Stress and the administrator of rural schools being rebuilt

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Abstract

School construction or renovation projects can have a profound affect on students, faculty and administration. The negative impact on the ongoing educational programs is a stressor for many administrators. The possibility that rural school administrators would experience more stress producing problems than would suburban and urban school leaders was studied. Using a sample of 190 school administrators, this hypothesis was supported for a number of dimensions of school climate. Possible causes for this differential effect are proposed.

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Introduction

Americans have learned to cope with living in homes during renovations and redecoration, and we have found ways of commuting on highways under repair or reconstruction. The question is how well does the education of our children fare when schools experience major renovations or undergo significant construction projects.

A series of reports from the Government Accountability Office in the 1990s described how one third of all school buildings are in need of significant repair or replacement (http://www.gao.gov/archive/1996/he96103.pdf) and (http://www.gao.gov/archive/1995/he95061.pdf). Additionally 60% of schools in the United States need at least one major item repaired or replaced such as windows, heating and air-conditioning, plumbing, wiring, roofs, and ventilation. Cash-strapped school systems only budget a half of one percent of their annual budget for preventative maintenance, and another 3% for emergency maintenance.

President Barack Obama signed into law the American Recovery and Reinvestment Act in February of 2009. This legislation provided $24.8 billion in bond authority to states and local governments for school construction and modernization through the Qualified Zone Academy Bond program and a new Qualified School Construction Bond program. This money for updating school buildings is in addition to other funds within that act designed to stabilize school budgets and expand early education and special education programs.

The purpose of this ongoing research is to learn the impact of rural school reconstruction on student learning, school climate, teacher and administrator morale and stress levels, and the schools' co-curricular activities.

Perspectives

Schneider (2002) studied the quality of learning as it relates to school facilities and concluded that a school's physical plant has a profound effect on student learning. The dimensions, which Schneider described as influencing learning included, spatial configurations, noise level, temperature, proper lighting, and air quality. These physical factors impact on students' and teachers' ability to focus on academic achievement on a daily basis.

In a national study of public school construction Filardo, Vincent, Sung, and Stein (2006), noted that in the decade between 1995 and 2004 there may have been a positive response to the GAO reports about the poor state of school buildings in the United States. In that 10-year span, public school districts built more than 12,000 new schools and managed more than 130,000 renovation and other improvement projects to address health, safety, technology, access for students with disabilities, educational enhancement, and other needs. Much of this activity was in response to public pressure, access mandates, and court orders following suits by parents of children attending unsafe and out of date schools.

In a New York study covering 1995 through 2000 the impact on the time schedule of building principals in schools being renovated was studied. Approximately 10% of the school leaders' time was spent during the construction attending to tasks related to the building projects (Cianca, 2001).

A dissertation by Ott (2001) found the top five building construction stressors by administrators were the presence of dirt in the building, increased noise levels due to construction, presence of fumes and odors, and temperature fluctuation throughout the

building. These stressors were directly related to environmental issues during construction.

Generally rural schools are smaller than either suburban or urban schools and therefore have less flexibility with space and facilities than do larger schools. The loss of one laboratory equipped classroom during a year long building modification can require a change in the school's curricular offerings in science for that year. A associated factor in the potential for a heightened sense of disruption during renovations of rural schools relates to its faculties. Historically, the most motivated teachers have ended up teaching in high-performing suburban schools. Rural and inner city schools have frequently had less well-prepared and less experienced teachers (Peske & Haycock, 2006).

Rural schools tend to enroll more children of families in poverty than either suburban or urban schools, and the median home values are lower in rural communities (Yan, 2006). In many states lower home values equate to less tax revenue to support schools and educational programs.

It was hypothesized that students, faculties, and Principals of rural schools would experience a greater disruptive impact during school renovation and reconstruction than would occur in either suburban or urban schools.

Methods

Research questions were answered using survey research methods. Data collection occurred in two phases. The first involved a pilot study that used the Internet to make a random distribution of a survey instrument to building principals in 25 public schools in Pennsylvania. The instrument consisted of 18 questions including demographic and opinion items. Opinion items covered six topics: student learning,

student discipline, school curriculum, co-curricular activities, staff morale, and the stress level felt by the Principal. The opinion items were stated as semantic scales using stems and ten point scales for level of agreement. No effort was made to identify which Principals actually worked in a school undergoing reconstruction or major repair. A total of 24 useable questionnaires were returned from Principals that experienced a school construction project. An analysis of these questionnaires found that two dimensions of the scale provided responses that differed significantly from neutral feelings about the topic. See Table 1.

Table 1: *Descriptive Statistics and Variables used in Research*

Variable	M	SD	t	Sig. Level
Student Learning	5.71	2.91	0.35	n.s.
Student Discipline	4.71	2.51	1.55	n.s.
School Curriculum	5.29	3.06	-0.33	n.s.
Extra Curricular Activities	6.58	2.62	2.03	n.s.
Staff Morale	7.04	2.54	2.97	.01
My Stress Level	7.12	2.33	3.42	.01

Data Source

From these findings, and comments provided by participants in the pilot study, a revised questionnaire was developed. See Table 2.

