Middle School Programs Do Make a Difference: An Analysis of Significant Relationships between Program Implementation and Student Achievement

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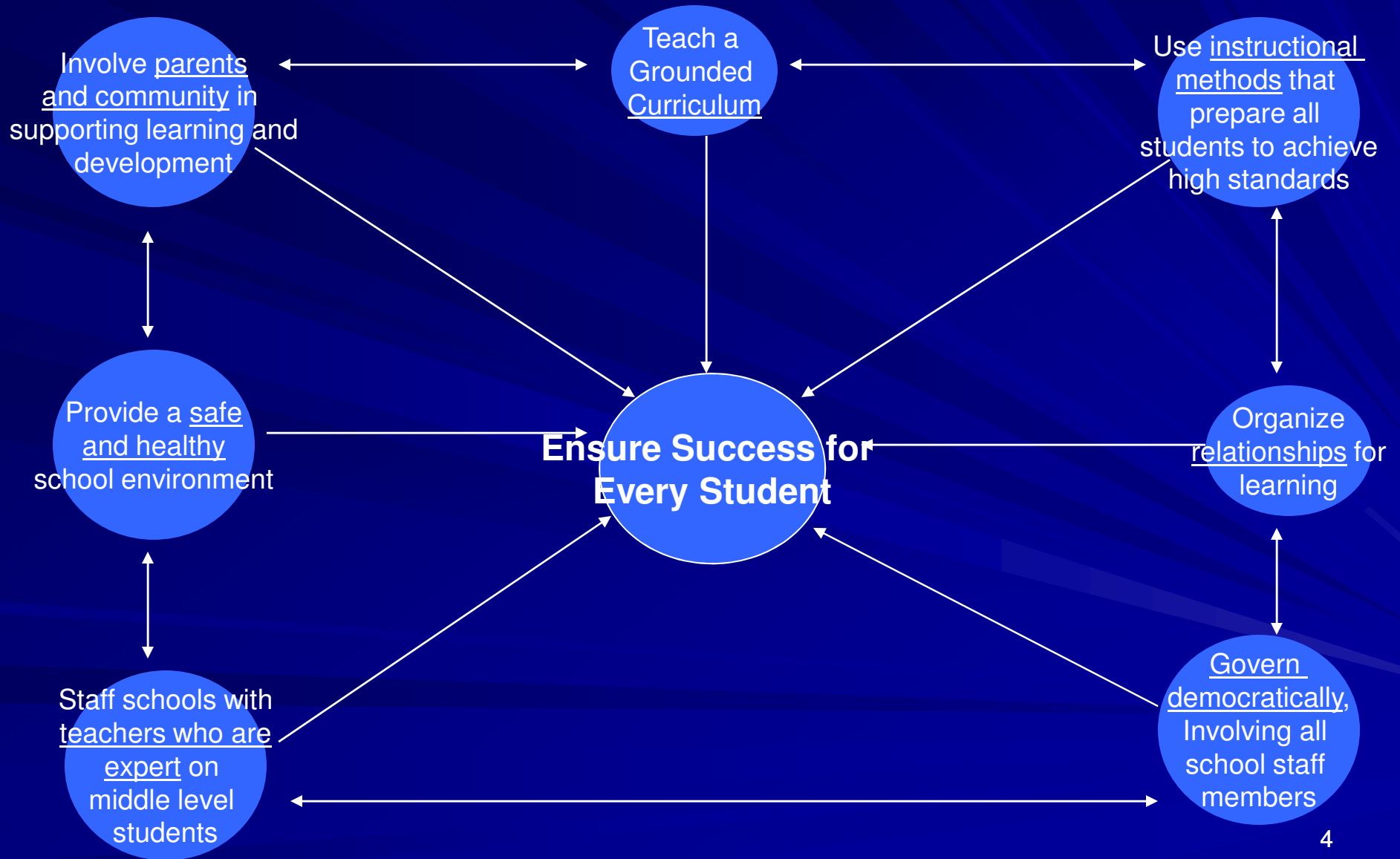*University of Missouri, Columbia, MO*

Statement of the Problem

- The problem examined in this study was student achievement at the middle level and the programs and practices that might positively influence it.

