student data for the following activities?**  
*Scale: Not At All - A Great Deal (4 point scale)*
- **Principal Q13: Have you received assistance from the District with regard to any of the following?**  
*Scale: Yes - Did Not Need (4 point scale) [Reverse Coded]*

# What Method of Analysis Did You Use?

To answer these questions, I used what is known as structural equation modeling (SEM).

## ❖ What is SEM?

- ✓ Modeling that specifies the relationship between latent factors and observed variables.
- ✓ They show relationships between variables visually. (Factor analysis and regression in one.)

## ❖ Why use an SEM in this analysis?

- ✓ Need a way to map multiple relationships between standalone variables and factors.
- ✓ Want to understand the strength (statistical sig. and effect) of these multiple relationships.

## How do you account for school types?

Clustering	Grouping
Model considers schools of a type together in the same model.	Model groups schools of a type in separate models.
Pro: More accurate measures (more precise coefficients and smaller standard errors)	Problem: # of Elementary Schools > # of Middle Schools > # of High Schools
Don't need high number of cases.	Not enough cases (power).
<b>Only one result</b>	<b>Multiple results for each model.</b>

# Principal Perceptions of Instructional Leadership Latent Factors (Part I)

Predictor Variable	Variable Scale	Variable Mean	Variable SD
How often were your professional development activities explicitly supported and/or encouraged by your principal or other school leaders.	Likert Scale converted to Continuous (4.0 points)	3.217	0.344
<b>Outcome Variables</b>	<b>Variable Scale</b>		
Percent Proficient or Advanced Proficient on PSSA/Keystone ELA/Literature	100pts.	33.735	20.795
Percent Proficient or Advanced Proficient on PSSA/Keystone Math/Algebra I	100pts.	22.564	21.536
Percent Proficient or Advanced Proficient on PSSA/Keystone Science/Biology	100pts.	33.391	20.928

## Frequency of Data Usage

Variable Description	Variable Scale
I use data when making changes to the school's curriculum and/or instructional materials.	4.0 (Likert)
I use data when developing a school improvement plan.	4.0 (Likert)
I use data when assigning teachers to students.	4.0 (Likert)
I use data when evaluating teacher performance.	4.0 (Likert)
I use data when focusing teacher professional development.	4.0 (Likert)
I use data when making decisions about how much time to spend on each academic subject.	4.0 (Likert)

# Principal Perceptions of Instructional Leadership Latent Factors (Part II)

## Frequency of Instructional Support

Variable Description	Variable Scale
Instructional leadership activities (e.g., observing your teachers' classroom instruction or providing feedback to teachers regarding curriculum and instruction).	7.0 points (Likert)
Planning or conducting teacher professional development workshops.	7.0 points (Likert)
Meeting with school leadership teams on issues related to teaching and learning.	7.0 points (Likert)

## Professional Development Needs

Variable Description	Variable Scale
Facilitating student achievement.	4.0 (Likert)
Analyzing student data.	4.0 (Likert)
Identifying research-based school improvement strategies.	4.0 (Likert)
Aligning curriculum and state content standards with state assessments.	4.0 (Likert)
Planning or providing professional development that is tailored to the needs of teachers.	4.0 (Likert)

# Some Technical Modeling Stuff (If You are Interested)

## Is This Model Valid?

(1) **Chi-Square Value:** Should be statistically non-significant. ❌

(2) **Comparative Fit Index:** Should be  $>0.900$  ✅

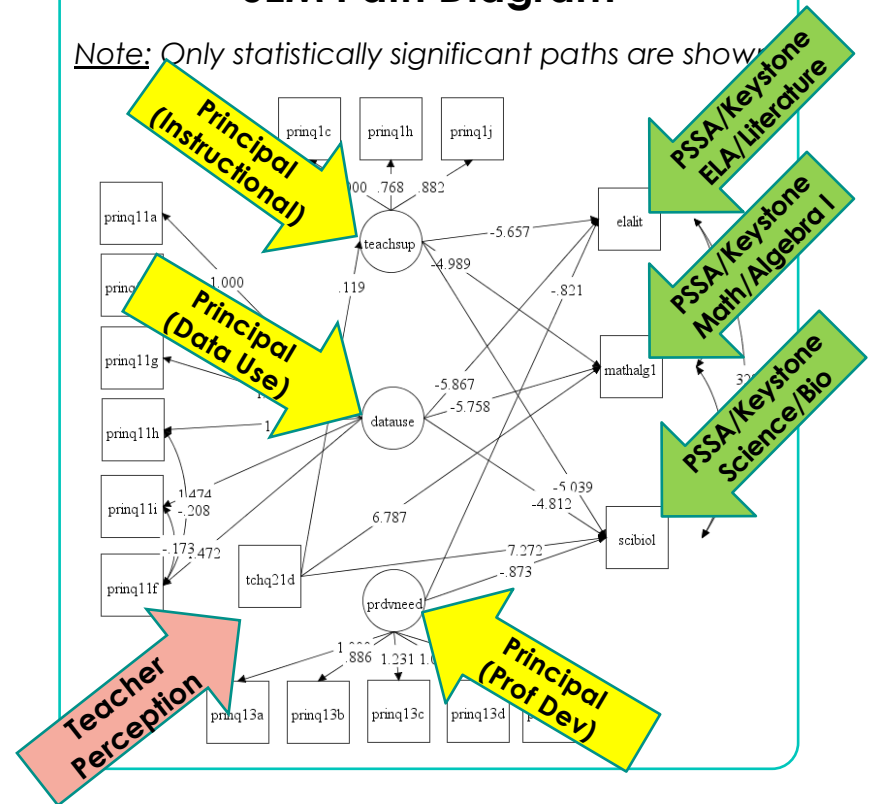
(3) **Root Mean Square Error of Approximation (RMSEA):** Should be  $<0.080$  ✅

### Model Fit Statistics

n (model)	n (total sample)	n (clusters)
767	94.8%	4
Chi-Square ( $\chi^2$ ) Value	Comparative Fit Index (CFI)	RMSEA
df(153)=2,948.25 ( $p < 0.001$ )	0.910	0.053 (CI: 0.047-0.059)

## SEM Path Diagram

Note: Only statistically significant paths are shown.



