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ABSTRACT

This study determined the perceptions of selected architects, administrators, and teachers concerning essential design elements for new middle schools. Professionals from 14 south and southeastern states ranked statements from not applicable to essential in the following 5 categories: planning, design, site selections; environmental factors; space utilization; technology; and school and community service. Proactive planning, user-friendly facilities, exploratory spaces, and safe environments were confirmed as essential elements. Architects perceived significantly fewer essential criteria than administrators or teachers indicating that those who use schools are either not providing significant design input, are being ignored in the process, or the data are being filtered. Appendices include the survey instrument, copies of several correspondences, and the quantified survey responses from a subset of five states. (Contains 121 references.) (GR)

MIDDLE SCHOOL FACILITIES FOR THE TWENTY-FIRST CENTURY: AN IDENTIFICATION OF CRITICAL DESIGN ELEMENTS BY SELECTED ARCHITECTS, ADMINISTRATORS AND TEACHERS

A Dissertation

by

ARTHUR LEE BURCH, JR.

Submitted to the Office of Graduate Studies
Texas A&M University
In partial fulfillment of the requirements
for the degree of

DOCTOR OF PHILOSOPHY

August 1994

Major Subject: Educational Administration

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August 1994

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ABSTRACT

Middle School Facilities for the Twenty-First Century: An Identification of Critical Design Elements by Selected Architects, Administrators, and Teachers. (August 1994)

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Research continues to document that children learn more rapidly in environments that are stimulating to all senses, varied in form and size, and meet basic needs for comfort. These qualities are especially essential for pre-adolescent and adolescent students in the most critical developmental period termed "middle school." School facilities across the nation are in decline, and this need for replacement and renovation of school buildings presents the opportunity to develop educational environments that enhance teaching and learning.

The purpose of this study was to determine the perceptions of selected architects, administrators, and teachers regarding the essential design elements for new middle schools. Professionals from 14 south and southeastern states were identified as having been involved in planning and design of a middle school since 1990. The professionals ranked statements in 5 categories: Planning, Design, Site

Selections; Environmental Factors; Space Utilization; Technology; and School and Community Service on a scale from not applicable to essential for future middle schools. Four of 42 statements were agreed to be essential by the population groups. Proactive planning, user-friendly facilities, exploratory spaces, and safe environments were confirmed as essential elements.

The study revealed a disparity among these professionals with regard to items deemed essential. Architects identified significantly fewer essential criteria than administrators or teachers and exhibited a greater amount of variance in response. This examination confirmed the perception that those who use schools are not providing significant design input, are being ignored in the process, or the data is being filtered.

Recommendations for further study include additional regional studies, examination of facilities study programs in higher education professional programs, and additional study of the linkage between learning and environment at the middle school level.

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Dr. Oates has provided support, encouragement, chastising when necessary, and ever the guiding hand. Dr. Hawkins and Dr. Hoyle are gentlemen of the old school who provide leadership by example. Dr. Hill always offered a kind word and direction when needed.

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CHAPTER I

INTRODUCTION

Educational facilities across the nation are in decline. Recent reports, Wolves at the Schoolhouse Door (1989) by the Education Writers Association and American Association of School Administration's Schoolhouse in the Red (1992), detail severe deficiencies in both physical condition and design. According to former Secretary of Education Lamar Alexander, some schools in our nation are so dilapidated and in such unsafe neighborhoods that no one should be forced to attend them (Agron, 1992b).

A staggering 89% of the nation's public school buildings currently in use were constructed prior to 1980 (Schmidt, 1991). According to Dr. Werner Rogers, Georgia State Superintendent of Schools, if educators do not effect major change in school programs and facilities before the year 2000, public and political components of the nation will take control and mandate change (Rogers, 1991). The Texas Legislature, as an example, will be challenged in the 1994 1995 session to return a majority of power over public schools to the local district boards of education (Ratliff, 1994).

Programs such as the New American Schools Development Corporation, Whittle Communications Edison Projects, and RJR

The style and format of this dissertation are patterned after the Journal of Educational Research.

Nabisco New Century Schools are a result of increasing public and private concern for the quality of education and educational facilities in the United States. The increasing desire for higher levels of technology has placed equipment in schools that are not equipped to take advantage of the capabilities of these technologies (Brubaker, 1989).