Table 2. *Revised On-line Survey*

School Construction / Renovation		
Order	Question	Choices
1	Gender:	2
2	Age:	5
3	Type of school:	3
4	Total number of years as a building principal:	5
5	Total number of years working in education:	7
6	What type of building do you oversee?	4
7	The number of students attending your building?	6
8	On a scale from 1 (disagree) to 10 (totally agree), please rate the following statement: School construction / renovation has decreased overall student learning.	10

9	On a scale from 1 (disagree) to 10 (totally agree), please rate the following statement: School construction / renovation has increased student discipline problems.	10
10	On a scale from 1 (disagree) to 10 (totally agree), please rate the following statement: School construction / renovation has decreased staff morale.	10
11	On a scale from 1 (disagree) to 10 (totally agree), please rate the following statement: School construction / renovation has disrupted extra-curricular activities.	10
12	On a scale from 1 (disagree) to 10 (totally agree), please rate the following statement: School construction / renovation has a negative impact on school curriculum programs.	10
13	On a scale from 1 (disagree) to 10 (totally agree), please rate the following statement: School construction / renovation has increased my personal stress level.	10
14	On a scale from 1 (disagree) to 10 (totally agree), please rate the following statement: Working with the PA Department of Education during the project has increased my personal stress level.	10
15	On a scale from 1 (disagree) to 10 (totally agree), please rate the following statement: Attempting to comply with state and federal mandates, as well as organizational rules and policies during the project has increased my personal stress level.	10
16	On a scale from 1 (disagree) to 10 (totally agree), please rate the following statement: Attending meetings regarding the construction / renovation project has increased my workload.	10
17	On a scale from 1 (disagree) to 10 (totally agree), please rate the following statement: Gaining public approval and/or financial support for school programs during the project has been hampered.	10
18	On a scale from 1 (disagree) to 10 (totally agree), please rate the following statement: Complying with school board requests during the project to cut costs and at the same time maintain a high quality instructional program has increased my personal stress level.	10
19	On a scale from 1 (disagree) to 10 (totally agree), please rate the following statement: Completing routine paperwork and reports on time during the project has been very difficult.	10
20	Because of construction / renovation has staff recruiting become more difficult to complete successfully?	10
21	Did the contractor work with administration to take the necessary steps to minimize any disruptions to the educational process?	2
22	What is your district ZIP Code?	1
23	Did you receive additional resources from the central office to help smooth the teaching and learning process during the project?	1
24	Please provide any comments and / or reactions.	Open
25	If you are interested in receiving a copy of the survey results, please provide your e-mail address:	Open

In this questionnaire a seventh dependant variable was added addressing total school climate. School climate was defined by subjecting the six semantic scaled items to the principal component factor analysis. The data set was found to be highly factorable using both the Bartlett Test of Sphericity (Chi Square = 383.9, $p<0.001$), and the Kaiser-Myer-Olkin Measure of Sampling Adequacy (KMO = 0.81). As only one core factor was identified no rotation was attempted and a combined factor was created by employing simple linear methods to create the seventh variable (combined variable) named "school climate."

The Pennsylvania Department of Education file of state approved school construction projects was examined, and a total of 943 schools were identified that experienced significant reconstruction or a major renovation during the previous five years. The Principals of those schools were sent the revised on-line survey during September of 2009. A total of two email requests for participation were made and a sample of 214 data forms was retrieved. Of these 190 were in usable form and subsequently became part of this analysis.

Results and Analysis

Reliability of the opinion based semantic questionnaire items was conducted using Cronbach's Alpha. The total scale of six items (without the school climate combined item) constitute a reliable measure, $\alpha = 0.80$. The descriptive statistics for these six opinion items and one combined (school climate) variable are presented in Table 3.

Table 3: Descriptive Statistics by School Type

Dependent Variables

School Type	Statistic	Co-Curricular Programs	Faculty Morale	Curriculum Flexibility	Personal Stress Level	Student Discipline	Student Achievement	School Climate
	Mean	3.44	4.24	6.31	7.38	2.97	3.22	4.04
Rural	Number	72	72	72	72	72	72	72
	S.D.	2.42	2.64	2.80	2.41	2.35	2.39	1.79
	Mean	2.32	3.18	3.68	5.84	2.23	2.30	2.74
Suburban	Number	92	92	92	92	92	92	92
	S.D.	1.66	2.19	2.53	2.59	1.77	1.70	1.44
	Mean	3.85	3.65	3.73	5.15	3.50	3.08	3.56
Urban	Number	26	26	26	26	26	26	26
	S.D.	2.98	2.81	3.11	3.12	2.83	3.06	2.48
	Mean	2.95	3.65	4.68	6.33	2.68	2.76	3.34
Total	Number	190	190	190	190	190	190	190
	S.D.	2.26	2.49	2.99	2.72	2.21	2.23	1.84

A One Way Analysis of Variance (ANOVA) was employed to test the hypothesis as to the possible difference between the perceptions of school administrators in rural schools and those in suburban and urban schools with regard to the impact of school reconstruction.

