

**IMPACT OF EDUCATIONAL FACILITIES ON ACADEMIC PERFORMANCE
SECONDARY SCHOOL STUDENTS IN KARU LOCAL GOVERNMENT AREA
OF NASARAWA STATE**

BY

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AND PLANNING (PGDEAP)**

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DECLARATION

I, hereby declare that this research project is been written by me and it is a report from my personal research work and it has not been presented in any previous work for postgraduate programme.

All quotations are indicated and all sources of information are specifically acknowledged by means of references.

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DATE

CERTIFICATION

This is to certify that this research project titled “Impact Of Educational Facilities On Academic Performance Secondary School Students In Karu Local Government Area Of Nasarawa State” meets the regulations governing the award of Post Graduate Diploma in Educational administration and planning (PGDEAP) Nasarawa State University, Keffi

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DEDICATION

This project is dedicated to God Almighty my creator. The only one who is Omniscience, in His graciousness; He kept me all through my going up and down in this institution. I will commit myself to worship Him. Also to my wife and children who gave me the moral and financial support.

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ABSTRACT

This study investigate the impact of Educational facilities on Academic performance secondary school students in karu local Government Area of Nasarawa State. The attitudes, perceptions and beliefs regarding the physical environments) in which they had been educated. The core questions which guided this research were: 1.) To what extent do students perceive their academic achievement, motivation and/or personal conduct is positively or, negatively affected by the condition of the facility in which they are educated? 2.) The researcher also conducted participant observations within the various Summer School settings. Data analysis involved coding responses from surveys and interviews into categories along emergent themes, which was followed by an item analysis concerning the frequency with which each code surfaced in the context of the study. Analysis revealed that students involved in the study perceived there to be a significant connection between the 'condition of the school they attended and their own levels of motivation, conduct and achievement. The study also showed this group of urban students regarded the quality of teaching and administrative staffing in their educational environments as being largely contingent upon the condition of the school itself. Students who participated in this study also held the point of view that teachers and principals of higher quality were generally employed elsewhere and were more effective in well-maintained schools. The study also revealed a distinct connection between students' perceptions of the facilities in which they are educated and the degree to which the school district values their education and safety.

CHAPTER ONE

INTRODUCTION

1.1 Background to the study

The no child left behind Act (2001) is the latest federal approach in improvement and closing of gaps in student academic performance. Traditionally, high schools have received much attention in the discussion of school reform. This is possibly due to the sequential proximity that higher education or the world of work. According to A(Gregory and smith, 1987), "A new body of academic inquiry is growing with a focus on the physical environment in the education process. Studies may find specific design function at their core. For instance, studies has found that the students in class rooms with natural lighting, large windows or well designed skylight performed 19 to 26 percent (%) better than their peers in classroom without those features. More profoundly, in the Abuja municipal area councils, (AMAC) studies are increasing their focus on the impacts that the environmental design will have on student outcomes. When the learning process is at the core of design priorities, there is a significant likelihood that the facility will possibly influence performance (Blair, 1998). The correlation appears to be positive, between facility design and learning.

Chan, (1996) clarifies that, poor learning facilities can foster negative attitudes jus as exceptional designs may bolster achievement. The growth of brain base on research has provided a short in the arm for facility design students. Kennedy (2003) point out that, schools officials must not only deal with the student in the prevention of misbehavior and violence, but also on the physical nature of school building. Along with behavior,

attendance and moral play large roles in school success. Killeen, Evans and Danko(2003) go as far as to promote the inclusion of students in the facility design in attempts to increase ownership and attendance. The impact of the physical environment on education is not ignored in current research. It has been determined that the surrounding in which people function can greatly impact moods, satisfaction and self-worth (ma and Macmillan 1999). Facility appraisal school be one of the many roles assumed by educational leaders maiden and Foreman (1998) claim that school administration should be "armed with a general understanding of the relationship between various physical features if a facility and the learning climate" (p41). It stands to reason that facility evaluation would warrant equitable security and effort to venture into pedagogy and curriculum. A growing body of research contributes to the belief that school facility design impacts student achievement behavior attendance and teacher retention. (O'Neill, 2000) assert that, the financial plight of Nigeria public schools would also deem it necessary closely investigate the effectiveness of these expensive building projects, this exercise will likely lead to a physical surrounding that support growth and learning.

1.2 Statement of the Problem

Recent studies by the Nigeria society of civil engineering report that 75% percent of the Nations school buildings are inadequate (Kerr, 2003). This has occurred coincidentally while student performance for many of our nation's students has remained stagnant. A number of studies have shown that many schools systems, particularly those in urban and high-poverty areas, are plagued by decaying buildings that threatened the health, safety and learning opportunities of the students. Good

facilities appears to be an important precondition for student learning provided that other conditions are present that support a strong academic program in work will state the significance of school facilities in our Nation schools, most especially in Karu local Government Area of Nasarawa State.

1.3 Research Questions

This study will be guided by the following research questions.

- (1) To what extent do schools facilities influence student achievement?
- (2) To what extent do schools facilities influence student attendance?
- (3) To what extent do schools facilities influence student behavior?
- (4) To what extent do schools facilities influence student completion rate?
- (5) To what extent do schools facilities influence teacher's turnover?

1.4 Objective of the Study

The objective of this study is to examine the possible influence of the school facilities quality on student achievement, attendance behavior, dropout rate and teacher turnover rate in selected schools in Karu local Government Area of Nasarawa State. Subsequently, the researcher will attempt to identify the aspects of the school facility design that have the greatest potential to impact learning, the finding and design of school facility construction and renovation.

1.5 Assumptions

- (i) Administrators understand the purpose of the instrumentation, and answered honestly and to the best of their ability.

- (ii) The researcher will be impartial in collecting and analyzing the data gathered.
- (iii) The person who receives the instrument or designed will be the individual that complete the instrument.

1.6 Significance of the Study

With the implementation of No child left behind Act (2001), schools must continue to improve student performance. All the while Karu local Government Area of Nasarawa State schools are seeing a significance increase in enrollment. There were 97,000 more students enrolled into public schools, in the year 2015 - 2016 than in the previous years. There for, school districts must provide more space for growing enrolments, while focusing on student achievement increase. Currently there limited quantitative data available drawing correlation between facility quality and student performance, especially in the junior school settings. Karu local Government Area of Nasarawa State schools are growing, in Karu local Government Area of Nasarawa State educators are striving to meet state and National standards. This study is significance because; there would be a provision of data specific for Karu local Government Area of Nasarawa State. It will potentially have implication for policy-making funding formulas and facility design.

1.7 Scope and Limitation

Findings from these studies may not be generalized beyond schools in Karu local Government Area of Nasarawa State Although there are other secondary schools in Karu local Government Area of Nasarawa State such as: Government secondary school

Karshi, Government Day school Karu Abuja would be considered in this research work.

1.8 Definition of Operational Terms and Acronyms

The terms used in this study are operationally defined as follows:

Influence of the school: it involves having an effect on a particular situation and the way that it develops.

Facilities: this refers to buildings, services, equipment that is provided for a particular purpose.

Academic: it involves a lot of reading, and studying rather than practical or technical schools.

Performance: is referring to the act, or process of performing a task, an action, it also involves how well or badly something works e.t.c.

CHAPTER TWO

LITERATURE REVIEW

2.1 Conceptual Framework

This study examines the impact of school facilities on outcomes in selected Secondary school in Karu local Government Area of Nasarawa State. This chapter is included to provide insight, as evidenced by a review of pertinent literature, into the content of school facilities and their bearing on school improvement efforts. The chapter opens with a description of the condition of Nigerian school facilities. The examination then ensues on the relationship between school design and student variables such as achievement, attendance, and behavior and dropout rate. The review of literature then focuses on the role of school facilities in the professional development of educators and on the establishment of community. The chapter concludes with an investigation of facility assessment and with the manner in which school facility design has evolved as a result of modern research.

2.1.2 Facilities and Student Achievement

“Learning is a complex activity that puts students’ motivation and physical condition to the test” (Lyons, 2002, p. 10). It has been a long-held assumption that curriculum and teaching have an impact on learning. However, it is becoming more apparent that the physical condition of our schools can influence student performance. Earthman, Cash and Van Berkum (1996) recently found that 11th grade students in above standard buildings scored higher as measured by the Comprehensive Test of Basic Skills than did their counterparts attending class in substandard facilities. Another report indicates

that students follow the trend found in the study conducted by Earthman et al. (1996). In a Virginia study, Cash (1993) developed research that examined the impact of various factors of building condition on student achievement in a manner that controlled for socio-economic status of the students. Cash (1993) found that when socio-economic factors were constant, facility condition had a significant correlation with student achievement. Specifically, Cash (1993) found that air conditioning, absence of graffiti, condition of science laboratories, locker accommodations, condition of classroom furniture, wall color and acoustic levels correlated with student achievement at a significant level when controlling for socio-economic status of students. Chan (1996) conducted a similar study of the impact of physical environment on student success. This study classified 165 Georgia schools into one of three categories: Modern Learning, Obsolete Learning, or Half Modern Learning Environment. Other than building age, differences in the three categories included lighting, color schemes, air control and acoustic levels (Chan, 1996). As one might expect, Chan (1996) found student achievement to be highest in Modern Learning Environments and lowest in Obsolete Learning Environments. Chan (1996) concluded those technologies and adaptabilities of modern environments better equipped students for success and that to ignore that fact was to disregard the physical difficulties of learning.

2.2 Empirical Review

Such studies regarding differences in student performance based upon building condition have focused on many factors of facility quality. With the average Nigerian school building maturing to 45 years old (Deweese, 1999), facility age is a

common discrepancy of building condition that is studied in correlation with student achievement. Bowers and Burkett (1989) studied differences in achievement between secondary students in two buildings, one built in 1939 and one built in 1983. In this study, all other building variables were consistent between the two schools. Bowers and Burkett's (1989) study revealed that the students in the modern building scored significantly higher in reading, language and mathematics than their counterparts in the older building. The age of a building can influence many of the individual factors used in evaluating the condition of an educational facility (Earthman & Lemasters, 1996). Earthman and Lemasters (1996) noted that in each case of their study, age of the building had significant impact on student achievement and behavior.