- With the exception of a small number of studies (e.g. Lee & Smith, 1993; Felner, Jackson, Kasak, Mulhall, Brand & Flowers, 1997; and Russell, 1997), there has not been a clear understanding as to what influence the programs most commonly associated with "best practice" middle level education have on student achievement.

- ***Middle level education would be well served to be able to confidently say what the programs and practices are that influence (both positively and negatively) student achievement (NMSA, 2003).***

Framework of the Study

- Conceptually, the study was driven by three influential sources on middle school philosophy:
  - Turning Points 2000 (Jackson & Davis, 2000)
  - This We Believe (NMSA, 2003)
  - Schools to Watch Criteria (National Forum, 2005)

Turning Points 2000 Design

Involve parents and community in supporting learning and development

Teach a Grounded Curriculum

Use instructional methods that prepare all students to achieve high standards

Provide a safe and healthy school environment

Ensure Success for Every Student

Organize relationships for learning

Staff schools with teachers who are expert on middle level students

Govern democratically, Involving all school staff members

Research Design, Purpose

- The purpose of this study was to analyze the relationships between individual and collective middle school programs and practices and student achievement in the middle level schools of Missouri.

Research Design, Research Questions

1. Based upon the data from the state department of education and survey items designed to represent concepts espoused in *Turning Points 2000*, what is <u>descriptive of the demographic characteristics</u> common to Missouri middle level schools?

2. Based upon the survey items designed to represent concepts espoused in *Turning Points 2000*, <u>what are the programs and practices</u> in Missouri's middle level schools?

Research Design, Research Questions (continued)

3. Based upon data collected during this study about the programs and practices of Missouri's middle level schools, <u>can statistical factors be developed</u> that describe the programs and practices of middle level schools and if not, can logical "scales" be used to study clusters of items that represent the programs and practices as espoused in *Turning Points 2000*.

4. Based upon the factors or scales developed during this study designed to represent concepts espoused in *Turning Points 2000*, <u>what is descriptive of the programs and practices</u> in Missouri's middle level schools?

Research Design, Research Questions (continued)

5. <u>Are there relationships among the programs and practices factors or scales, the school and leader variables, and the student achievement variables</u> of Missouri's middle level schools?

6. <u>Can an empirical model be developed</u> that depicts the relationships between the variables analyzed in this study, particularly those describing middle level programs and practices as espoused in *Turning Points 2000*, and student achievement?

Research Design, Null Hypotheses

H_{01}: There are no significant <u>correlational relationships</u> among the programs and practices variables, school and leader demographic variables, and student achievement as measured by the Missouri state assessments for Communication Arts and Mathematics, when controlling for socio-economic status.

H_{02}: There are no significant <u>linear relationships</u> that explain the variance between program and practices variables, school and leader demographic variables, and student achievement as measured by the Missouri state assessments for Communication Arts and Mathematics, when regressing initially for socio-economic status to control the effect of socio-economic status on the outcome variable.

****For all statistical tests, the <u>influence of socio-economic status</u>, as reported by the percent of students in each school who qualify for the free/reduced lunch program, <u>was held constant</u>.

Summary of Design

- Develop survey items per MS benchmark literature (TP2000, This We Believe, STW)
- Survey all ML school principals in Missouri
- Analyze items, create factors/scales
- Describe existing practices
- Analyze relationships between items, factors, scales and student achievement.
- Develop models of impact/influence.

Population

- In the 2005-2006 school year there were 369 middle level schools in Missouri (any combination of grades 5 through 9).
- This study included only those with either a grade 7 or grade 8.
  - 337 schools
- The school level was the unit of analysis.
- 224 schools participated in this portion of the study.

Procedure

- Cross-sectional design (Descriptive data from a slice of time)
- Factorial Design (Effects of multiple independent variables on dependent variables at one time)
- Scale reliability and factor analysis
- Stepwise multiple regression models

Instrumentation

- Missouri Middle Level School Survey was developed and used to collect data from middle level principals about the presence of middle school programs and practices in Missouri's middle level schools.
  - Survey was written after a thorough review of the literature on middle level education.