Futurists predict that in the coming century educational systems will become a focal point for communities and will work with businesses to provide life-long development and learning (Babineau, 1992). The concepts of the neighborhood school and the community school are finding a resurgent popularity with communities and educators. The housing of schools of the future should be on professional research agendas, and educators, planners, and architects must recognize that a facility used by a dynamic and constantly changing organization is never "finished" (Birch, 1975).

The quality of a school's environment affects the quality of its students education (Christopher, 1988a). School climate, including site and facilities, has been cited as one of the five correlates of effective schools (Hoyle, 1985). Dunn, Dunn, and Price's Learning Style Inventory, a checklist to determine the optimum environment for learning, includes the physical facilities as one of five significant areas that impact a student's learning style (Dunn, 1978). The National Association of Secondary School Principals (NASSP) (NASSP, 1985) included connectivity, climate, client

centeredness, and technology as some of the key elements in developing excellence in middle schools.

Research continues to document that children learn more rapidly in environments that are stimulating to all senses, varied in form and size, and meet basic human needs (Taylor, 1988). These qualities are especially critical for pre-adolescent and adolescent students, who undergo dramatic physical and emotional changes during the years termed "middle school." The restructuring movement, currently a force in national school organizations, encourages a reconceptualizing of education (NASSP, 1992), and the keystone Carnegie Council Study (1989) suggested that small, in-school communities for learning and schools-within-a-school provide the best atmosphere for the adolescent learner. Such rethinking of education generally is encouraged by those seeking a re-invention of the educational system (Foster, 1986). Curricular and programmatic changes necessitate a corresponding evaluation of the host for these activities, the school facility.

Within this morass of deficient educational facilities lies the still developing middle schools. Criticisms of the junior high patterns of education structure in the 1960s and 1970s fostered the middle school organization (Bondi, 1972; Capelluti, 1991; McGlasson, 1973; Messick, 1992; Wiles, 1986, 1976). Criticisms (that middle-level schools are less understood than elementary and high school programs) have

continued in the 1980s and 1990s. The concept of the middle school suffers from unclear and seemingly contradictory definitions (Capelluti, 1991; Eichhorn, 1991; George, 1992; Messick, 1992; NASSP, 1989, 1987). This lack of consensus often means that middle school facilities are placed at a lower priority than other components of the educational system (McGlasson, 1973). Unfortunagely, this neglect can have significant consequences.

Research indicates that the middle school years are some of the most critical for student personal development (Blyth, 1977; Capelluti, 1991; Carnegie Council, 1989; Egan, 1990; Eichhorn, 1966; Gatewood, 1975; George, 1992; Gump, 1987; Lounsbury, 1982; Messick, 1992; Schlecty, 1990; Taylor, 1988; Wiles, 1976; Wohlwill, 1987). Despite these findings, facilities appropriate to these developmental needs have been slow to evolve (Birch, 1975; Bruss, 1989; Burrows, 1978; Day, 1992; Dunn, 1988, Gatewood, 1975; Hathaway, 1988a; Hawkins, 1993; Knirk, 1979; Lowe, 1992).

Statement of the Problem

Middle-level students, typically those in grades six through eight, are often described as children in transition to adults or in "transescence," and, therefore, in need of unique programs and attention (Bondi, 1972). Middle-level schools have unique needs for programs and facilities and are beginning to be identified as a special, separate

category within the educational system (McGlasson, 1973; Messick, 1992; Wiles, 1976).

Some current research has provided better definitions of the learning styles and developmental needs of these students (Bondi, 1972; Messick, 1992). Although facilities are an important part of the delivery system for effective educational programs (Hathaway, 1988a), middle schoolers have been relegated, all too often, to the old high school building when a new facility is constructed for the upper grades (McGlasson, 1973; Messink, 1992). Literature or research on middle school facilities has been limited. NASSP has produced a few monographs that may be interpolated to apply to the critical design elements for middle schools (NASSP, 1989, 1987, 1985; Capelluti, 1991). The Texas Model Middle School Academy, Accelerated Middle Schools, and a variety of targeted middle school projects around the nation point to a need for predesign and programming direction to create optimum middle schools to facilitate student learning and development. However, little effort has been made to compile middle school design elements using input from architects, administrators, and teachers.