Furthermore, the study indicated that age was a surrogate for other variables of building condition such as lighting, temperature control, proper lighting, sound control, support facilities, laboratory condition and aesthetic values (Earthman & Lemasters, 1996). The development of curriculum or instructional strategies can exaggerate the differences in building age. Chan (1996) found that many buildings had become obsolete despite their structural soundness. Chan's (1996) study found an impact of building age similar to that of the aforementioned studies. However, his key conclusion was that many of these facilities have become obsolete because their failure to adjust to or accommodate innovations in curriculum development, instructional strategies and content development (Chan, 1996). Rather than the typical correlation study, the Cornell study provided a valuable before-and-after look at achievement in schools that were renovated. Significant impact was found in student achievement after facilities in these schools were refurbished. Most significant was the improvement in mathematics scores

of sixth grade students (Moore & Warner, 1998). The correlation between building age and student achievement has been found to be significant in Texas studies. O'Neill and Oates (2001) report that building age had the highest correlation with student achievement of all building factors investigated in a 1999 study of middle schools in Karu local Government Area of Nasarawa State. The study indicated that the strongest relationship between building age and student achievement existed in the area of eighth grade students passing reading. O'Neill and Oates (2001) found this correlation to be consistent with numerous other studies that linked building age with factors establishing student achievement, such as the research conducted by Bower and Burkett (1989). As school buildings age, they not only provide hurdles for teachers and students. Older buildings have been found to actually cause the loss of instructional time (Stricherz, 2000).

2.2.1 School Size and Student Achievement

Knowing that building age can contribute to the deterioration of facility conditions does not, in itself, assist practitioners in the improvement of student achievement. Many other factors of facility design have been linked to academic success of students. As enrollment numbers climb, the issue of school size becomes relevant to the task of improving student performance. School size questions came to the forefront after the Columbine disaster, where two students designed and carried out a violent plan undetected by the adults in the school (Kennedy, 2003a). Kennedy (2003a) notes that educators have been battling this disconnectedness that seems more prevalent at larger schools. Smaller schools have shown a greater capacity to develop personal connections among students and staffs that tend to prevent violent or antisocial

behavior (Yaunches, 2002). An issue related to school size is the ability for students and staff to establish personal links with one another and with the physical environment. This notion has been adopted by school designers as they design entire campuses or as they lay out classroom plans that allow for small-group or individualized instruction (Cook, 2002). Bryk (1994) found that students in smaller learning environments achieved at higher levels than their cohorts in larger schools. In an examination of hundreds of such studies, the Educational Research Information Clearinghouse commissioned a report that supported the assumption that smaller schools provide more attention to and support for individual student success (Raywid, 1999).

Despite the wealth of research espousing the benefit of smaller schools, statistics indicate that districts continue to erect larger campuses (Viadero, 2001). *Education Week* reports that a majority of our nation's students attend schools with enrollments of 750 or more, while seven states report average high school sizes of more than 1,000 students (Viadero, 2001). Raywid (1999) suggests that policy makers and scholars have turned a deaf ear to the debate of school size, favoring a focus on curriculum and pedagogy. This trend seems to follow suit with parents and teachers. A recent New York City survey indicates that less than half of teachers and parents would favor dividing large high schools into those with enrollments of less than 500 (Viadero, 2001). Why would educators, school board members and politicians continue to promote the construction of larger schools? Much of the research suggests that there are financial motives. *American School and University* magazine reports that restricted funding and lack of available land encourage districts to continue to trend of

constructing larger school facilities (Kennedy, 2001b). The ability to serve more students with common facilities such as cafeterias, libraries and other physical plant features makes the larger school appear much more cost efficient on a cost-per-pupil basis (Nathan, 2002a).

However, studies based upon cost-per-graduate instead of cost-per-pupil indicate that smaller schools are as efficient financially as their larger counterparts (Nathan, 2002a). School systems promoting smaller campuses have also found that the sharing of student-support facilities such as libraries and gymnasiums have lowered the construction and operating costs of decreasing school size (Nathan, 2002b). Supplemental funding for the construction and maintenance of smaller schools has also become available in the wake of school size research. The Gates Foundation, along with the Carnegie Foundation, provided more than \$38 million in support of building smaller schools (Kennedy, 2001b). Under the Clinton Administration, the United States Department of Education established the Smaller Learning Communities program with \$45 million in grants for program participants. Arguments other than cost efficiency exist in reluctance to build smaller schools. Some of this resistance finds its roots in more affluent communities, where research indicates that the link between school size and student achievement is not as strong (Howley& Bickel, 2002). Support for larger schools is also based upon the premise of student choice. Proponents of large schools, especially large high schools, base their position upon the assumption that larger schools provide a wide range of curricular choices such as advanced classes and fine arts. (Viadero, 2001). The size and variety of course offerings also affords larger schools the luxury of employing more specialized and diverse staff members

(Stevenson & Pellicer, 1998). Similar arguments for larger schools espouse the ability of large schools to support extracurricular programs such as athletic teams, theatrical productions student clubs and competitions (Viadero, 2001). The small-school movement is an issue that is not solely addressed by building more schools in attempts to keep campus enrollment down. The high school setting in particular has provided a number of alternative design methods that aid in establishing smaller learning communities. One such method is the schools-within-schools, where larger campuses are broken up into smaller groups of student and teachers assigned to interdisciplinary teams (Raywid, 2002).

Modern schools are being designed by architects in attempts to accommodate small groups such as “houses,” “families,” “clusters” and other small learning communities (Cook, 2002). Some high schools are allowing students to attend schools-within-schools arranged to fit a particular curriculum theme (Gewertz, 2001). Gewertz (2001) reports that these smaller themed learning communities utilize the original campus layout with renovations allowing for specialized laboratories in each smaller sub-school. As the research builds in support of smaller schools, states and local governments are carefully considering this issue as a way to address educational reform and academic achievement. Private foundations and governmental entities are providing financial incentives for the construction of smaller learning communities in an attempt to offset any disadvantage of economy of scale that may occur with smaller schools (Krysiak & DiBella, 2002). Some state governments are rescinding policies that had, in the past, encouraged or mandated the consolidation of smaller schools (Cutshall, 2003). While policies and funding are assisting districts in creating smaller

learning communities, educational leaders are still faced with the task of identifying physical environmental factors that impact academic achievement of their students. Within any size of school setting, it is important that students are given a clean and bright surrounding so that learning can take place in an optimal setting.

2.2.2 Lighting and Student Achievement

Just as empirical research exists linking school size and age with student performance, a growing list of studies is finding a relationship between classroom lighting and academic achievement. Our reactions, motivations, moods and sense of well-being are greatly impacted from the illumination of our surrounding environment (Ruck, 1989). Ruck (1989) noted that the issue of illumination has driven building design for centuries as evidenced by ancient architecture and its attention to natural lighting. Differing degrees of illumination, namely natural lighting, can be used to stimulate productivity and increase creativity in offices and schools (Ruck, 1989). Karu local Government Area of Nasarawa State study showed a significant correlation between natural lighting and student success (Hale, 2002).

Hale (2002) reports that students in the Capistrano Unified School District with natural lighting provided by windows or skylights scored 19 to 26 points higher on standardized tests than their cohorts with little or no natural lighting in their classrooms. This study (Hale, 2002) does not clearly assign whether the improvement in student performance was due to increased light, quality of light or the physiological effect of natural lighting. In a middle school study, student performance was compared across three campuses. The study found that students in classrooms with large or high amounts of windows and skylights outperformed other students by five to 14 points on

end ofcourse tests (Rouk, 1997). Ruck (1989) stated that windowless environments generate a great amount of tension, especially when coupled with restricted spaces and monotonous tasks. Lackney (1994) found that windowless spaces contribute to negative attitudes on the part of students and teachers. Natural lighting, or daylight, has shown to be effective in improving the quality and quantity of lighting in instructional areas. Daylight has been and is still the standard by which artificial light is measured (Fielding, 2000). Fielding (2000) reports that studies by Kuller and Lindsten (1992) and the HeschongMahone Group (1999), indicate a positive correlation between day lighting and academic performance. In Texas, districts have realized the academic benefit of natural lighting. The Austin Independent School District initiated a lighting program that increased natural lighting in instructional areas in order to increase student comfort, which would likely improve academic performance across all subject areas (Clanton, 1999). While the issue of lighting cannot singularly address all academic success variables, it is important to note that quality lighting increases the comfort of students and that comfort often translates into higher scores and increased performance (Rodgers, 1998). Design experts also promote the consideration of the developmental stages of students when establishing lighting systems (Bushweller, 1998). This effort on establishing comfort is more than an exercise in providing luxury to children. Design factors such as lighting can create an atmosphere where students are physically supported to concentrate on academic endeavors. Recently, the focus on effective learning environments has shone on healthy physical surroundings.

2.2.3 Facility Health and Student Achievement

Four decades ago, energy conservation became an important goal and had a profound impact upon building design. Resulting were facilities that were increasingly “tightened” against outside air infiltration in order to make them more energy efficient (O’Neill, 2000). This design approach has resulted in significant energy savings, yet it has been discovered that “tightening” buildings has led to higher levels of airborne gases from building materials and organic hazards such as bacteria and viruses (Witzling, Childress & Lackney, 1994). Witzling et al. (1994) have noted that this effort of energy efficiency has led to serious elements of sick building syndrome. Designers have recently increased efforts in the elimination of environmental problems such as noise, glare, mold, poor ventilation and temperature extremes (Rydeen, 2003). Rydeen (2003) notes that architects who design healthy schools that address the aforementioned concerns decrease distractions and allow students and staff to focus on the learning process. Buildings must not only be designed to be healthy. Districts must also maintain their facilities in an effective manner in order to provide a healthy learning environment (Kennedy, 2003a). For example, poorly maintained roofs may leak allowing moisture to enter the building and increase the growth conditions for mold. The presence of mold could cause respiratory problems for students and teachers or even lead to the closure of the classroom or entire building (Kennedy, 2003b). Mold and other indoor air quality issues have become the most common concern of designers and administrators in dealing with building health. Issues regarding indoor air quality are increasingly challenging school board members and administrators across the nation (Colgan, 2003b). Colgan (2003b) notes that older schools are more susceptible to mold and indoor air quality problems, but warns that newer buildings are not immune from these effects.