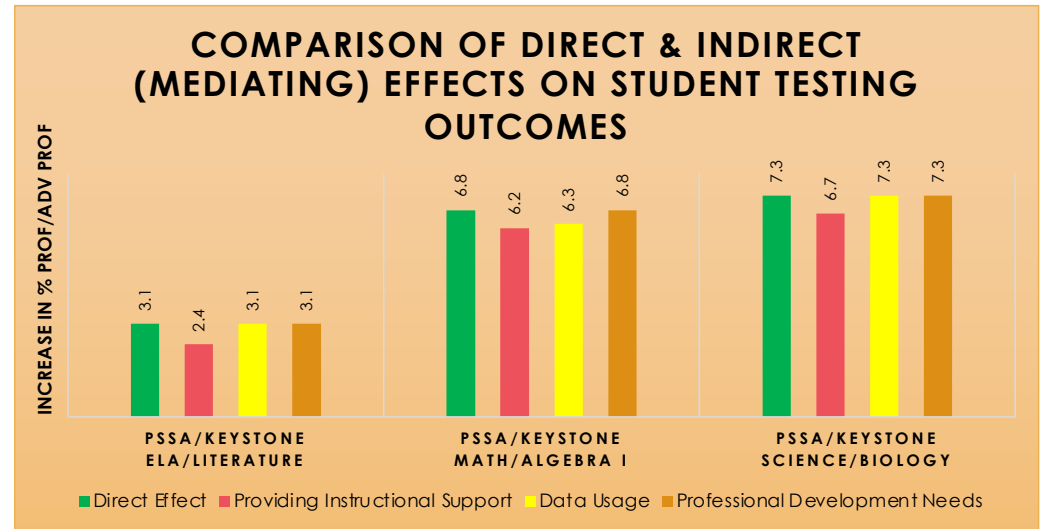
# What Did You Find?

**Green Bar:** Teacher perception and effect on PSSA/Keystone scores

**Red Bar:** Principal perception of providing more instructional support and effect on PSSA/Keystone scores

**Yellow Bar:** Principal perceptions of using more data in decision making and effect on PSSA/Keystone scores.

**Orange Bar:** Principal perception of professional development needs and effect on PSSA/Keystone scores.



## How to Read This Chart

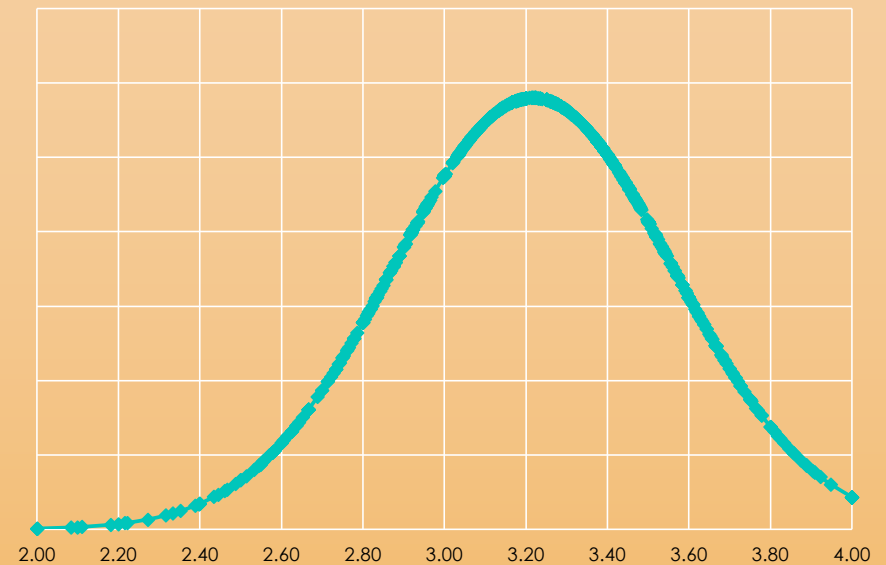
“For a one unit increase (e.g., 2 → 3) on the Likert scale measuring teacher perceptions of high quality professional development, there is a X% increase in percent advanced/proficient in PSSA/Keystone scores.”

“But, when principal perceptions of \_\_\_\_\_ are considered, there is a X% (increase/decrease/no effect) on percent advanced/proficient in PSSA/Keystone scores.”

# What Did You Take Away From This?

- ❖ **Direct Relationship:** Teachers appear to be aware of the need for high quality professional development as it relates to improving student outcomes.
- ❖ **Indirect Relationship:** But it appears that when principals increase frequency of instructional leadership, there is little if any, mediating effect.
- ❖ **Putting It Together: Quality + Quantity = Results!** Professional development that is consistent and supported with effective principal leadership can yield results for unsupported teachers.

NORMAL DISTRIBUTION OF TEACHER SURVEY RESPONSES FOR QUESTION #21D (SCHOOL LEVEL)



Thank You!  
Questions?

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“  
The truth will  
set you *free*,  
but first it will  
piss you off

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GLORIA STEINEM

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