Purpose of the Study

A need exists to define the critical elements of design of middle school facilities that meet changing student learning and development requirements of the next century (Graves, 1991). The professions of education and

architecture can work together to provide optimum teaching and learning environments. This study surveyed practicing architects and educators who reviewed and evaluated critical elements for middle school facilities in order to increase the knowledge base about the interaction between these professions and to contribute to the scholarly knowledge about middle school learning environments.

Space and the functions of space are of critical importance to the purposes of education. This study first reviewed the professional literature to determine what recognized experts in the fields of education and architecture consider to be the most important design elements for the evolving middle school. Survey questions about these elements were then distributed to practicing architects, administrators, and teachers involved in recent middle school design in 14 states. The study of essential school elements including space and the functions of space will benefit architects, administrators, teachers, and students (Hurt, 1992; Taylor, 1988, 1975). The survey form additionally allowed the collection of demographic data regarding gender, ethnicity, length of professional tenure, and type and size of school.

Research Questions

School programming and design issues generally are negotiated by architects, administrators, and teachers. Although current education trends call for the inclusion of

students, parents, and community members, this study surveyed only architects, administrators, and teachers since they comprise the broadest knowledge base for facilities planning.

This study addressed the following questions:

1. What design elements for future middle school facilities, as defined by architects, are most ssential to meet the learning and development needs of students?
2. What design elements for future middle school facilities, as defined by administrators, are most essential to meet the learning and development needs of students?
3. What design elements for future middle school facilities, as defined by teachers, are most essential to meet the learning and development needs of students?

Operational Definitions

The following definitions are applicable to the study:

1. Administrators - Superintendents, associate or assistant superintendents, principals, assistant principals, curriculum directors, directors of instruction, school counselors, and others actively involved in governance of schools.
2. Architects - Professionals holding state license for the practice of architecture.
3. CEFPI - Council of Educational Facility Planners,

International, Scottsdale, Arizona. International organization of educators, facility planners, architects, educational programmers, and others interested in promotion of quality educational facilities.

4. Essential Design Elements - Those items considered as essential to planning and design of facilities where optimum teaching and learning may occur.
5. Middle School - The middle level grades, the transitional years for students, typically grades six, seven, and eight.
6. NASSP - National Association of Secondary School Principals, based in Reston, Virginia. Membership includes principals and assistant principals of secondary schools.
7. NMSA - National Middle School Association, based in Columbus, Ohio. Membership consists of teachers, administrators, and those interested in the development and promotion of quality middle schools.
8. Subset of states - Florida, Georgia, Kentucky, North Carolina, and Texas were selected as a subset for comparison. These states represent diversity in size, growth, and facility regulation. A substantial number of responses to the survey came from the subset states.

9. Teachers - Certified professionals involved in active classroom teaching.

Assumptions

The following assumptions guided the conduct of this study:

1. The instrumentation used in this study is valid to identify the critical elements of middle school design as perceived by architects, administrators, and teachers.
2. The samples of architects, administrators, and teachers represent their corresponding populations.
3. The sample architects, administrators, and teachers are knowledgeable and honest in their response to the instrument.
4. The interpretation of the data collected in this study accurately reflects the intent of the responses of those surveyed.

Limitations

The following limitations will apply to this study:

1. The findings of the study are based on the opinions of the respondents.
2. The findings of this study are based on the opinions of a limited number of randomly chosen professionals from among many who could be considered.

Significance Statement

Facilities must be able to adapt and respond to deliver increasingly specialized curricula and programs. New concepts of teaching and administration, combined with the technologies to enhance them, require that architectural considerations be an equally important part of the middle school design and planning process.

Kosmoski (1990), Dunn (1988), Messick (1992), and others stress a need for a whole-world approach to teaching and curricula. The focus of research regarding middle schools has been the need to humanize educational programs, to realize the unique developmental requirements of the middle level student, and to design programs that will serve this category of students. Bondi (1972) described middle school students as in transescence and, therefore, in need of unique programs and attention.

This study has collected data to direct the development of middle school facilities for the coming century. Additionally, it may create an awareness among architects, administrators, and teachers of the interrelationship that exists between facilities, governance, and curriculum delivery. Architects, administrators, and teachers should function together, not in isolation, to optimize the learning and development of all who use the school buildings and site.