In previous decades, the concern over building health was focused on antiquated building materials such as asbestos and lead-based paints. Laws and policies have now been established to protect students from exposure to these items. These laws have had a profound impact on how schools are built and maintained (Centifonti& Gerber, 1997). As schools have been successful in eradicating asbestos, arsenic in drinking water and lead in paint, mold and its effect on indoor air quality have established a new challenge in maintaining a comfortable environment in which students can learn (Colgan, 2003b). Studies have shown that schools with indoor air quality problems experience a higher rate of health problems with students (Guarneiri, 2003). It then stands to reason that sick children will not be as likely to succeed academically. The research linking specific airborne pathogens with specific student health problems is still in the infancy stage (Smolkin, 2003). Smolkin (2003) reports that schools are working under the consultation of the Environmental Protection Agency to establish maintenance practices and educational programs to assist schools in maintaining healthy buildings while informing parents of the risks that are actually linked to poor indoor air quality. Schools that have adopted the Environmental Protection Agency's Tools for Schools program are beginning to see improved indoor air quality and a positive impact upon student academic performance (Rosenblum& Spark, 2002). As facility health improves, educators find that achievement increases due to improved attendance of healthy, attentive and motivated students.

2.2.4 Facilities and Student Attendance, Behavior and Dropout Rate

Student attendance has long been linked to success in school. Therefore, it stands to reason that educational leaders and policy makers would be interested in the physical

conditions that contribute to absenteeism. The Environmental Protection Agency reports that respiratory problems such as asthma are the leading cause of student absenteeism, leading to more than 10 million missed school days per year (Lyons, 2002). Lyons (2002) states that the Environmental Protection Agency's Science Advisory Board and the Cincinnati Asthma Prevention Study name indoor air pollutants as one of the top causes of asthma complications. The U.S. General Accounting Office reported in 1995 that more than half of our nation's 91,000 public schools have conditions that adversely affect indoor air quality (Lyons, 2002). Many facility conditions other than indoor air quality have been found to influence student attendance. A study of 139 Milwaukee public schools showed that, when controlled for socioeconomic status, students' attendance and achievement were positively correlated to facility quality (Lewis, 2001). School size, as mentioned earlier, has been found to affect student achievement. A portion of this impact can be greatly attributed to the influence that school size has upon student attendance. Education author Bracey (2001) notes that an abundance of research corroborates the belief that smaller high schools will improve attendance rates. Research in Oregon found better attendance rates in high schools with enrollments between 600 and 900 students (McComb, 2000). McComb (2000) writes that the benefits to attendance do not continue as enrollment dips below 500 students. Increasing school size was seen as a method of enhancing curriculum offerings while lower per pupil costs.

However, the benefits of larger schools have not been realized for many students, especially those from low-income families (Howley, 1994). The increase in size of these campuses has been connected with a decrease in student attendance rates

(Raywid, 1996). Smaller schools have been found to foster instructional innovation that, in turn, engages students and provide motivation for class attendance (Irmsher, 1997). Along with school size, the age of educational facilities can also contribute to attendance rates. Bowers and Burkett (1989) compared schools with ages differing by 44 years. The study found that students in the modern school had favorable attendance data when compared to the students in the older facility. In a study of Texas middle schools, building age had the highest correlation with student variables including student attendance (O'Neill & Oates, 2001). The illumination of classrooms has also been found to have an impact on attendance as well as achievement. The Alberta Department of Education conducted research that compared children in classrooms with some natural lighting to those attending class with typical electric lighting. This study indicated that students who study under full-spectrum lighting attended school three days more per year than students attending schools in buildings with other lighting (Rouk, 1997) Higher levels of daylight illumination has been found to increase initiative and, in turn, raise motivation for attendance (Ruck, 1989). Schools have realized financial benefits parallel with the academic benefit of improved attendance through the enhancement of classroom lighting. Not only are modern lighting systems utilizing daylight more energy efficient. Schools participating in energy performance contracting have found that, by improving classroom lighting, attendance rates have risen leading to increased state funding (Birr, 2000).

2.2.5 School Facilities and Student Behavior/Discipline/Safety

Factors of physical surroundings that affect behavior are known as ambient environmental conditions (O'Neill, 2000). O'Neill (2000) notes that these factors

include temperature, ventilation, lighting, color and noise level. These elements produce comfort or irritation, either of which can affect behavior of building inhabitants. The behavior of students is often driven by how they perceive their surroundings, including their physical environment (Maiden & Foreman, 1998). Annoyed students often become discipline problems. For example, Earthman and Lemasters (1996) found that the thermal environment of the classroom can be very important to the well being of children. Temperature levels have been found to have a significant impact upon attention spans of students (McGuffey, 1982). Interior factors such as lighting and aesthetic features can affect student behavior and influence discipline referral rates. Evidence exists that fluorescent lighting may increase stress level and hyperactivity more so than full spectrum or incandescent lighting (King & Marans, 1979). Lackney (1994) found that students in rooms without windows had more negative attitudes than children exposed to natural light. Studies have found that interior color also has an impact upon student attitudes and behavior. Early research on the impact of color took place in industrial settings. Earthman and Lemasters (1996) write of studies that determined certain colors that assist in increasing performance of workers in factory and office settings. Research regarding the impact of color has entered the educational arena and has found a link to teaching and learning. Color has been found to influence student attitude, behavior and learning (Sinofsky & Knirk, 1981). Certain researchers (Papadatos, 1973) have suggested that educators can manipulate atmosphere from constricting to engaging by changing color schemes in instructional areas. Papadatos (1973) suggests that such changes would promote positive perceptions and behaviors as well as increase attendance. While designers and educators strive to take proactive steps to improve the ambient environment of our

classrooms, the sad reality exists that we live in a society that must be conscious of and prepared for violence from within and without our campuses.

The occurrence of school violence has led to a collision of seemingly opposite forces of providing a warm, welcoming learning environment versus securing students and staff from attack or sabotage (Kosar& Ahmed, 2000). Kosar& Ahmed (2000) note the example of designing exterior doors that appear welcoming to students, staff and visitors while providing a safe barrier from intruders. Students and staff must be able to flow freely throughout the campus during the school day, yet the building must be protected from unwelcome visitors and unruly students (Kromkowski, 2003). Kromkowski (2003) tells us that architects must consider the security of the campus setting without compromising the flexible learning environment. Establishing a safe learning environment consists of more than secure entrances and surveillance systems. One must also look at the proximate surroundings of the school (DePatta, 2003). Noted security expert Bill Sewell explained in an interview that, when assessing the safety of a school, one must examine the surrounding neighborhood to determine to what immediate risks the campus may be exposed (DePatta, 2003). DePatta (2003) also learned that a professional evaluation of school security must include interviews with staff and parents in order to ascertain the typical threats that may take place in that particular environment. One act of student misbehavior that has the most impact upon campus facilities and that is the most perplexing for school safety experts is that of vandalism. A 1998 report by the U.S. Department of Education listed vandalism as one of the top three crimes occurring on school property, along with fights and theft (Black, 2002). Of these three, vandalism obviously has the most physical impact upon school

facilities. Due to this fact, designers must take vandalism into account when selecting building materials for school construction (Kromkowski, 2003). While the appropriate building materials will endure vandalism, it is also important to design spaces that deter such misbehavior. Noted school architect Stephen Kromkowski (2003) indicates that areas must be well lit and highly visible in order to remove the blanket of darkness or blind spots that conceal vandals during this criminal act. The same criteria hold for exterior building design, which should eliminate blind areas and supply adequate exterior lighting (Kromkowski, 2003; Pappalardo, 2002).

Once again, the impact of school size surfaces in the discussion of student behavior. On the topic of vandalism, it is theorized by school sociologists that vandals are most likely to be students who are disconnected from fellow pupils and from educators in their schools (Black 2002). While some children vandalize simply for the thrill of it, it is also theorized that vandals are most likely to be students lacking the appropriate counseling to deal with issues of anger and frustration (Black, 2002). Black (2002) reports that when larger schools do not promptly replace or repair facilities damaged by vandalism, they send a message to students that vandalism is allowed. The anonymity that students experience at large schools runs much deeper than the topic of vandalism. Violent acts such as the Columbine tragedy are often carried out by students who feel disconnected and unwelcome in school, yet go undetected by the adults on our campuses (Kennedy, 2003e). In the wake of recent acts of school violence, technological advances have been made in school security design. Schools have also begun to employ security measures that had previously been reserved for industrial and correctional facilities. Police departments, once seen as the responsibility of

municipalities and other governmental entities, are now commissioned by school districts and universities throughout the country (Kennedy, 2003e). *American School and University* magazine author Mike Kennedy (2003e) writes of the millions of dollars included in school bond proposals to upgrade or install digital video surveillance systems designed to monitor student, staff and visitor actions during and after school hours. Surveillance is just one of the methods used by schools to detect unwanted behaviors. Schools are also employing practices such requiring visible identification worn by all students, staff and visitors (Lupinacci, 2002). Electronic access systems have also been introduced to allow schools to limit and track who is given or obtains access to both exterior and interior entrances of the educational facility (Koziol, 2003). No matter how much effort a school system employs to deter misbehaviors of a violent or disastrous nature, educators must also be prepared for the occurrence of such crimes. The attacks of September 11th have also shown that we are just as vulnerable from without as we are from within (Lehmuller& Switzer, 2002). Events ranging from “shooters” in the school to terrorist attacks to natural disasters have schools developing plans and practicing drills to transform learning environments into protective shelters (Jacobson, 2003). The importance of disaster preparedness is not lost on the federal government. Secretary of Education Rod Paige and Secretary of Homeland Security Tom Ridge recently unveiled a grant program through the Department of Education that provides \$30 million in grants to assist districts in preparing emergency-response and crisis management plans (Robelen, 2003). With improved technology and resources, it is incumbent upon schools to protect the children that occupy our classrooms and hallways.

2.2.6 School Facilities and Dropout Prevention

It is also important that we focus on how our facilities might encourage students to continue enrollment, be academically successful and behave appropriately throughout graduation. The research is limited but growing in regard to the role that school facilities have in relation to high school dropouts. In an era of increased graduation requirements, schools are finding it more important to prevent students from dropping out of school instead of meeting the advanced expectations (Viadero, 2001). As with the issues of academic achievement, pupil attendance and student behavior, school size has shown to have an impact upon a student's decision to remain in high school or to drop out (Lee &Burkam, 2001). In a paper presented to a dropout conference hosted by Harvard University, Lee and Burkam (2001) note that, along with curriculum and social relation variables, large schools tend to see more students drop out prior to graduation than their smaller counterparts. The issue of school size is critical as communities decide upon how large to build new high schools or to enlarge current secondary campuses. Research on small schools has shown that high schools with smaller enrollments are experiencing smaller dropout rates and are expending fewer resources on dropout prevention (Howley, 1994). A study of urban high schools in New York indicated that, when controlling for socioeconomic status, larger inner-city high schools have higher dropout rates and lower graduation rates than smaller NYC high schools (Stiefel, 1998). Studies are beginning to surface that expose facility-related instructional and curricular strategies that deter students from leaving school prematurely. A Georgia study showed that technology integrated into the classroom and allowing for more real35 life applications in the classroom decreased dropout rates

(Wright, 1997). A Louisiana study found that student dropout rates were impacted by how grade levels were configured within school buildings (Franklin & Glascock, 1996). Studies such as these are growing and are often combined with the physical environment's impact upon teacher retention and professional development.

