The Effect of School Building Renovation / Construction on School Culture

Lee J. Lesisko
Pleasant Valley School District (PA)

Robert J. Wright
Widener University

Brenda O'Hern
Widener University

Abstract

School construction or renovation projects can have a profound affect on students, faculty and administration. The literature revealed that continuous communication is essential for a smooth process. This research identified bureaucratic issues and school climate to be leading factors of concern during construction projects. Analysis of this study indicated that female Principals experience more stress during construction projects, and building leaders regardless of gender who oversee a rural school facility experience more stress than their suburban counterparts. The more experience the Principal has the easier it is for him / her to deal with school climate issues and concerns. The researchers also found that increased staff recruiting was not significant. The majority of the building contractors did work with school officials to minimize disruptions to the day-to-day activities during school hours. However, many schools did not receive additional resources from the district office to help smooth the teaching and learning process during the project.

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Introduction

School construction / renovation has become a current topic in education. With aging school facilities, changes in building safety codes, over-crowded classrooms, and advances in technology, district officials are faced with the dilemma to either upgrade or invest in new construction in order to bring their facilities into the 21st Century. A study from the General Accounting Office (1995) explained that $113 billion is necessary to repair existing school buildings. Holloway (2000) reported that one in three American school facilities need extensive repair or replacement. In addition to securing funding for a building project, district officials must also be cognizant of how school culture will be affected during this process. There is a current upturn in construction projects following the passage of president Obama's initiative to fight the Great Recession of 2007-2009, The American Recovery and Reinvestment Act of 2009, abbreviated ARRA (Pub. L. 111-5).

As school projects begin, students, faculty and administration must adapt their schedules and daily routines because of construction disruptions. During this time, issues such as loss of telephone service, power, intercom, walkways, and lavatories may be unavailable for extended periods of time. In some cases, the cafeteria, gymnasium, pool, auditorium, and athletic fields may be off limits. This may cause parking to be at a premium because of the construction vehicles moving in and out of the worksite. The inconvenience of changing room assignments, scheduling, constant or irritating noise, loss of space, and even foul odors will certainly impact day-to-day activities and the instructional process. These factors can influence the culture of any school.

Research Question

School leaders across the United States will at some point need to consider updating the physical plant. Whether this be a renovation or new construction, it is inevitable that upgrades will be necessary. This study answers the following research question: What effect does facility construction / renovation have on school culture?

In her book, Danielson (2006) explained that school culture is shaped by the behavior of the entire organization; from the Superintendent of Schools to the students and from the teachers to the parents. However, school personnel have a responsibility of creating a culture of academic success for all learners. In order to change the culture of a school, Villa and Thousand (2005) postulated that new heroes, rituals, symbols, and histories must replace the current structure. Depending on the situation, this process may take a very long period of time to implement.

Review of the Literature

Filardo, Vincent, Sung, and Stein (2006) found a significant amount of school construction projects across the United States from 1995 through 2004. More specifically, they determined that 60% or $179 billion in construction funding was spent on additions or improvements to existing facilities and about 40% or $124 billion was earmarked for new construction. Research revealed from this study that 12,467 school systems across the United States built new facilities to meet enrollment growth demands or replaced buildings that were identified by school officials as being beyond repair.

According to Schneider (2002) the requirements for teaching and learning are affected by the physical surroundings. In his research, the author reported that school facilities have a profound affect on student learning. These include, spatial configurations, noise level, temperature, proper lighting, and air quality that impacted on students' and teachers' ability to

focus on academic achievement on a daily basis. Schneider also suggested that class size is directly related to improved academic achievement especially with students from lower socioeconomic groups.

A qualitative study by Dawson and Parker (1998) found that during the facility renovation, faculty morale was elevated because of the newness and upgrades to the building. Tuttle (2001) explained that social relationships among students have increased in a positive nature because of additional facility space. The author sited that the single most recurring positive theme found throughout the study was teamwork. The architects, construction management, contractors, students, staff, parents, and community members communicated on a regular basis which helped defuse potential problems and frustrations. Direct collaboration among the stakeholders allowed everyone in the loop throughout the process, to rally support for funding, encourage participation, maintain morale, instill ownership, and facilitate the understanding of the project.

Marzano, Walters, and McNulty (2005) asserted that collegiality and professionalism refer to a manner in which school staff interacts and the extent to which they approach their duties in a professional way. This concept was referred to as “school climate” in the 1970s.