Design of the Dissertation

The dissertation is presented in five chapters. Chapter

I contains the statement of the problem, purpose of the study, research questions, operational definitions, assumptions and limitations of the study, and a statement of significance of the study. Chapter II details a history and review of the literature applicable to the study. Chapter III summarizes the methodologies used to complete the research. Chapter IV contains the analysis of the findings. Chapter V provides a summary, conclusions, and implications of the study.

CHAPTER II

REVIEW OF THE LITERATURE

A thorough search for relevant literature regarding middle school facilities and considerations important in their development was made using card catalogues, ERIC, Silver Platter, Dissertation Abstracts, AIRS, KIDSPHERE electronic bulletin board, and ERIC's electronic net. Although a variety of education research studies and articles about ideal facilities was available and useful in the generic application of ideas on general educational facilities, these searches revealed a dearth of literature specific to the research questions.

History of Public Schools

America was founded by rich idealism in most primitive conditions. In spite of the physical difficulties, the founding families brought concerns for the quality of the mind and set about assuring that education for the future continued (Thayer, 1966). The ill-fated Jamestown expedition of 1607 was followed by still more colonists, and by 1642, the Massachusetts Bay Colony enacted laws requiring townships to make provision for the education of children (Greer, 1972). By the end of the 17th century all the northern colonies had enacted education statutes.

The first 100 years of education in America was modeled after the systems brought from Europe, overlayed by the

strong religious fervor that had precipitated the trek to a new land. The Puritan ethic of hard-work-for-reward permeated these early schools. Through the early 1700s, the northern colonies structured themselves in cities and towns that allowed a gathering of students for these schools. The need for continuing education resulted in the founding of Harvard College in 1636, the College of William and Mary in 1693, and Yale University in 1701 (Fraser, 1974). The development of educational systems in the southern colonies lagged behind that of the north until the end of the Civil War. The emphasis on plantation and agriculture and the large number of slaves made the gathering of students difficult. Southern children of wealthy landowners were often sent to Europe for their educational experience.

In the mid-1700s, the colonies coalesced into a nation. The population of this new nation, only two generations removed from Europe, grew to a self-sustaining mass (Fraser, 1974). Education continued to be considered important and grew to serve the enlarging population. Ben Franklin's Academy, begun in 1750, became a model for college and business preparatory teaching. Thomas Jefferson published his comprehensive educational plan for the nation's boys late in the 18th century.

America in the 1800s continued to grow and change. The Louisiana Purchase alone doubled the land mass of the new nation, and the gold rush to California in 1848 cemented the

coast-to-coast nation. The educational system, however, changed little until the late 1800s. Jefferson's comprehensive plan had been poorly supported in spite of educators' efforts throughout the states. Ohio became a state in 1802, through Federal Land Purchase, and required that monies from each township be set aside for educational purposes (Johnson, 1985). Horace Mann became head of the Massachusetts education system in 1837 and held the first national convention of educators in 1849. The developing nation continued an awareness that it needed an educated public in order to survive.

The "common schools" that were prevalent in the first half of the 1800s promoted a free education for all white children in the United States and began the establishment of state controls over public education. This system fell from favor, however, as the nation moved from an agrarian society to an industrialized power. Reformers like Dewey typified the concerns and changes in the education system from the late 1800s through World War II (Church, 1976).

Between 1940 and 1980, the nation's student population more than doubled, the number of teachers tripled, and the number of school districts dropped from 117,000 to 16,000 (Johnson, 1985). Society began to demand more of education as the country moved to an industrialized society. The reaction in the 1950s to the launch of Sputnik and the demand for a return to the basics in math and science education have

been echoed in the 1990s as the fear of falling behind the Japanese fuels another back-to-basics movement.