2.2.7 School Facilities and Teacher Retention/Professional Development

Recently, federal lawmakers squabbled over how to spend \$2 billion on teacher recruitment in the United States (Boles & Troen, 2000). *Teacher Magazine* authors point out that, while new teachers are needed to address retirees and enrollment growth, more emphasis should be placed upon retaining the teachers already employed (Boles & Troen, 2000). In 2000, more than 247,000 teachers left their jobs resulting in a turnover rate exceeding 24 percent (Blair, 2003). Teachers Boles and Troen (2000) note that one of the reasons commonly attributed to novice teachers leaving the profession are poor working conditions. However, past research has considered the issue of poor working conditions one that is not readily addressed in order to keep qualified teacher professionally satisfied (Keller, 2003). With more than half of teachers leaving the profession listing physical environment as one of their reasons for quitting (Blair, 2003), it is imperative that educational leaders address the workplace as a factor of school improvement. Just as students' attitudes and behaviors are impacted by their physical surroundings, teachers also are influenced by the physical conditions within which they work (Keller, 2003). In a recent survey of teachers in Chicago and Washington, DC, teachers gave their physical working conditions an over grade of a C on an A through F grading scale (Schneider, 2003). Echoing the findings of research

aimed at connecting facilities with student achievement, the survey commissioned by the National

2.2.8 Clearinghouse on Educational Facilities

(Schneider, 2003) notes that teachers report inadequate lab space, lack of fine arts accommodations, and small classrooms as deterrents to their jobs of educating children. Schneider (2003) reports that teachers list environmental problems such as poor indoor air quality, noise, low lighting as well as 25 percent indicating that they have taught in non-instructional areas such as hallways or even closets. Even as school designers must consider commons areas for students such as cafeterias, courtyards and hallways when designing a campus, workspace and commons areas for teachers and other professionals must also be considered. Insufficient workspace is found to be a significant contributor to lagging morale among American teachers (Black, 2001). Teachers have difficulty maintaining their sense of professionalism if they are not provided with private workspace (Hathaway, 1988). As with many other professionals, it stands to reason that teachers should be provided with private working space with telephone, fax machine and computers (Moore & Lackney, 1994). If teachers are expected to participate in shared decision-making, then workspace should also be arranged to provide professional interaction with peers and administrators (Moore & Lackney, 1994). In a study of exemplary schools in the United States and Japan, professors from Texas A&M University found that these outstanding schools provided sufficient workspace for teachers (Viadero, 1990). Viadero (1990) reports in *Education Week* that the group from Texas found the Japanese schools to be especially generous in the area of teacher workspace. Other faculty accommodations found in the

outstanding American schools were professional libraries and well-furnished meeting rooms for teachers (Viadero, 1990). Viadero (1990) notes that teachers with higher job satisfaction do a better job of educating children. Other factors of teacher space contribute to the sense of professionalism among faculty. Teachers need space to engage other teachers. Outside of class time, teachers need adult interaction that takes place in pleasant and appealing places (Stenzler, 1988).

Teachers need space to interact professionally and socially, according to Hawkins and Overbaugh (1988). Lack of such space for relaxation and planning is a cause for poor morale among faculty members. Job satisfaction is a common factor influencing teacher absenteeism and turnover rate (Keller, 2003). Good physical working conditions in any occupation can have a positive impact upon job satisfaction, attendance, effort, effectiveness and morale (Becker, 1981). According to Keller (2003), it is difficult to separate behavior from work environment when addressing teacher morale and job satisfaction. Physical surroundings impact job satisfaction and, hence, job performance, decreases in job performance and increases in turnover rate result in real financial cost on the part of school districts as a result of inadequate facilities (Becker, 1981).

Becker (1981) notes that adequate space with comfortable temperature; furnishings and lighting will increase the satisfaction of occupants and increase individual capabilities as a result. Teacher retention is critical to the success of educational reform, as reform is a long-range project (Reeves, 2002). Studies, such as that conducted by O'Neill (2000) in Texas middle schools, indicate that teacher satisfaction with physical working conditions is positively correlated with student academic performance. The

writings of Ma and MacMillan (1999) corroborate the findings of O'Neill (2000) in that they found a significant connection between workplace conditions and teacher job satisfaction. Just as teachers have been involved in the instructional and management decisions of their schools, campus designers have begun to find success in the inclusion of teaching personnel in the design process. One aspect of school design where teacher input is critical is that of teacher workspace (Strange, 2001). Teachers must be given an opportunity to assess their working environment, both the classroom and support areas (Long, 2000). Teaching methods vary, depending upon content area, student age, demographics and technology available.

Teaching strategies of the staff should be taken into consideration by school architects when determining the plan of new or renovated facilities (Sanoff, 1996). Stanard (1996) suggests that teachers are best prepared to interject the educational needs of students into consideration during the facility design process. Allowing teachers to participate in facility design along with consideration of teachers by facility designers is not only critical to staff morale and retention; it has been shown to have a significant impact upon teacher performance (Christopher, 1991). Factors, such as working conditions, which improve teacher job satisfaction, have been found to have a direct impact upon school effectiveness (O'Neill, 2000). Fisher and Grady (1998) found that poor facility conditions were a profound factor in teacher job dissatisfaction. Stockard and Mayberry (1992) contend that the physical environment has been shown to play a significant role in teacher effectiveness. In a study of five urban school districts, the facility conditions were found to be deplorable and the researchers reported a negative effect on teacher effectiveness (Corcoran, 1988). Teachers agree that the facilities in

which they teach can deter from the quality of their performance if the physical environment is substandard (Schneider 2003). Research is growing that urges architects and school leaders to take the teacher into account as much as the learner when designing campuses. Keck (1994) states that school design should consider the effective learner, the effective teacher and the effective organization.

The shape, size, arrangement and décor of the classroom and support facilities can either be welcoming or repulsive to teachers and students. This simple fact has been noted to profoundly influence the acts of learning and teaching (White, 1990). School architecture speaks volumes of a district's commitment to its professional staff by the type of workplaces it provides for teachers (Deal & Peterson, 1999). For example, Deal and Peterson (1999) note that the school signifies that it values professional growth and study by placing a research library for the faculty. In a national study, state Teachers of the Year was surveyed as to how their physical working environment affected their professionalism (Overbaugh, 1990). Overbaugh (1990) found that these outstanding educators were satisfied with the majority of classroom design aspects. However, the research showed that many of the support areas needed for professional development and interaction were inadequate – namely, professional libraries, telephones for teacher use, teacher to teacher conference rooms, planning areas and lounge facilities.

2.2.9 School Facilities and Establishing Community

The meaning that schools hold for both students and the community is evidenced in the architecture that the campuses exhibit (Cutler, 1989). For example, schools in the nineteenth century were built to model the factory-type design that signified efficiency and industrialization (Deal & Peterson, 1999). Cutler (1989) notes that schools recently

have transformed from castle-like erections with limestone décor, dark oak stairways and monumental paintings to the modern school that communicates a more personal setting. Architecture can symbolize many things to a community. Schools are a sustainable part of a community. School buildings can be an icon of a community's heritage and a celebration of its culture (Malone, 2001). Building designs and construction materials reflect the history and make-up of the area that the school serves. For example, in one New Mexico Pueblo, the school principal insisted that the school's perimeter be surrounded by an adobe wall instead of a chain-link fence to follow the architectural tradition of the Pueblo (Deal & Peterson, 1989). Deal and Peterson (1999) note that some schools may put up items such as sculptures to reflect the varied ethnic backgrounds of the many students enrolled. School architecture also symbolizes what is important to a community and to the educational leaders therein (Cutler, 1989). For example, a school with large gymnasiums and a small, isolated library may send the message that athletics is much more important than reading or academic research. The complexity, size and arrangement of space on a campus sends an important message about what is important to a community, faculty, student body, school board or district (Deal & Peterson, 1999).

2.2.10 Restore or Rebuild

Sustainable as they may be, school buildings begin to deteriorate with age. However, communities have found that historic neighborhood schools can be preserved to maintain the cultural significance of an area or town. Districts containing historic facilities have found that restoration and renovation are more publicly acceptable than demolishing these older buildings and replacing them with new construction

(Hammond, 2003). Colleges and universities have also taken great strides to maintain historically significant buildings and landscapes in response to the need for community identity and to appease alumni (Biemiller, 2002). Preserving historic campuses can prove to be challenging for designers and expensive for local taxpayers. Often times, due to outdated materials, modern building codes or technological advances of teaching space, it is less expensive to newly construct a school rather than renovate an antiquated facility (Hammond, 2003). Furthermore, it is often times more expensive to maintain older facilities due to obsolescence of mechanical systems or lack of energy efficiency (Sack, 2002). For years, building planners and educators determined that a district should not exceed 40% percent of the replacement cost in renovation expenses (Yeater, 2003). Yeater (2003) states that rules such as this are arbitrary and becoming less of the norm when dealing with classical buildings and limited state funding. However, the public outcry to cease the razing of these community icons has created funding opportunities and governmental support for renovating older facilities.

The National Trust for Historic Preservation, the National Park Service and the Council of Educational Facility Planners International has lobbied for the preservation of historic school buildings (Sack, 2002). Sack (2002) reports that states such as Vermont and Maine have adopted policies and made funding available to assist districts choosing to restore rather than rebuild. The preservation of historic school buildings marks a change in educational construction trends. Following the building surge of late twentieth century, towns are beginning to return the neighborhood school to the center of community focus and are longing for nostalgic design (Kacan&Bolling, 2002). Often times, schools may have lost their appeal to citizens as a result of poor

maintenance, vacancy or obsolescence. However, designers are discovering that refurbishing these older campuses will return them to their status as a symbol of community history, culture and values (Buffington & Baxter, 2001).