Data Collection

- Data were collected during the 2005-2006 school year.
  - Online, electronic version (Fall & Winter 2005)
  - Hard copy, printed version (Winter & Spring 2006)

Data Analysis

- Item-level zero-order and partial correlations with achievement measures were conducted.

- Factor analysis was used to obtain factors, which then became variables for the multiple regressions.

- Factor-level zero-order and partial correlations with each other and achievement measures were conducted to inform the selection and identification of variables for the multiple regressions.

- Standardized beta coefficients (β) were obtained from the regression analyses and used to construct the "Model of Influence."

Findings

Item-Specific Correlations with Student Achievement

Item	Comm. Arts		Mathematics	
	Zero-order	Partial	Zero-order	Partial
Enrollment by Grade Level	+		+	-
Content linked to state standards		+		
Curriculum, relevant	+	+	+	+
Curriculum, challenging	+	+	+	+
Curriculum, integrative	+	+	+	+
Critical thinking practices		+		
Practices that bolster skills in reading				+
Practices that bolster skills in writing				+

Item-Specific Correlations with Student Achievement

Item	Comm. Arts		Mathematics	
	Zero-order	Partial	Zero-order	Partial
Educators, familiar with middle school philosophy	+		+	
Educators, practice middle school philosophy	+		+	
Educators, value working with this age group	+		+	+
Educators, prepared to work with this age group	+	+	+	+
Teams have high expectations for all students	+	+	+	+
Teams have a sense of cohesion and harmony	+	+	+	+

Item-Specific Correlations with Student Achievement

Item	Comm. Arts		Mathematics	
	Zero-order	Partial	Zero-order	Partial
School has an inviting, supportive, and safe environment	+		+	+
School has students who are motivated to achieve	+	+	+	+
School has students who work well together and respect one another	+	+	+	+
Parent contact re student academic performance			+	+
Parent contact re student accomplishments	+		+	

Factors

Factor	# of Items	Scale Reliability
Curriculum Rigor	8	.7856
Performance Assessment	4	.7671
Curricular Determination	3	.5325
Instructional Practices	9	.8062
Middle School Disposition	4	.8589
Professional Development	9	.8436

(Scale Reliability is provided in parentheses after factor name.)

Factors (continued)

Factor	# of Items	Scale Reliability
Staff Allocation	6	.6945
Personalized Learning	2	.1683
Leader Experience	2	.8704
Curriculum Audit	2	.0590
Learning Environment	7	.8668
Team Maturity	3	.8232
Parent Communication	5	.7111

Partial Correlations, Factors

	Cur Rig	Perf Asse	Cur Det	Inst Prac	MS Dis	Prof Dev	Staff Alloc	Ldr Exp	Lrng Env	Tm Matu	Par Com
CR			+	+	+	+			+	+	+
PA				+	+		+				+
CD	+										
IP	+	+			+	+			+	+	+
MS	+	+		+		+			+	+	+
PD	+			+	+				+	+	+
SA		+							-		
LdrEx											
LrngE	+			+	+	+	-			+	
TM	+			+	+	+			+		+
PC	+	+		+	+	+				+	
CA	+									+	
Math					+				+	+	+
Total	8	4	1	7	8	6	2	0	7	8	7

Zero-Order and Partial Correlations between Factors and Student Achievement

Factor	Comm. Arts		Mathematics	
	Zero-order	Partial	Zero-order	Partial
Curriculum Rigor	+	+	+	
Performance Assessment				
Curricular Determination				
Instructional Practices				
Middle School Disposition	+		+	+
Professional Development				
Staff Allocation				

Correlations between Factors and Student Achievement (continued)

Factor	Comm. Arts		Mathematics	
	Zero-order	Partial	Zero-order	Partial
Leader Experience				
Learning Environment	+		+	+
Team Maturity	+	+	+	+
Parent Communication	+		+	+

Summary of Regression Findings

(Independent Variables)

	F/R	CR	PA	CD	IP	MS	PD	SA	Ld Ex	Lrg E	TM	PC
CR						+	+				+	
PA					+							+
CD												
IP	+		+				+					+
MS		+								+		
PD		+			+					+		
SA	+		+									
LdEx												
LrgE						+	+	-				
TM		+				+				+		
PC		+										
CA	-	+										
Math	-									+		
Total	**4**	**5**	**2**	**0**	**2**	**3**	**3**	**1**	**0**	**4**	**1**	**2**