A significant difference was found using standard one-way ANOVA with the variables for Personal Stress Level ($F = 10.1$; $df = 2, 187$; $p<0.001$). Multiple comparisons employing Fisher's LSD found Rural schools were significantly different from either suburban or urban schools on this factor. There was no significant difference between the stress level reported by suburban and urban school administrators whose schools were undergoing renovation or major reconstruction.

A second significant difference was found between the perceptions of administrators of rural schools and the administrators of suburban and urban schools in terms of perceived curriculum flexibility ($F = 20.6$; $df = 2, 187$; $p < 0.001$). LSD comparisons found that while rural school administrators differed significantly from both urban and suburban peers, those two latter groups were not significantly different.

A third ANOVA also found significant differences between administrators whose schools were undergoing renovations or reconstruction ($F = 4.51$; $df = 2,187$; $p < 0.01$). The multiple comparison procedure found that all three groups of administrators differed significantly in terms of how they perceived school discipline problems during school renovations or reconstructions.

Data from three of the variables (Faculty Morale, Student Achievement, and Co-curricular Programs) and the combined School Climate variable were found to violate the assumption of homogeneity of variance. Those 4 dependent variables were then analyzed using the Kruskal-Wallis method with comparisons made employing the Mann-Whitney statistic "U". The three questionnaire items and the combined measure of school climate were all found to differ significantly between the three groups of administrators.

1. Faculty Morale ($X^2 = 6.52$; $df = 2$; $p < 0.04$): Mann-Whitney U (Rural with Suburban) U = 2,549; $p > 0.01$: (Rural with Urban) U = 789, n.s.: (Suburban with Urban) U = 1,144; n.s.
2. Student Achievement ($X^2 = 6.02$; $df = 2$; $p < 0.05$): (Rural with Suburban) U = 2,589; $p > 0.02$: (Rural with Urban) U = 814, n.s.: (Suburban with Urban) U = 1,135; n.s.
3. Co-Curricular Programs ($X^2 = 11.15$; $df = 2$; $p < 0.004$): (Rural with Suburban) U = 2,451; $p > 0.001$: (Rural with Urban) U = 885; n.s.: (Suburban with Urban) U = 840; $p > 0.02$

4. School Climate (X^2 = 1,983; df = 2; $p < 0.001$): Mann-Whitney U (Rural with Suburban) U = 1,921; $p > 0.001$: (Rural with Urban) U = 762; n.s.: (Suburban with Urban) U = 1,048; n.s.

Conclusions

America's schools are in need of significant repair and updating. The administration of President Obama has funded a method to both reduce unemployment in the construction trades and improve public education. This effort by the national leadership has provided an infusion of almost $25 billion in 2009 and 2010 that has spurred much needed school construction and repair work.

While necessary, there is no doubt that a school under repair and /or reconstruction can be a stressful experience for all concerned. Yet, these data indicate that the impact may not be evenly felt by those in rural, suburban, and urban schools. Overall school climate is reported to be best in suburban schools and poorest in rural schools during reconstruction and when major repairs are being made. This pattern is repeated with all six factors related to stress for school administrators during school reconstruction.

Reasons administrators of rural schools are likely to experience more stress during school reconstruction are related to having fewer available resources to overcome the hardships and disruption that occur (Yan, 2006).[i] The proportion of students receiving a reduced cost or free lunch in rural schools is 35% while it is 28% for suburban schools (Ohio University, 2007). Adults living in rural communities tend to have less college education and make less income than their peers in the suburbs. Rural schools tend to be smaller and have less technology available for student and faculty use than is true of suburban schools (Ohio University, 2007), and the faculties of rural schools tend to be

older than is true of either of the other two groups. All of these factors can contribute to reducing the flexibility of actions available for a school's leadership.

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[i] A recent new line of expenses has differentially impinged on the school budgets of rural schools. Rural schools spend more per pupil for transportation than is true of the other two groups of schools (Spence, 2000). Beginning in 2004 the cost of student transportation was significantly increased by the sharp escalation in fuel prices (Williams, 2007). Rural school bus routes tend to be longer than suburban and urban routes with 85% exceeding the national standard of 30 minute maximum ride each way. A quarter of rural bus trips exceed an hour in length. The median is 45 minutes and many of those trips are over unpaved or mountainous roads (Howley, 2001). School buses in a rural community typically burn over 2,000 gallons per year (American School Bus Council, 2008). An increase in gasoline prices of $2.00/gallon produces a budget shortfall of $4,000.00 per bus.