Danielson (2006) explained that a school’s culture affects how students treat each other, expectations they have for behavior, and the belief structure of school practices. She also pointed out that school culture is an important influence on how the institution operates and to the extent that it can achieve positive or negative results. A negative culture can promote cynicism, but a positive one inspires optimism. Bolman and Deal (1997) explained that cultural conflict can occur between individuals with different values, beliefs, and lifestyles.

In her study, Cianca (2001) found that school renovations across New York State significantly increased between 1995 and 2000. At the same time school building principals were committed to assuming additional responsibilities in operations and were more accountable for meeting academic achievement goals. Cianca also explained that during a renovation, 10% of a Principal's time throughout the academic year must be spent on construction projects. Patently, this represents an added source of stress for building leaders.

A study 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 facility. These stressors were directly related to environmental issues during construction. The author also reported the top three coping mechanisms were assistance with moving, appropriate administrative response to problems during the construction process, and appropriate administrative response to post-construction issues.

Lapinsky (2007) reported in his study of occupational stress among career and technical education directors across the Commonwealth of Pennsylvania that the top stress related factor was dealing with changes in mandates and regulations from the state department of education. Other factors identified by chief school administrators as moderate to high stress levels included: imposing excessively high personal expectations, too heavy of a workload, and too many meetings and organizational appointments during building projects.

Methods

Data for this study were gathered from an online questionnaire sent to select building principals across the Commonwealth of Pennsylvania during the months of June and September 2009. The Pennsylvania Department of Education provided the names of the school districts that

were involved in a building project within the past five years. The school buildings included both elementary and secondary facilities. The Internet was used to obtain the electronic mail addresses of the current Principals in each building and a total of 943 school leaders were identified.

The questionnaire was specifically created for this investigation and a preliminary instrument was developed during the spring of 2009. In order to determine its validity, the questionnaire was piloted with the help of building principals in Monroe, Lehigh, Luzerne, and Northampton counties of Pennsylvania. This process was accomplished in order to determine if the items in the study were clearly understood and to gain relevant feedback regarding its content. Gail, Borg, and Gail (1996) explained that a pilot questionnaire should be conducted prior to distributing the final survey instrument. The pilot was sent electronically to 25 school leaders who were asked to complete the survey and to provide relevant feedback. Their responses allowed the researchers to develop a strategy for statistical analysis for this research project. As noted by Rea and Parker (1992) surveys are a widely used research method because they are perceived as a reflection of attitudes, preferences and opinions. Top building administrators were chosen for this study because they represent the instructional leadership for the school and would be most knowledgeable about the building project. These individuals have a stake in the teaching and learning process and would generally be concerned about the perceptions and feelings of students, faculty and staff in the building.

The final survey document consisted of 25 questions of a varied format including identification of the most current choice from the selection provided and ratings on a Likert-type scale. According to Huck (2000) a Likert-type scale is a measuring device used to determine a level of agreement or disagreement. Space was provided for the participants to write additional comments and / or reactions. Nine hundred forty-three building level principals were provided an

electronic questionnaire in early June and 102 were returned in completed form. Another mass email was sent out in mid-September to the remaining 841 individuals identified in the sample and another 88 were returned. A total of 190 building principals completed and returned the survey. This represents a participation rate of 20.1%. Although a reasonable attempt was made to find the electronic mail address of each Principal via the Internet, only schools who listed a valid address on their website were chosen to participate in this study. Furthermore, no additional attempt was made to follow-up with non-responders. This option was foreclosed as there was no way to guarantee anonymity.

Results

Of the 190 individuals participating in this study, 58% were male while 42% were female. Thirty-six percent of the respondents were between the ages of 36 and 45 and 33% were between 46 and 55 years of age. These returns are a good demographic match to the actual population of Pennsylvania's school principals. Almost 35% of the building principals have served in the position as instructional leader for less than five years and 25% of the survey takers have worked in education between 16 and 20 years. Over 46% of the principals in this study oversee a Kindergarten through grade six facility and 51% manage a student population of 301 to 600 on a daily basis.

Factor analysis (principle component) found two clear factors in the Likert questions. First, data from questions 13 (personal stress level), 14 (collaborating with the department of education), 15 (state and federal mandates), 16 (increased workload), 17 (public approval and financial support), 18 (maintain quality instructional levels), and 19 (completing routine paperwork) were combined into one factor that the researchers labeled, "Bureaucratic Issues". A second factor labeled "School Climate" was comprised of questions 8 (overall student learning),

9 (student discipline problems), 10 (staff morale), 11 (extra-curricular activities), and 12 (school curriculum programs). Table 1 presents the descriptive statistics for these variables by gender for school principals.