Middle School Beginnings

Education in the United States has continued to be evolutionary. The concept of middle school is an indicator of this change and continued concerns for the quality of education. As early as 1893, the Council of Ten from Harvard recommended a six-year elementary and six-year secondary grade arrangement (George, 1992). The graded school programs common by the late 1800s separated classes into grades 1 through 8 as grammar schools and grades 9 through 12 as high school (Alexander, 1981). There were occasional attempts to create a junior high program as early as 1920, and a report in 1913 by a federal study panel recommended a separate junior division of secondary education (George, 1992). Increasing enrollments after World War I brought more movement toward a 6-3-3 plan, and by 1960, four-out-of-five graduates had been through schools with this grade alignment (Alexander, 1981). Evaluation of programs and facilities have been on-going. Englehardt (1932) published a set of standards for the junior high as they existed between the World Wars, and Proctor (1930) published a description of the organization and administration necessary for operation of a junior high.

The evolution of the middle school continued as educators realized that the concept of junior high provided

only a smaller version of the high schools and was not responsive to these children's needs (Alexander, 1981). Over 5,000 junior high schools were in existence by 1960 (George, 1992) and only 100 middle schools (Alexander, 1981). By the mid-1960s, the call for a true school in the middle was being taken up by William Alexander and others (George, 1992). Through the early 1970s, some middle schools were created as declining enrollment in high schools was supplemented by the addition of the ninth grade, and the sixth grade was added to the junior high. The logic of a school for the pre-adolescent learner began to take hold in the mid-1970s (Wiles, 1986), and by 1977, over 4,000 middle schools were in existence (Alexander, 1981). Between 1970 and 1990, the total number of junior high schools declined by 53% while the total number of middle schools increased by 200% (George, 1992). In the 1980s, legislation created many middle schools as a reaction to the indictments of A Nation At Risk (National Commission on Excellence in Education, 1983). Development of true middle school curricula and texts, and the beginnings of a number of organizations that focus on the middle school came in the early 1980s (Wiles, 1986).

Middle Schools Defined

Writing for the National Middle School Association (NMSA), Lounsbury (1982) defined a middle school as "an educational response to the needs and characteristics of youngsters during transescence and, as such, deals with the

full range of intellectual and developmental needs" (p. 9). NMSA listed ten essential elements of a true middle school:

1. Educators knowledgeable about and committed to the "transescent,"
2. Balanced curricula based on transescent needs,
3. Range of organizational arrangements,
4. Varied instructional strategies,
5. Full exploratory program,
6. Comprehensive advising and counseling,
7. Continuous progress for students,
8. Evaluation procedures compatible with the nature of transescents,
9. Cooperative planning, and
10. Positive school climate (Lounsbury, 1982).

A study by the Canadian Middle Years Association determined that these students:

1. Experience a distinct developmental stage different from primary or secondary;
2. Require teachers who understand the physical, social, emotional, and academic needs as a group;
3. Require a school atmosphere that enhances self-concept, self-expression, and personal growth;
4. Require a flexible program that deals with their special needs; and
5. Require societal understanding and support (Ornstein, 1992).

Uniqueness of Middle School Students

The concept of the middle school has evolved during the past century. Today, the physical and psychological needs of middle school students are beginning to be understood as unique. For example, the Carnegie report, Turning Points (Carnegie Council, 1989), described the middle grade school, the junior high, the intermediate, and the middle school as society's potentially most powerful force to recapture millions of youth who are adrift. The report further stated that the adolescent years (ages 10 to 15), offer opportunities for these children to choose a productive, fulfilling path or a diminished future. Researchers for NASSP (1993) have written that middle-level students are unlike any other age group, and even more important, they are more unlike each other than any other age group. Middle school students are a group constantly in motion and change (Carr, 1993). They are kinetic and doing learners. They can learn sitting or standing, quietly or noisily, inside or outside (Holloway, 1994). Middle school years represent an exciting and pivotal time to reach students and build their skills in social decision making and problem solving (Elias, 1993). Indeed, they may represent the final opportunity for such educational intervention.

Wiles (1976) described middle schools as,

> a renewed effort to design and implement a program of education which can accommodate the needs of the pre-adolescent... a broadly

> focused program of education drawing its philosophy rationale from the evolving body of knowledge concerned with human growth and development (p.5).

Middle school education attempts to match formal learning to the developmental needs of the student client. Wiles (1976) enumerated five global areas of developmental tasks, or criteria, for the middle school: 1)academic adequacy, 2)physical development, 3)aesthetic expansion, 4)self realization, and 5)social awareness. Many educators concerned about middle schools and the pre-adolescent age group have discussed these five areas of development (Bondi, 1972; Capelluti, 1991; Castaldi, 1994; Edelsberg, 1992; NAASP, 1993; Ornstein, 1992).