2.2.11 Community Involvement in School Facility Design and Use

Increasingly, public schools are highly integrated with other community functions (O'Neill, 2000). "This includes the development of a community center as part of the normal operations of the school, and making the school a hub for community activities" (O'Neill, 2000, p. 49). This heightened interaction between school and community is a reflection of the increasing perception of the school as a lifelong learning community (Moore & Lackney, 1993). Facilities can motivate community members to participate with the educational process, support school initiatives and utilize the building due to a welcoming design (Deal & Peterson, 1999). Deal and Peterson (1999) report that messages are transmitted to the community subtly by facility features such as carefully manicured landscaping, which signifies the love and care that children receive on the campus. The fact that educational facilities serve as cultural icons and that the citizens view and utilize the campus as their own justifies the inclusion of community members in the building design process. The typical school district would have numerous reasons to desire community participation in the design process. One such motivation would be the desire to build community support for the financing of the construction project (Moore, 2003).

Community members can bring a technical advantage to the design process by providing suggestions in order to meet the educational and social needs of their children (Bray & Kuhnen, 2002). Involved citizens can also bring community values to

the design table and their participation instills pride in the new or renovated facility (Meno&Karnyski, 2002). Funding for new school construction or significant renovation usually requires the approval of taxpayers in the form of a bond referendum. Citizens will demand information from district officials, such as the intended use of new buildings or the condition and capacity of existing facilities (Bell, 2003). Bell (2003) led a building process in 2000 that took a slower pace in order to allow input from community members and staff from all content and support areas. Members of this leadership team gathered human data that was shared with building architects before any technical plans were ever placed on paper (Bell, 2003). Such opportunities for citizen participation, along with an aggressive communication campaign, will greatly increase a district's likelihood of gaining voter support for a construction project (Moore, 2003). Contributing to the facility design process is an important way for parents to be involved in their children's educational experience. A wealth of research links parent involvement with student success (Moore, 2003). The idea of involving parents in the design process creates a dually successful situation for districts by increasing parental contributions to the learning process and by gaining their support for building projects (Moore, 2003). In additional efforts to expand the design team, some districts have allowed students to play an active role in the process of planning school facilities (Arora, 2001). Including community members in the process of designing educational facilities can take many forms. In some instances, local citizens are allowed to take part in decision making regarding site selection, building layout and design of parks and playgrounds (Schneider, 2001). Other times, community members are asked to participate in the collection of demographic data important for enrollment projections and site determination (Henry, 2000).

However, the most common method for involving citizens in the school design process is through membership of an advisory committee (Carey, 2001). According to Carey (2001) it makes sense to involve citizens in the design process since the school facilities belong to the taxpayers. The act of planning involves more than just facts, it includes ideas and opinions that should be shared by all stakeholders (Carey, 2001). The fact that public school facilities belong to district citizens drills much deeper than the simple fact that taxpayer dollars pay for the construction and upkeep of buildings. Community members and organizations occupy and utilize school facilities on a regular basis. The most common and obvious use involves access to activity centers such as athletic fields, gyms and natatoriums (Fickes, 2003a). The benefits of such arrangements are numerous. Most notable is the increased financial and physical capacities realized when community entities join with school districts in the construction, maintenance and use of educational facilities (Ritchey, 2002). Ritchey (2002) notes that such joint ventures increase the financial capacity for construction or renovation and make the most efficient use of limited real estate. In addition to athletic and recreational use of school properties, citizens are realizing academic benefits from their public educational facilities. Schools are providing library access to citizens so that they may use the literature and technology for personal and professional research (Sapp, 2001). School buildings stay open afternoons, evenings and weekends to host such activities as youth outreach programs, Community Theater and adult education classes (Kennedy, 2001a). Opening school doors to community members is not without its obstacles. The fact that an increasing number of people are allowed in the school buildings during various hours of the day and evening could have safety and security implications (Kromkowski, 2003). Evening and weekend activities taking place on

campuses are less likely to have the proportion of adult supervision as is available during the school day. This fact increases the need to prevent vandalism and theft in school buildings (Kromkowski, 2003). Deciding which groups are allowed to use school facilities can also present legal questions for district administrators (Jenkins, 2002). Ultimately, it is more common than not that schools benefit from opening their doors to the community. Citizens of all ages gain a respect for and tend to support districts that allow them to make optimum use of educational facilities (Sullivan, 2002). Taxpayers' naira has a greater impact when community entities partner with schools for the development of facilities and grounds (Geiger, 2003). Communities have also recognized benefits such as neighborhood revitalization and economic development when they become actively involved in the design and use of school facilities (Dolan, 2001; Rittner-Heir, 2003a). Hence, American schools have returned to a practice of opening its school doors to citizens as it did in the mid-20th century (Kennedy 2001).

2.2.12 School Facility Assessment

School administrators execute many tasks throughout the school year. In the quest to improve academic performance in order to meet mandates such as No Child Left Behind Act (2001), principals and other educational leaders tend to focus on curriculum and pedagogy rather than the physical learning environment. However, researchers Maiden and Foreman (1998) state that all school administrators should possess a basic understanding of facility assessment and use this knowledge to continually evaluate the condition of school buildings and its impact upon student success. The building principal is not the only individual who should be mindful of the

role that facilities play in school success. Teachers, parents and students are encouraged to reflect upon the condition of their school buildings (Sanoff, 2001). Sanoff (2001) notes that facility assessment can include tasks as simple as determining the arrangement of classroom furniture or concepts as complex as an obsolescence study of the mechanical, electrical and plumbing systems. Assessment can include various methods of data collection, including direct observation, interview and simulation (Friedman, Zimring&Zube, 1978).

School facility assessment normally conjures up thoughts of designers, architects, engineers and other professionals trained specifically to evaluate buildings. However, a growing trend considers that the users of a building such as teachers, students and community members, are the most reliable people to assess school facilities (Sanoff, 2001). This involvement of building occupants helps to ensure that facility quality assessment is an ongoing process rather than one only done when design professionals visit the building (Lackney, 1999). School facility assessment can focus on many factors of educational adequacy and excellence. Most obvious are an investigation of the environmental factors that impact academic performance and the delivery of curriculum (Sanoff, 2001). However, schools are increasingly evaluating the safety and security of their campuses. Efforts to improve safety and security should consider facility systems as well as policies and preparedness (Vigue, 2002). Facility assessment can determine the likelihood that building design may contribute to misbehavior and violence by examining sightline obstruction, door hardware security and space for student circulation (Reid, 2000). Facility assessments can often prove to be expensive and time-consuming.

However, formative facility assessments can be executed by school administrators during the normal course of their job duties. Software and other assessment instruments have been developed to assist the layperson in determining building condition (Oualline&Rabenaldt, 2002). Other technological advances, such as hand-held computers containing facility condition history, have made data access more efficient for building managers as they assess the physical environment (Bhimani&Pantaleo, 2001). The aforementioned justifications for facility assessment and the advanced technology assisting with building evaluation are but two reasons that educational leaders should be knowledgeable regarding campus assessment. Additionally, an extensive and accurate assessment of current facilities can assist in persuading elected officials and taxpayers to financially support improved and innovative construction (Rabenaldt, 2000).

2.3 Theoretical Framework

Any discussion of the progress made in the design of educational facilities should begin with the history of school building architecture. Early schoolhouses of the seventeenth century were as uncivilized as the frontier that they served. Most of these facilities were one-room structures with limited furnishings functioning primarily as shelter (O'Neill, 2000). As towns grew, additional rooms were added for additional space with little regard for modernizing the schools (Graves, 1993). The nineteenth century ushered in such advances as chalkboards, gas lighting and central heating (O'Neill, 2000). As the century progressed, the need to separate children based upon age prompted schools to separate students into grade levels and to separate older students into specific rooms for instruction in certain content areas (Siegel, 1995). The

first fully graded public school facility in the United States was Boston's Quincy Grammar School (O'Neill, 2000). The Quincy school was a four-story structure built to house 660 students. This structure strayed from the traditional bench seating for students, using individual desks and chairs for each pupil (Graves, 1993). The Quincy design established a pattern for nineteenth century school design across the United States (Cutler, 1989).

According to Graves (1993), schools following the Quincy design would have a façade based upon local preference although the basic layout of classrooms remained constant. Early school design failed to consider the instructional process. The psychological and physical needs of children were greatly ignored (O'Neill, 2000). At the turn of the twentieth century, O'Neill (2000) notes that schools such as Frank Lloyd's Hillsdale Home School began to convert to a more open design concept. Contemporary educators such as John Dewey also took note of the physical environment and its impact upon student success. Arrangement of the building and classrooms allowed for active student participation. One such stride in this direction was the unbolting of student chairs and desks from the floor (Siegel, 1995).

The 1940's noted an increase in class size as well as attention to characteristics such as increased student access and natural lighting (Graves, 1993). However, the traditional, egg-crate design prevailed throughout the early and mid twentieth century. During the 1960's and 1970's, educational research indicated that students performed better in a variety of settings and groupings. The response from architects was to design schools with open plans meant to provide flexibility in student grouping (Siegel, 1995). Many of these open designs failed due to a lack of input from understanding by educators.

This lack of staff development involved in the design process spelled the doom of open-concept schools (Rittner-Heir, 2003b). After a lull in enrollment growth during the 1970's and early 1980's, the number of students in our nation's schools began a steady rise in 1984. As the number of American students grew, national leaders took an increased interest in education and educational goals. President George Bush began the formation of national educational goals in 1989 and that emphasis was carried forward by President Bill Clinton in the 1990's (Kennedy, 2003c). The release of the U.S. General Accounting Office (1995) report entitled *School Facilities; Condition of America's Schools* brought specific attention to the inadequacies of many educational facilities and the high price tag for bringing these schools up to standard. The past decade has seen an insurgence of technology into the educational program, and hence in school buildings.

2.3.1 Technology and School Design

The role of technology in the classroom is actually an issue of literacy. The term "literacy" now refers to concepts beyond reading and writing. Literate students must be knowledgeable of and skillful with globalization, automated social interaction, the World Wide Web, and new cultural dynamics (Stokes, 2000). Stokes (2000) provides examples of the way in which technology will transform education: from augmenting traditional textbooks to providing Web-based tutorials outside of the classroom. Interactive technology is a common part of the world from which American students come. The world of work increasingly relies upon technological skills as well as concepts of interaction and information processing (Day & Spoor, 1998). "Technology is the inescapable companion of the 21st century citizen" (Day & Spoor, 1998, p. 32).