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

Variable	Mean		SD	
	Male	Female	Male	Female
Bureaucratic Issues	4.67	5.52	2.07	1.93
School Climate	3.12	3.51	1.81	1.86

Using these two factor scores as dependant variables, studies of the assumptions of homogeneity of variance using Levine's test for Equality of Variance were conducted for a test of the equality of means using "t" tests. The School Climate factor was found to be within the normal parameter. During a subsequent analysis no significant difference was noted for the question of school climate and the gender of the school's principal ($t = 1.41$, df 188, n.s.). The variable called Bureaucratic Issues was found not to meet the assumption of equality of variances. Analysis was conducted by employing the Mann-Whitney procedure ($U = 3{,}392$, $n_1 = 110$, $n_2 = 80$, sig. <0.001). A third possible factor, "Hiring or Recruiting" (Question 20) did not offer enough variance for meaningful analyses.

These analyses indicate that female administrators experience significantly more bureaucratic stress over school construction than male administrators. Moreover, males and females have similar levels of concern about school climate as it relates to renovation or construction.

Presented in Table 2 is a One Way Analysis of Variance (ANOVA) using the Bureaucratic Issues factor as the dependent variable with the independent variable, three school types: rural, urban, and suburban.

Table 2: Analysis of Variance for School Type with Dependent Variable Bureaucratic Issues

Source of Variance	Sum of Squares	df	Mean Square	F	Significance
Between Groups	94.72	2	47.36	12.96	0.001
Within Groups	683.16	187	3.65		
Total	777.88	189			

Post hoc comparisons using Fisher's Least Significant Difference (LSD) test found that all three types of schools had principals report significantly different levels of concern with bureaucratic issues during construction. Table 4 explains the descriptive statistics related to the two dependant variables.

Table 3: Descriptive Statistics by School Type and Bureaucratic Issues and School Climate

		Bureaucratic Issues		School Climate	
School Type	Number	Mean	SD	Mean	SD
Urban	26	4.11	2.33	3.56	1.84
Suburban	92	4.79	1.90	2.74	1.44
Rural	72	6.02	1.76	4.04	1.79

An ANOVA for the factor score, School Climate was also carried out and the results are reported in Table 4.

Table 4: Analysis of Variance for School Type with the Dependent Variable School Climate

Source of Variance	Sum of Squares	df	Mean Square	F	Significance
Between Groups	69.90	2	34.45	11.27	0.001
Within Groups	571.73	187	3.06		
Total	640.63	189			

Fisher's LSD test analysis found the rural school principals had the highest stress levels regarding school climate over their suburban counterparts which had the lowest. The analysis also revealed that urban school administrators feel more stress during a construction project than their suburban peers.

An ANOVA was calculated using the Bureaucratic Issues factor score against student enrollment. The results of this analysis were not significant. Likewise, an analysis with enrollment size as the independent variable with the factor score of School Climate was also not significant.

The last area of significance noted was the experience level of the building principal. Analysis of Variance with experience level as the independent variable and Bureaucratic Issues as a dependent variable was not significant. However, the factor score for School Climate did vary by the experience level of the school administrator. The top two levels of experience were combined to increase the cell size and the result of that analysis is presented on Table 6 while the descriptive statistics for this analysis is presented on Table 5.

Table 5: Descriptive Statistics for Principal's Experience Level and School Climate

Experience Level	N	Mean	SD
Less Than 10 Years	65	3.75	1.87
11 to 15 years	64	3.37	1.72
15 to 20 years	31	3.28	1.94
Over 20 year	30	2.48	1.70

Table 6: Analysis of Variance for Principal's Experience with Variable School Climate

Source of Variance	Sum of Squares	df	Mean Square	F	Significance
Between Groups	33.30	3	11.10	3.40	0.02
Within Groups	607.33	186	3.26		
Total	640.63	189			

This supports the likelihood that experienced instructional leaders are more comfortable dealing with school climate issues than are lesser experienced school principals during construction projects.

Survey Question 20 asked if staff recruiting has increased due to the construction project and 95% of the survey takers answered no. Respondents were asked in Question 21 if the

contractor worked with administration to take the necessary steps to minimize disruptions to the educational process during school hours. Ninety-five percent of the respondents replied yes. More than half of the respondents who answered Question 23 indicated that no additional resources from the district office were provided to help smooth the teaching and learning process during the project.