Middle school students are transforming from childhood to adulthood in many ways. Their emotional, physical, psychological, and mental boundaries are stretched daily. They are transescents, uniquely explorative, dynamic and imaginative (Bondi, 1972). The middle school child is aware and involved in an interactive environment (Wohlwill, 1987). These children-becoming-adults face physical, emotional, and social disturbances that are diverse and hectic (Bondi, 1972). Egan (1990) described these students as exploratory, usually engaging their world in extremes of physical and intellectual efforts. These students find interest in extremes of experience and are, therefore, attracted to super

heroes, interplanetary travel, war and romance, along with an intense interest in self.

Bondi (1972) described these pre- or early adolescent learners as curious, explorative, interested in many things, full of energy and imagination. His ideal middle school includes an atmosphere of physical activity integral to the learning process. Eichhorn (1966) also wrote of the nature of the transescent as best served by minimized rigidity in a climate that provides maximum opportunity for physical activity. Blyth and Derricott (1977) recognized the physical and intellectual stages of development of the pre-adolescent and postulated that the institutional context for these students must be social and flexible within limits. Children do retain some adaptability even during this tumultuous transescence. Holloway (1994) found teachers with similar understanding and concerns describing children who need to step out of the classroom and into the world to study and apply what they learn. The National Association of Secondary School Principals (NASSP, 1993) wrote that integration of learning and active, participatory curricula are necessary to stimulate the early adolescent. Carr and Stevensen (1993) noted that the image of today's children sitting in rows doing similar work is a false illusion of active learning. Children continually change, and NASSP (1993) further encouraged a focus on the learner rather than teaching. Burrows (1978) believed that not all progress depends on

buildings or equipment; rather, effective in-service training, open channels of communication, and articulate leaders are influential elements in significant programs. Richardson (1993) wrote of another NASSP survey that found old instructional practices still in place in the classroom. Despite literature and research encouraging specialization for the unique issues of the middle school, the NASSP survey found only 11% of the professional population in the studies were certified for middle school and may not have been prepared to work effectively with adolescents.

The journey to today's model middle school of integrated learning, accelerated programs, and cross curriculum strategies began as teachers, administrators, and parents explored the desirability of separating students by age into graded programs. Messick and Reynolds (1992) cited Piaget's Theorem of Cognitive Development as a basis for encouraging consideration of the middle schooler from cognitive or intellectual development, and social and emotional, physical or physiological perspectives. Edelsberg (1992) listed the elements of an effective middle school as safe, academically effective, and responsive to early adolescent needs for diversity, competence, structure, limits, participation, self-explanation and definition, positive interaction and physical activity. The successful middle school involves students, teachers, and parents in the learning process to identify and support the needs of the transescent (Foriska,

1992). A middle school should foster the growth of these transitioning children without snatching their childhood from them (Bondi, 1972).

The Role of Facility Design in Learning

In this study the different, or unique, features of middle schools that influence facilities planning were identified. The literature indicates a classroom is perceived to represent much more in the learning process than simply four walls. Wiles (1976) questioned whether middle school facilities need to respond to these clients by changing from standard classrooms to varied learning environments. Dunn (1978), Taylor (1975), Weinstein (1984) and others encouraged schools to view the facilities and sites as learning environments in which everything is seen as contributing to learning.

The importance of facilities to education is acknowledged periodically throughout history in educational literature. Brubacker (1947) described the colonial school house as crowded, cold, poorly lit, unpainted and unhealthy. Knight (1951) cited an 1844 description of the New York schools as "naked and deformed, in comfortless and dilapidated buildings with unhung doors, broken sashes, absent panes, stilted benches, yawning roofs, and muddy, moldering floors" (p. 56). Horace Mann's 1838 report to the State of Massachusetts included recommendations for construction of quality educational facilities (Mann, 1891).

Somewhat more recently, Davis (1925) and Proctor (1930) called for schools to meet the functional needs of education.