Day and Spoor (1998) note that the infusion of technology into the educational program impacts design components such as infrastructure, interior design, classroom size and furniture. Technology has impacted the content of learning as much as it has pedagogy. Programs such as industrial arts have been replaced with technology education. Such changes transform curriculum and facilities (Daniels, 2003). The processing of information that is afforded by technological advances changes the very layout of the classroom. No longer are desks arranged in rows with the teacher positioned at the front of the room from where she can lecture. Many schools are beginning to replace desks with tables so that students can interact with one another. Traditional desks have been replaced by tables and modular furniture in more than 25% of Karu schools (Daniels, 2003). The need to adjust classroom design to accommodate technological advances exists beyond computer labs and media centers. The National Center for Education Statistics reports that over 75% of United States public schools have computers in classrooms (Syvertsen, 2002). In order to support the increase in technology equipment, school designers must also address items such as lighting, power supply and classroom size. While natural lighting has been found to enhance learning, it can also raise the heat index of a classroom and decrease the life and operation of computers (Syvertsen, 2002). Syvertsen (2002) found that classroom space must be increased to allow room for computer hardware as well as raising ceiling heights to accommodate projectors and video screens. The increase of electronic media such as computer monitors, LCD projectors, digital whiteboards and file servers have greatly increased the burden placed upon the power infrastructure of school buildings. With the average age of school buildings exceeding (40) fourth years (Deweese, 1999), many of America's schools were not constructed in a manner that would support the

electrical loads created by increased technology. The challenges facing older building reach beyond simply adding electrical circuits and service. The power needs for computers, file servers, printers; wireless modems and projectors vary significantly.

For example, computers have a low tolerance for power fluctuations and must be not share loads with other electrical equipment (Failla&Birk, 1999). Failla and Birk (1999) caution designers to ensure that modern building codes be strictly adhere to when renovating the power infrastructure of an older facility. Electrical capacity is not the only wiring issue facing school designers and administrators when dealing with technology integration. The insertion of the World Wide Web and networking into educational programs necessitates the availability of network wiring. Industry standard for data, voice and video transmission is fiber optic wiring. However, educational institutions such as high schools and colleges operate with limited financial resources and find it difficult to create an entire network and purchase equipment for fiber optic systems (Yan, 1999). The speed required for data, voice and video transmissions should be considered when designers and education officials determine the scope of a building or renovation program. From an infrastructure standpoint, the development of wireless networks has made the most significant impact in recent years. In 2002, two out of three campuses reported some use of wireless technology (Swanquist& Garza, 2003). This technology, according to Swanquist and Garza (2003) is having a direct impact upon teaching and learning strategies. For example, students in some schools transfer their homework assignment from their own personal digital assistant (PDA) to their teacher's computer] as they enter the classroom. Modern technology advances are transforming the acts of teaching and learning. One technological tool introduced into

the instructional program is the use of video conferencing and distance learning. This technology allows students to hear from distinguished lecturers or participate in advanced curriculum that would not be available in their local schools (Yan, 1999). Hardware and software are allowing teachers to vary instruction based upon the need and learning styles of their students. Amplification systems, video systems and interactive whiteboards have expanded the tools available to teachers as they deal with students with varying capabilities and modes of learning (Milshtein, 2003). Technology allows educators to focus on the development of lifelong learners. Through information attainment systems, teachers can focus less on feeding facts to students and more on providing them with the skills to find the facts for themselves (McDonough, 2000).

Advances in technology have changed school design in ways other than instructionally. With heightened security concerns stemming from shootings and terrorist attacks, architects and school officials are increasingly advancing technological tools used for campus safety and security. Digital surveillance cameras are becoming the norm on campuses throughout the country (English, 2003). English (2003) reports that schools in Atlanta have invested hundreds of thousands of dollars improving the safety of their campuses with digital technology. Emphasis has also been placed on designing automated access to buildings that control and record those allowed entering schools. This technology has advanced to the realm of biometric identification such as hand geometry or face recognition required to enter the most secure areas of schools (Szczerba, 2000). Along with surveillance and access control, the introduction of telephones in classrooms, two-way radios and cellular phones have provided more

tools for teachers so that they can communicate with administrators for security purposes (Fickes, 2003b).

2.3.2 School Design and Learning Styles

Efforts to reform education and improve performance of an increasingly diverse student population have led to many advances and adjustments to teaching styles and curriculum delivery. As teaching strategies evolve so must, the physical environment of our schools, approaches such as interdisciplinary teaming and cooperative learning place different demands on our traditional schools settings (Day, 2001). Day (2001) suggests that modern schools should contain elements such as teaching museums, ecological landscapes, technology studios and flexible furniture systems to meet the special needs of all students. Flexible classroom space increases the capability for the students to interact in participatory learning exercises. Increased classroom size and flexibility will allow teachers to utilize modern educational strategies such as project based assignments and interactive laboratories in an environment that allows for multiple group sizes and well as individual investigation (Day, 2001). As educators have become increasingly involved in the design process, facilities have become more flexible and suited to innovative instructional approaches. The developmental level of students housed on the campus must be taken into account when developing instructional space. Sanoff (1997) notes that, modern schools will include a wide variety of classrooms in contrast to the twentieth century schools with their egg crate designs and symmetrical classroom designs. Educational researchers are frequently recommending that cognitive learning specialists become actively involved in planning instructional space in efforts to design interiors that maximize student performance

across all learning modalities (Hill, 1996). Brain-based research has profoundly affected both the medical and educational fields. A vast field of literature is focusing on the physiology of the brain and implications for teachers and educational leaders.

As this research becomes readily available and analyzed, it will impact decisions ranging from school start times to teaching strategies to assessment methods (Jensen, 1998). Noted brain research scholar Eric Jensen (1998) notes that this body of research will also impact the design of classroom environments. Brain-based learning scholars promote the creation of a constructivist environment. This term relates to the idea that students learn best when they are able to construct knowledge from their experiences and other connections rather than receive it in a rote manner from the teacher. The constructivist classroom is one in which students interact with the teacher as a facilitator and where they are prompted to take new information and exercise flexibility in fitting the new data into their own experiences and realities (Brooks & Brooks, 1993). This field of research heavily emphasizes the role of the physical environment.

Most commonly espoused by brain researchers are the flexibility of learning space to accommodate multiple levels of interactions as well as increased space for projects and other tangible assessments of student performance (Valiant, 1996). Brain research has broadened the concept of classroom design. Facility planning must now become a holistic and systemic practice, focusing on the physical environment while considering the social and emotional influences of the learning process (Lackney, 1998). Dr. Lackney (1998) offers suggestions for designers as they attempt to create brain-compatible learning environments. These principles include rich color and texture; group learning spaces; linking indoor and outdoor spaces; symbols of community

values; safe places; variety of design elements; changing displays; proximity of resources; spatial flexibility; activity centers; passive space; and utilization of the natural environment.

2.4 Summary

With enrollment expected to grow exponentially along with heightened accountability for student success, it is definite that school construction must increase and improve during the coming years. Research leans toward smaller campuses with larger classrooms (Cook, 2002). This arrangement assists school leaders in addressing the personalization and safety of a small school while allowing spatial flexibility to accommodate technology and multiple student groupings. In moves that appear retrospective, school buildings are designed with traditional facades and allow increased amounts of natural lighting (Cook, 2002). Other aspects of school design will change as a result of modern research and limited resources. In order to increase parental involvement, community awareness and access to additional financial resources, schools of the future will be designed to be central to community activity (Geiger, 2001b). In an era of more enduring construction and more limited financial resources, districts must adhere to instructionally and physically sound design approaches in order to avoid the erection of a monument of poor planning that may stand for decades (Stevenson, 2001). This responsibility on the part of school district administrators and trustees, calls for the development of a comprehensive building plan that will carry a district throughout years of enrollment growth and community development (Stevenson, 2001). As schools strive to improve student performance, they must accurately assess their needs as an instructional entity. These needs must

then be reflected in the design and arrangement of instructional space (Chan, 1996). Chan (1996) warns educators that schools which ignore the learning needs of their students and the modern teaching research are doomed to allow their facilities to slip into the trap of obsolescence. This mistake could prove costly on a financial and, more importantly, an instructional level.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Research Design

This study was descriptive in nature, investigating the possible impact of school facilities on student achievement, attendance, discipline, completion rate and teacher turnover rate in 7secondary schools Karu local Government Area of Nasarawa State. In addition, this study focused on the aspects the physical environment that has the potential to enhance student learning. Principals were asked to evaluate the condition of their high school facility in regard to architectural and cosmetic features as well as maintenance of the physical plant. One commonly held tenet of educational research is to examine new information about the educational phenomena (Gall, Borg & Gall, 1996). Descriptive studies, through their exploratory nature, provide the opportunity to increase the understanding of developments in the field of education. Inferential studies provide analyses that may assist in predicting results across an entire population based upon data gathered from a certain sample (Howell, 2002).

This study is conducting during the 2017-2018 academic year. Data pertaining to building facility conditions were acquired from the junior secondary schools this research instrument utilized in a similar study. The study followed seven basic steps outlined by Gall et al. (1996) required of research utilizing questionnaires: (1) defining the research objectives, (2) identifying a population or sample, (3) determining variables of the study, (4) designing the instrument, (5) pre-testing or pilot testing, (6) cover letter, (7) distributing the questionnaire and follow-up. Data on student

achievement, attendance, discipline, completion rate and teacher turnover rate were acquired from the Karu local Government Area of Nasarawa State Education Agency's website. Data for student achievement, attendance, discipline, and completion rate was provided for the 2016-2017 school year. Data pertaining to the teacher turnover rates were provided for the 2014-2015, 2015- 2016, and 2016-2017 school years. The design of the study allowed for a comparison of student achievement, attendance, behavior, dropout rate and teacher turnover rate with ratings of the school facilities. A significance level of 0.05 was used for this study. According to Gall et al. (1996), this level of significance is commonly selected by educational investigators and that it is more significant than the 0.10 level.