Question 24 of the survey asked respondents to provide comments and / or reactions to the survey. Of the 190 building principals who participated in this study 65 or 34.2% submitted additional information regarding their experiences with facility construction projects. This information was categorized, summarized and analyzed for patterns, differences, and commonalities. In terms of instruction, one building principal with six to 10 years of experience who oversees a Kindergarten through grade six building said, “Though there were obvious disruptions the staff did an exemplary job of staying focused. We had the highest PSSA (Pennsylvania State mandated exam) scores ever recorded, in each grade level 3rd thru 6th, in both Math & Reading.” An instructional leader working in a grade seven through 12 facility explained, “I believe that a positive attitude and approach has limited the impact school construction has had on instruction. Although frustrating at times, the faculty and staff have been very flexible and understanding when problems have arisen or last minute changes have been made to the daily schedule.”

In terms of issues that occurred during a building project, a comment from a building principal with 16 to 20 years experience as an educator reported, “My biggest problem / concern with my construction project was with restrictions and rules from PDE (Pennsylvania Department of Education). They resulted in frustration.” He further explains, “Things that should have been done more cost effectively either did not happen or did not happen in a way that

would be in the best interest of the school district and kids. I also found working with architects unbelievable. If I wanted a change order, I had to pay. If they made a mistake (which was often) then the school district still had to pay. This drives up cost and does not make sense." On a positive note, a principal serving in a rural school with less than five years experience as the building leader explained, "Our students and staff were cooperative and adjusted well to the disruptions caused by construction / renovation. The positive attitudes of these groups minimized many problems."

Many of the responses indicated that communication between all parties was positive in nature. A principal in charge of a Kindergarten through grade eight facility with six to 10 years experience proclaimed that, "A crucial piece of the construction project was the constant communication between the project manager, my custodian, and myself. Failure to open these lines can result in extreme chaos. In my situation, the contractors worked with school staff to alleviate many problems. In those occasions when unforeseen problems surfaced, the school team and the construction team worked together to solve our issues."

Another Principal with more than 21 years experience as an instructional leader indicated that stress for her was higher during building projects. Another Principal with 15 to 20 years experience working in an urban school said, "The final project is worth the added temporary stress." The Principal of a rural school with a student enrollment between 601 and 900 with less than five years serving as a Principal and over 30 years experience working in education reported, "We are building "outside" of the old building, which has been a plus…there certainly is an increase in "general" stress as I facilitate the "normal" building process, but I would state that the stress that accompanies the new building project was expected and "normal" given the trials and tribulations of participating in the process. It was very educational for me personally. I

feel privileged to be a part of contributing to our students, staff, and community." A building principal with less than five years experience and managing a junior / senior high school with an enrollment of 601 to 900 pupils said, "My personal stress level was raised because I was not involved in any of the initial planning for the project. I was not allowed to have any say in the matter until everything had been signed, sealed, and delivered. Not a very educationally sound way to make construction decisions involving an educational institution."

One Principal suggested that due to high stress levels, students and staff should be completely separated from daily construction activities. He further indicated, "While the positives far outweigh the negatives…school construction, whereby students are attending the school that is being constructed or reconstructed, the stress and affect on the school community is magnified 8-10 fold. When you can keep faculty, staff, parents, and students separated from the project, the planners should make that accommodation whenever possible."

Conclusions

School construction / renovation projects can have a profound affect on students, faculty and administration. The literature revealed that continuous communication by all parties is an important factor to ensure that everyone is informed. The research question in this study was to determine how building projects such as renovations or new construction effects school culture. The analysis revealed that female Principals experience more stress during construction projects. However, males and females have similar levels of concern about school climate as it relates to building construction. School building leaders regardless of gender who oversee a rural school facility felt more stress than their suburban counterparts. The investigators also found that increased staff recruiting was not a significant factor due to construction projects and the majority of contractors took the necessary steps to minimize disruptions to the educational

process during school hours. In terms of assistance from the central office during building projects, more than half of the schools in this study did not receive any additional resources to help with teaching and learning.

This research may be helpful to building administrators or school district officials who plan on proceeding through a construction / renovation project. However, more research needs to be conducted on the personal stress level of the Principal and how building projects can affect school climate.

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Instrumentation

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 Ended
25	If you are interested in receiving a copy of the survey results, please provide your e-mail address:	Open Ended