Yet, attention to the evolution of public school facilities has been stagnant. Ornstein (1992) wrote that few noticeable changes have occurred in schools or classrooms in the last 50 years despite concerns expressed in education research supporting such change. In 1981, Davis and Loveless described schools still being developed by Procrustean design theory. In the legend of Procrustus, he fit his victims to a bed by stretching or removing of body parts. Such application in design would alter the clients (students) to fit the facility. Hathaway (1988b) described building design factors that serve to constrain people and programs. These constraints can be perceptual (perceived from the building presentation), individual (the facility's physical or physiological aspects), or programmatic (including technology and internal form). An NASSP monograph of 1989, describing middle level education's responsibility for student development, mentioned nothing regarding the significant role of facilities in support and development of student learning.

There is a growing recognition, however, of the science of environmental psychology as a contributor to the body of research and knowledge regarding school buildings. Writings by and for planners of educational facilities reveal a growing comprehension of and concern for educational philosophies and the need for responsive facilities. Heff

and Wohlwill (1987) described a concern for the real world environmental scale of a child's life. Lucas and Thomas (1990), writing about special education facilities, called for matching classroom "geography" to teaching aims and styles in order to prevent some learning difficulties. They noted that special education teachers need to consider change in the main stream classroom as a way of meeting children's needs. Their conclusions appear applicable to middle school education and educators, as acknowledged by Castaldi (1994), Doan (1978), Earthman (1991), Gump (1987), and others. Castaldi (1994) wrote that although buildings have for centuries been viewed as merely incidental to education, they are now considered critical tools of education. Existing literature may be added to this research base as educators begin to better understand that a direct connection exists between the physical environment and the teaching and learning that occurs there.

Davis (1925) wrote, "The aim and purpose of the school as an institution should determine the form and character of the school buildings" (p. 323). Procter and Ricciardi (1930) concluded:

> Buildings exist because there is a function to be served. As far as schools are concerned, this is a statement of profound importance. The criteria for evaluating housing must come from the fundamental aims of each separate school, its curricula, its social and educational philosophy, and the methods and devices it intends to employ in attempting to encompass these aims (p. 11).

According to Hathaway (1988b), buildings are not neutral in their effect on learning and human performance. Educational facilities may aid or inhibit learning and performance by constraints to perception, individuals, and programs (Hathaway, 1982b). Knirk (1979) further agreed that design can help or hinder the teaching-learning process as spaces fail to provide for the variety of learning activities that occur during a typical day. If synomorphic relationships indeed exist in facilities, then those planning programming for school buildings must be cautious to avoid a "function-follows-form" relationship. Gump (1987) concluded that much of the research on school environments is done on the physical arrangements separated from the action structures and programs. He wrote: "In reality, physical qualities of school environments must be understood in terms of the programs that these environments enclose and support" (p. 692).

Research suggests that educators do believe in a direct reciprocal relationship between the attitudes within a school setting and the teachers and classroom climate (Hoyle, 1977). Hoyle's study of organizational and spatial characteristics further found teachers' perceptions of the learning environment connected to their experience in facility arrangement. Architect Gaylaird Christopher (1988b), in a study for the American Institute of Architects, wrote that teachers were dramatically affected by their environments,

changing the way they taught, and even the way they dressed. When surveys create an opportunity for awareness of facilities involvement in teaching and learning, there is a corresponding acknowledgement by educators of the impact of facilities on these activities (Agron, 1993).

Educators need to be responsive to the effects of their physical environments. A child's social environment is interactive, open-ended, and generative in quality (Wohlwill, 1987), and the physical environment can be educational if it is designed to be supportive, helpful, and educational (Christopher, 1988a). Classrooms are places where most students learn either by appropriate responses or adaptive strategies (Ornstein, 1992) through three types of learning activities: passive, interactive, and active (Knirk, 1979). To facilitate these processes, the learning space should be flexible, allowing multiple use and multiple group size, individual study areas with a wide range of instructional materials, yet aesthetically and psychologically pleasing (Knirk, 1979).

Hoyle (1985) and NASSP (1985) described school climate as an important element of a successful school. Climate is described as a physical and emotional atmosphere of supportive caring with opportunities for socialization and activity. As Castaldi (1982) noted, "The well-conceived educational facility today should be able to support a variety of learning experiences" (p. 5). Similarly,

Weinstein (1984) observed that educators and educational critics ignore schools as physical entities even as characteristics of the setting can influence the behaviors and programs operating within.