3.2 Population, Sample and Sampling Techniques

In order to more closely investigate the correlation between school facilities and campus performance, the study controlled for factors of school size and socioeconomic status of students. School size, as determined by student enrollment, was based upon figures reported by the Karu local Government Area of Nasarawa State Education Agency for the 2016-2017 school years. Socioeconomic status of student population was determined by the percent of economically disadvantaged students reported by the Karu local Government Area of Nasarawa State Education Agency for the 2016-2017 school years. According to the Karu local Government Area of Nasarawa State Education Agency, there are 52 public schools with enrollments between 1,000 and 2,000 students. This enrollment range eliminates possible errors in measurement that might occur with extremely large or small environment. Of the campuses in this range, 130 have less than 40 percent of their enrollment that is designated

economically disadvantaged. To further control for grade alignment differences between environments, only schools with grades nine through twelve were invited to participate. This reduced the number of schools in the study population to 25. It was determined that the principal or the principal's designee would be the most qualified to evaluate the physical plant of the school in regard to its possible impact upon student performance and staff retention. Therefore, the school principal for each school in the study population (n=25) were invited to participate in this research study. In all, there were 25 possible respondents who were surveyed for this research project. The entire population received electronic mail with a link to the web site containing the facility-rating instrument.

3.3 Method of Data Collection

Based upon the geographic dispersion of the population, it was determined that a survey mailed electronically would be used for data collection. Gall et al. (1996) cite this survey method as appropriate in providing valid assessment of variables studied. Several advantages of this survey method have been identified (O'Neill, 2000). First, it is an efficient way of reaching populations with wider ranges. Secondly, the questionnaire method was less expensive than other survey methods. Finally, stimuli provided to the participants are consistent and opportunities for uncensored responses are greater. The Total Learning Environment Assessment was developed for a similar study.

3.4 Methods for Data Analysis

This research was conducted as a survey study that used both descriptive statistics and inferential statistics to analyze the data. Data was gathered using basic research methodology as described in *Educational Research: An Introduction* (Gall et al., 1996). Analysis was derived from statistical methods outlined in *Statistical Methods for Psychology* (Howell, 2002). The results of the questionnaire entitled Total Learning Environment Assessment were downloaded from the research website to a Microsoft Excel spreadsheet. The data was then imported into the program entitled Statistical Package for Social Studies version 14.0.1. The program produced both numerical and graphical results of the study. Statistics gathered included means, frequencies, standard deviations and regressions. Findings are depicted using tables and graphs. Descriptive and inferential analyses were utilized to determine the relationship between dependent variables of student achievement, attendance, discipline, completion rate and teacher turnover rate to those of the independent variables of the sections and subsections of the measuring school facilities. Relationships were queried using correlation and regression models of statistical analysis. The data gathered in the first section of the Total Learning Environment Assessment, which contained responses on history of facilities studied as well as the instructional philosophy depicted in the facility, were used primarily as a statement of further description of the facilities of schools participating in the study.

3.5 Justification of Method

This study of junior secondary school facilities and their impact upon student performance was conducted during the spring and summer of 2017. Each principal of

the 25 eligible junior schools received an email explaining the purpose and scope of the study and inviting them to participate. Participants were assured that their school identity would not be divulged in the study. Ten of the 25 invited participants responded to the initial email. A second email was sent to the remaining invitees reminding them of the purpose of the study and reiterating the fact that the school identity would not be revealed in the study. Furthermore, an offer to share results with the respondents was made. Six additional participants replied in response to the email reminder. A third electronic request, along with reminder telephone calls, was made to the remaining invitees. Two additional participants replied to the third reminder. The total participant count was 16 schools of the 25 original invitees. The timeframe of emailing responses prior to the end of the academic year contributed to the lack of response, as many school administrators are engaged in time-consuming activities associated with the ending of school. However, it was necessary to contain the study to the spring term of the academic year due to the increased chance of facility renovations scheduled during the summer months that may significantly alter the ratings of the facilities and would be unrelated to the student performance data of the prior semesters. It was determined to continue with the study at the 30% response rate. The campus data necessary for a statistical comparison to the TLEA scores was obtained from the Karu local Government Area of Nasarawa State Education Agency. Scores for student achievement, attendance, and completion rate and discipline referrals were gathered from TEA's website through Academic Excellence reports. Student achievement data was based upon Texas Assessment of Knowledge and Skills scores reported for junior school, ten and eleven. Teacher turnover rate was calculated upon all instructional staff at a given high school. The turnover data was gathered using the 2014- 2015, 2015-

2016, and 2016-2017 school years. This data was provided by the Karu local Government Area of Nasarawa State Education Agency's Division of Communication and Public Information in the form of an electronic file transfer.

CHAPTER FOUR

DATA PRESENTATION AND ANALYSIS

4.1 Data Presentation

The data collected for the study were presented in tables and analyzed according to the research questions and hypothesis of the study and the interpretation followed immediately.

4.2 Data Analysis and Results

Research Question One

What is the importance of school environment on student's academic performance?

Table 1

RESPONSE IN PERCENTAGE						
ITEM	SA	A	D	SD	SA+A	D+SD
15	2	56	3	17	80	20
16	3	35	15	20	65	35
17	2	60	20	10	70	30
18	2	40	25	15	60	40
19	5	27	10	7	83	7

Source: Field Survey, 2019.

The above results from the items 15, 16, 17, 18 and 19 which were designed to provide answer to research question 1. The result revealed that 80% of respondents that responded to question 15 agreed that effective school environment promotes school coherence and positive relationship among the school members and these in turn enhances academic performance of students.

65% of the respondents agreed that effective school environment emphasizes students learning activities their commitment to learning and effective teaching strategies which lead to increase in students academic performance.

Also from the result 80% of the respondents agreed that in an effective school environment a disciplinary climate is provided within which teachers and students are able to conduct task-related work at a maximum capacity. 60% agreed that a sense of efficiency in teaching and learning performances is promoted among teachers and students if the school environment is orderly and purposeful. This in-turn enhances students' academic performance. In response to item 19, 83% of respondents agreed that a school environment that is effective promotes higher academic achievement. This by implication means that an effective school environment creates a conducive atmosphere for teaching and learning. It allows the students space and time to interact within the learning teaching process. It creates an atmosphere that can stimulate creativity, an environment of high challenge and low stress which can support students to become independent and active learners thereby resulting to higher academic performance.

Research Question 2

What should constitute a conducive school environment for effective academic performance?

RESPONSE IN PERCENTAGE						
ITEM	SA	A	D	SD	SA+A	D+SD
1	30	40	25	5	70	30
4	30	30	25	15	60	40
5	27	33	28	12	60	40
9	35	30	25	10	65	35
8	36	30	10	40	86	14
11	40	22	18	20	62	28
12	40	34	16	10	74	26
13	40	25	20	15	65	35

Source: Field Survey, 2019.

To answer research question 2, 70% of the respondents agreed that the general layout of the school site is vital to creating a conducive school environment for effective academic performance. The site of the school is the specific geographical location that contains the buildings where school equipment are kept for educational use. By implication school site or location should readily be accessible to students and teachers by both private and public transportation. The location should be near but not necessarily in an urban centre which is capable of providing many services required by the school and people associated to it. Natural beauty is a vital element in an ideal school, the closeness of the school plant to a majestic mountain, a lake, river or beautiful landmark is highly desirable. Trees for shade and flowers for beauty should be considered in order to create an educationally stimulating school environment that will facilitate students' academic performance. Safety from danger is also a prime consideration in selecting school site. It should not be located in a flight path of air craft or on the highway because of potential danger from accidents. It should not be located near industries or any sources of noise or air pollution that is dangerous to human health and can

equally affect student's concentration which will affect student's academic performance.

For a conducive school environment, 60% of the respondents agreed that school environment should be pleasant with fortified buildings which will "enhance students' academic performance. By implication, school buildings should be design in a way that its uniqueness must contribute to the advancement of health, safety and convenient to the promotion of sound academic work in the school. In line with this, 60% of the respondents equally agreed that old and dilapidated school building affect students' attitudes to learning which will in-turn affect their academics performance,

A conducive school environment should have adequate and qualified teachers who are competent to teach their subject area. In response to item 8 in the questionnaire, 86% of the respondents agreed that lack of qualified teachers affect students' academic performance.

As regard to facilities that students housed in modern schools facilities exhibits increase in academic performance, 74% agreed that, class rooms that are lacking adequate furniture affects students' academic performance. Also 65% agreed that for a conducive school environment, classrooms should not only have modern facilities but should equally be spacious and well ventilated, to enhance students' academic performance.

Research Question 3

What are the effects of school environment on the academic performance of students in Secondary School

ITEM	SA	A	D	SD	SA+A	D+SD
1	40	40	20	5	80	20
5	27	33	28	12	60	30
7	60	30	7	3	90	10
8	56	30	10	4	86	14
9	35	30	25	10	65	35
11	40	22	18	20	62	38
12	39	22	24	4	72	28

Source: Field Survey, 2019.

Table reveals that, 70% respondents agreed that school site or location is a vital ingredient in the creation of an educationally stimulating school environment to facilitate academic performance. Also, 60% of the respondents agreed that the building and the pleasant atmosphere enhances students understanding and enhance their academic performance. 65% respondents agreed that, the design of building affect students' attitude to learning which will in-turn affects their academic performance. 62% respondents agreed that, modern school facilities affect students' self-concept and students with higher self-concept exhibit increase in academic performance.

In response to item 2, 72% of respondents agreed that, a noisy school environment have negative effects on students' academic performance. Although, most of the respondents agreed that, it is not a direct effect, however they explained that noise reduces students level of concentration during lessons which can in-turn affect, their academic performances. Also, 70% of respondents agree that school environment with old and dilapidated buildings have a negative effect on students' attitudes to learning which in-turn affects the academic performance. 86% agreed that, lack of qualified teachers have a direct effect on students' academic performance in Secondary Schools, this is in response to item 8.

Research Hypothesis One

There is no significant relationship between school environment and academic performance of students in Secondary School.

Responses on the relationship between school environment and students' performance.

Table 4

ITEM	SA	A	D	SD	Mean		Coefficient of correlation	R	remark
					SA+A X	D+SD Y			
1	40	40	20						
6	40	21	29	10					
7		30	7	3	37.58	11.58	0.88		Significant
8	56	30	10	4					
10	28	37	30	5					
20	40	39	12	9					

Source: Field Survey, 2019.

The above results from items 1, 6, 7,8,10 and 20 were designed to provide answer to hypothesis I. The correlation coefficient is 0.88, which shows that the relationship between school environment and student's academic performance, hypothesis I is hereby rejected.