(Dependent Variables)

Model of Influence

Staff Allocation

-.280 ⟶ **Learning Environment**

.196 ⟶ **Math**

.184

.407

.240

Middle School Disposition

.323 **.225**

-.627

.201

Performance Assessment

Team Maturity

Free/ Reduced Lunch

.275

Professional Development

.416

Instructional Practices

.549 *.662*

-.744

.280

.588

.254 **.241**

Parent Communication

.305

Curriculum Rigor

.128 ⟶ **CA**
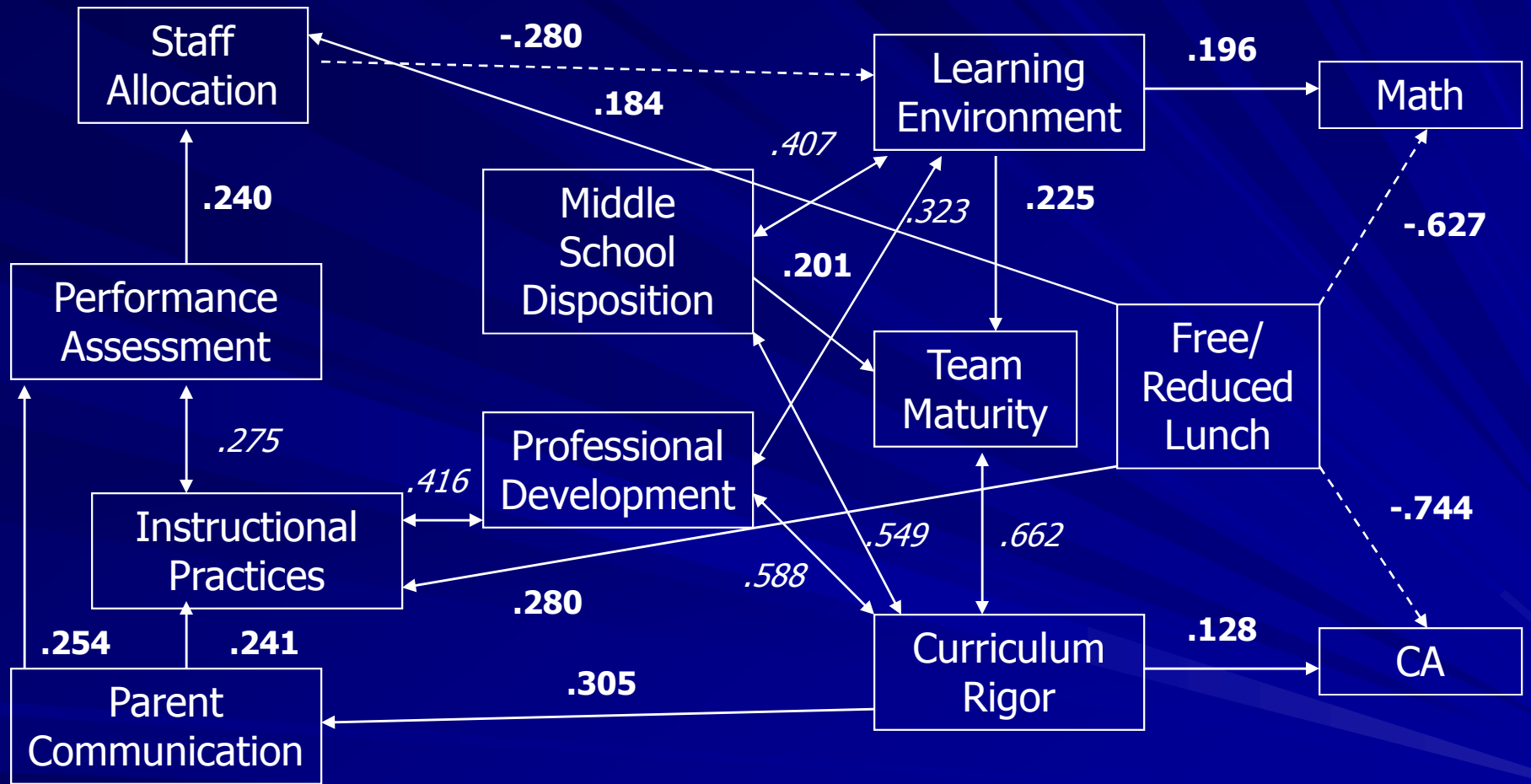
⟷ Mutually Influential, Positive (Partial Correlations in italics)

⟶ Directly Influenced, Positive (β in bold)

----➤ Directly Influenced, Negative (β in bold)

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Implications from Findings

Implications

Finding	Implication(s)
■ School size influences achievement (??)	■ The size and the context of the school (SES) are important concerning achievement (Matthew Principle)
■ Influential characteristics of the curriculum are consistent across content areas and school contexts	■ A relevant, challenging, authentic, curriculum promotes student achievement
■ Instructional practices related to literacy influence math achievement	■ Reading Math versus Reading in Math

Implications

Finding	Implication(s)
■ Positive relationship between teacher preparation for the middle level and student achievement regardless of context	■ Issues of teacher preparation and formal coursework for becoming a middle school teacher are vital
■ When interdisciplinary teams hold high expectations and work well together student achievement is promoted	■ Interdisciplinary teams need to do the things that good teams do in order to influence achievement
■ Student motivation and the ability to work with peers was correlated across content areas and context	■ Do not underestimate the importance of building student capacity as a mechanism to promote achievement

Implications

Finding	Implication(s)
◼ Parent contact about issues of academic performance correlated with Math regardless of context	◼ ?????????????
◼ Communication Arts was directly influenced by Curriculum Rigor	◼ Aspects of authentic pedagogy and student engagement are important for Communication Arts
◼ Mathematics was directly influenced by Learning Environment	◼ The learning environment variable represents the concepts of school climate and school health

Implications

Finding	Implication(s)
■ School context (SES) does influence achievement	■ Important to identify the points of high leverage that districts and buildings can address
■ There is a set of "Core Middle Level Variables"	■ The variables operate as a core set in relation to each other. When considering reform it must be recognized that a change in one can and will influence other aspects. ■ Turning Points 2000 noted this.

Implications

Finding	Implication(s)
◼ Interdisciplinary Teams provide an additional mechanism for influencing the rigor of the curriculum, but at the same time can be influenced by the middle school disposition and the learning environment variables.	◼ The larger school climate (learning environment) and the dispositions of teachers as individuals (middle school disposition) can influence, both positively and negatively, the maturity of interdisciplinary teams.
◼ Professional Development and Middle School Disposition were found to have mutually influential relationships with Learning Environment and Curriculum Rigor	◼ PD & MS Disp. reflect the human side of middle school practice, where professional development reflects the professional knowledge and skill teachers approach their work with and middle school disposition reflects the values and beliefs as well as past experience (preparation) that teachers bring to their work.

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Implications

Finding	Implication(s)
■ The more challenging, integrative, exploratory, and authentic the curriculum, the more parent communication increases.	■ Parent communication is promoted when curricular issues are more engaging for students.
■ The more parent communication increases, the more diverse instructional practices are used and the more instances of assessments requiring students to demonstrate performance are evident.	■ Teachers use more diverse instructional practices and allow for students to demonstrate performance as a result of enhanced parent communication.

Implications

Finding	Implication(s)
▪ The higher the percent of students receiving free/reduced priced lunch: –An increase of instructional practices occurs –Greater, more diverse, staffing is evident.	▪ Teachers may be trying a variety of approaches to reach certain students. ▪ Districts and schools responding to student needs by diversifying the staff members.
▪ The diversity in staffing (staff allocation) may hold a negative influence on the learning environment	▪ Perhaps, the more diverse the staff the more difficult to ensure all are "on the same page."

Summary and Q/A

- Clearly, the effective implementation of many of the espoused "best practices" in middle level education were found to influence student achievement in this state-wide study of 224 middle level schools.

- Stay tuned, as this study continues… we are currently surveying all Missouri middle level teachers about school leadership, climate, culture, student assessment, teacher leadership, teacher efficacy and teacher commitment to add to our picture of variables that influence student achievement.

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