4.3 Discussion of Major Findings

The findings of the study revealed that schools location, availability of equipped laboratories and library, availability of qualified teacher's aid classroom conditions have direct causal influences on students' academic performance in Secondary Schools. Other variables of the school environment such as condition of the school building. This has to do with whether the school environment is pleasant with fortified building

or and has modern school facility. This has indirect influences on the students' academic performance. They tend to of the students attitudes and conceptual focus to learning and their self-concept, all of which have a resultant died on student's academic performance. Also the study revealed that the availability of equipped school laboratories. (Item 7) lack of qualified teachers (item 8) and the general layout of the school site (item 1) have the highest contribution to students' academic performance in Secondary Schools. The findings is in agreement with Ogunleye, (2002), Aworanti and Olakanmi (1997), that school site produced a significant difference in the performance of students. However, studies such as those of Daramola cited on Ogunleye (2002), and Ajayi (1998) did not find such significant difference. The implication is mat schools cannot just be sited anywhere without following some laid down procedures. The education s) stem in each state of the Federation should decide where a particular type of building should be built, among others Mbaekwe (1986). To avoid schools being wrongly sited the issue of location planning should be address more so, that this study has established strong causal effect of schools location on the students' academic performance. As regards laboratory adequacy and adequate qualified teachers, the findings correlate those of Wisconsin et al (1991), Okegbile(1996). The interpretation of this result is that well-equipped laboratories and availability of qualified teachers can positively enhance students' academic performances.

This implies that, teachers should be given opportunity for re-training and be encouraged to go for workshop training in their areas of specialization as recommended by Ogimbiyi (2004). This will help them to be well equipped and they are able to rub minds with their counterparts on issues and problems confronting them

in their respective classes with a view to improving their teaching skills. At workshops teachers may find solution some impediments in the course of their duties which might have dampened their morale and interest. In essence, attendance of teacher's workshops in various teaching subject (area) will go along way in re-orientating teachers positive attitudes, increase their teaching skills. and this will likely increase students' academic performance in secondary schools.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Summary

This study was conducted for the purpose of determining the possible impact that school facilities has upon student academic achievement, attendance , behavior, completion rate and teacher turnover rate. The study population consisted of Texas public high schools with enrollments between 1,000 and 2,000 students with economically disadvantaged enrollment between zero and 40%. An analysis of related literature led to the selection of the school facility criteria for this study. An aging of school facilities across the United States had led to heightened interest in how facilities can be maintained, renovated or rebuilt in a way that addresses student outcomes (Colgan, 2003a). With limited resources, school districts have been faced with a rising price tag for addressing facility needs (General Accounting Office, 1995). Nationally, focus has continued to strengthen on raising student achievement across all populations and socioeconomic groups (No Child Left Behind Act, 2001).

This, coupled with a growing body of research linking physical school environment with student achievement, leads to the concern over decaying American schools reaching an urgent status (Crampton et al., 2001). Studies, such as those conducted in Karu local Government Area of Nasarawa Staeshow a distinct correlation between effective school facilities and student achievement when factors such as socioeconomic status are controlled. Similarly, teachers need space to interact professionally in order to provide meaningful service to their students and coworkers (Hawkins &Overbaugh,

1988). And the school facility also plays an important role in welcoming parents and community members into the educational process (Hawkins &Overbaugh, 1988). With this renewed emphasis on school outcomes such as academic achievement, student attendance, discipline, dropout rates and teacher turnover rates, school officials are searching for resources to improve public education. The construction, renovation and maintenance of school buildings represent a large percentage of annual school budgets. Both school administrators and designers must continue to search for facility characteristics that can most efficiently and effectively promote student achievement and educator professionalism. By assessing a school's facility condition and comparing it to performance outcomes, researchers may be able to develop the ability to identify the components of school facilities that can best predict student and staff performance. This study utilized the Total Learning Environment Assessment (TLEA) to gather quantitative data on the condition of the facilities for the schools participating in the research. This instrument was developed for a prior study of Texas middle schools (O'Neill, 2000). The dependent variable data for student achievement, attendance, discipline, completion rate and teacher turnover rate was gathered from the Texas Education Agency and their Public Education Information Management System (PEIMS). The study was begun in the 2002-03 school year. For that purpose, the 2002-03PEIMS report was used for comparison data to the school facility reports. The teacher turnover rate was calculated on a three-year average culminating in the 2002-03 year. School administrators completed the Total Learning Environment Assessment (TLEA) in order to gather facility scores for each participating school. The administrators were sent an email inviting them to participate on behalf of their school by visiting a web site on the Education web system containing an online version of the

Total Learning Environment Assessment(TLEA). A follow-up email was sent to those schools in the population who had not responded to the initial invitation. A third follow-up email and phone calls accompanied with the previous correspondence yielded 30 participant schools from the population of 101. While the response rate was approximately 30%, it should be noted that the survey procedures are aligned with those procedures prescribed as accepted in educational research (Gall et al., 1996). Public Education Information Management System(PEIMS) data on the non-responding schools was compared to those who responded to the instrument. It was statistically determined that results from the sample could be generalized across the study population.

Inferential statistical analysis was conducted across each of the five research questions. Each of the two sections and seven subsections of the Total Learning Environment Assessment (TLEA) were correlated to the Public Education Information Management System (PEIMS) data for all participant schools. Multiple regression models were identified to be the best method for measuring the effect of multiple predictors upon dependent variables (Howell, 2002). ANOVA calculations were provided for each section of the Karu local Government Area of Nasarawa State student assessment as well as for student attendance, discipline and completion rate. Analysis of variance was also calculated for the dependent variable teacher turnover rate.

5.2 Conclusion

The analysis of the research data led to limited statistical significant findings. The search for trends and predictors yielded few conclusions that were quantitatively significant. However, the study revealed areas of interest for each of the five research questions that

should lead the researcher and others to develop future studies in order to explore those areas found in the wealth of literature on the topic. The following conclusions are presented for each respective research question.

5.3 Recommendations

The researcher has developed several conclusions based upon the data collection and analysis of this study. The following recommendations are based upon the results of this research and will hopefully guide other investigations as data is gathered and analyzed on this very important topic. The areas of student behavior (discipline) and teacher turnover rate were the two dependent variables that proved to have statistically significant relationships to school facility conditions as a result of this study. For that reason, school leaders should be guided to further study these relationships in way that will provide direction in the design, construction and maintenance of school facilities. This may lead designers to give greater emphasis on academic spaces such as classrooms, labs and libraries and less to specialized spaces such as multi-use rooms and gymnasiums. This finding parallels previous determinations of the role that physical surroundings play in affecting student behavior (Maiden & Foreman, 1998). Teacher turnover rate is indicated by the data revealed in this study to be a variable that may be significantly related to school facility conditions. Specifically, it appears that when considering support spaces, one can predict a significant impact upon teacher turnover rate, as is echoed in the literature through a 1994 study of teacher perceptions of workspace (Moore & Lackney). Administrators and designers may consider more emphasis on learning spaces and deemphasizing support spaces for administration in attempts to improve working conditions for teachers.

5.4 Limitations of the Study

As may be expected of a research work of this kind, the researcher was faced with some constraint such as:

Due to financial constraint, the researcher was variable to by his hands on some of the materials related to the study.

Time is another major constraint encountered by the researcher, as it has not been combining research work and other curricular activities.

5.5 Suggestion for Further Study

Due to a limited significant relationship between education facilities and school outcomes revealed by this study, the researcher recommends that further investigations of this topic be from a qualitative approach model. A qualitative study could provide information that is either inaccessible in a quantitative mode or useful in deciphering data that is closely clumped together, as were the data for attendance, discipline and turnover rates. Educators would be able to provide descriptions of how the physical environment has impacted their performance and that of their students. Quantitative studies similar to this research should consider expanding the study population to gather larger study samples. This may assist in providing more statistically significant data. It would also provide practitioners with more readily applied conclusions across similar populations. Future studies would provide greater impact by focusing on a specific school or set of schools with a deeper investigation of student performance data. For instance, a researcher may wish to study two similar classes of students who are provided similar instruction by a common instructor, but in differing facilities. This approach is possible in schools that contain both old and new facilities on the same campus. This study was controlled for factors of school size and socioeconomic status of students. Future studies could research across schools of various sizes and degrees of economically disadvantages students.

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PPENDIX – A

Institute of Education,
School of Postgraduate Studies,
Nasarawa State University,
Keffi,
25th October, 2019.

Dear Respondents,

This questionnaire is aimed at finding out the Impact Of Educational Facilities On Academic Performance Secondary School Students In Karu Local Government Area Of Nasarawa State. Please feel free to respond to the item provided and be assured that your responses will be use for only the purpose for this research work.

Thanks for your kind acceptance.

Yours faith fully,

Researcher

SECTION – A
BIO – DATA

Instruction: Kindly respond to the item by completing the gap below.

1. Name of Respondent _____
2. Name of School: _____
3. School Type: _____
4. Qualification of Respondent: _____
5. Gender: _____
6. Age: _____

SECTION (B)

Instruction: Please indicate your opinion to show the extent of your opinion with the under listed items. You are to tick (√)

Key

Strongly Agreed (SA),

Agree (A),

Disagree (D),

Strongly Disagree (SD).

S/N	ITEMS	SA	A	D	SD
1.	The general layout site is a vital ingredient in the creation of an educationally stimulating school environment to facilitate academic performance of students.				
2.	School located close to market areas, garages or any source of noise, affect student academic performance.				
3.	Student in Urban schools manifest more brilliant academic performance that their rural counterpart.				
4.	Pleasant school environment with fortified building enhance students' academic performance.				
5.	Old and dilapidated school building affects attitudes to learning and hence their academic performance.				
6.	Availability of equipped school library is a necessity for students' academic performance.				
7.	Availability of equipped school laboratories increase students' academic performance.				

8.	Lack of qualified teachers in secondary schools affect students' academic performance.				
9.	School building design affects students' attitudes to learning and hence affects students' academic performance.				
10.	Adequate use of instructional materials during lesson increases students' academic performance.				
11.	Students housed in modern school facility have higher self- concept and hence exhibit increase in academic performance than those in older facility.				
12.	Classroom that lack adequate furniture affects students' academic performance.				
13.	Specious ad well ventilated classroom conditions enhance students' academic performance.				
14.	Large class size affects students' academic performance.				
15.	Effective school environment promotes school coherence and positive relationship among the school members which in-turn enhances students' academic performance.				
16.	Effective school environment emphasizes learning and the use of effective teaching strategies.				
17.	Effective school environment provides disciplinary climate within which students and teachers opportunities to conduct task-related work are maximized.				
18.	An orderly and purposeful school environment promotes a sense of efficiency among teachers and students which in-turn enhances teaching and learning performances.				
19.	Effective school environment promotes higher academic achievements.				
20.	Students' academic performance is affected by school environment				