Hurt (1992) wrote:

> When planning educational facilities, the designer must understand the inherent meaning of education and how it will be presented in that particular place by that particular group of educators as a reflection of societal goals (p. 14).

Hill (1989) noted that a well-designed school can be a catalyst for education change while the learning environment can represent physically the future of instructional changes. Wohlwill (1987) called for designs that facilitate environmental exploration. Taylor and Vlastos (1975) envisioned viewing a classroom as a whole learning experience. Dunn and Dunn (1978) created an inventory to determine the learning styles of students and called for redesigning the classroom into a multi-faceted, multi-dimensional learning environment that enhances learning. These and other authors encourage a broad view of the classroom as a center for lifelong learning and for learning for life.

Planning Considerations for the Future

Educational planners, primarily educators who are planners, understand the connection between facilities and learning. Castaldi (1969) described facilities as necessary for social development, transfer of learning, recognition of individual differences and group similarities, activity,

motivation, and even incidental learning. Johnson and Lowe (1992) called for education facilities to be designed to allow communication and social skills development. Christopher (1988b), after interviewing architects and educators from 17 schools recognized as exemplary in design, developed ten factors for outstanding school facilities. Included are:

1. Strong goals and objectives,
2. Environment that is friendly to users,
3. Building as teacher,
4. Fitting into the environment,
5. Attention to detail,
6. Variety of experiences,
7. Thoughtfulness in design,
8. Provision of adequate space,
9. Flexibility, and
10. Sense of community.

Castaldi (1994) has continued the promotion for sensitive educational facilities. His expanded list of specifications for better schools called for buildings that will:

1. Promote social development,
2. Allow individual differences and group similarities,
3. Provide multi stimuli instruction,
4. Encourage attending and learning,

5. Create high transfer of learning,
6. Nurture readiness,
7. Promote motivation,
8. Include activity programs and meaningful learning,
9. Reduce fatigue and improve learning, and
10. Incorporate effective group instruction.

Brubaker (1988) identified 21 trends he believed would shape facility design for the future. In addition to many already mentioned, he cited technology, energy concerns, safety concerns, social services delivery, and prototype evolution as areas to be considered in the development of educational facilities.

Professors Earthman and Westbrook (1991) directed attention to factors of concern in our changing demography that effect school design:

1. School choice will open and close facilities;
2. Pre-kindergarten education needs housing;
3. Increased programs for "at risk" children need space;
4. Full-day kindergarten programs will need rooms;
5. Day care and social services in public schools will need space;
6. Increasing special education programs have increased space needs;
7. Technology must be accommodated;

8. Reduction in class size ratio means a need for more classrooms;
9. Alternative education programs require space;
10. Magnet schools effect existing spaces as well as their own specialty needs;
11. Year-round school programs impact facilities; and
12. Increased requirements for graduation will create a variety of space needs.

Graves' (1992) "dreams of tomorrow's classrooms" included trends toward school networking, a realization of education as a lifelong process, and an increase in the cooperation between education and industry. Hawkins and Overbaugh (1988) identified the following six factors of interface between facilities and learning, paraphrased as follows:

1. When the school building is a reflection of the community, it is likely that increased learning will occur;
2. The school building aids learning when it readily meets the user's needs;
3. Student learning is related to teacher professionalism;
4. Communication fosters the connection between the facility and learning;
5. An appropriate environmental setting for learning is throughout the facility; and

6. The facility accommodates a variety of learning styles.

These listings, cited above, indicate some degree of consensus regarding the design of public school facilities. Terms such as flexible, responsive, adaptive, and accommodating are found throughout the writings of educational planners.

Although the emerging science of environmental psychology has not yet prepared prescriptive criteria for educational settings, literature does provide guidelines and suggestions (Wohlwill, 1987). For example, Project STAR, a four-year study of Tennessee public schools, concluded that school size, class size, location, noise levels, and study spaces affect academic performance (Moore, 1993). Yet Taylor and Vlastos (1975) and Lowe (1992) are among many who have noted the lack of collaboration, cooperation, and communication between architects, educators, behavioral scientists, and students to create the best learning environments.

Planning for the Future

Planning schools that will function as adaptive, responsive, progressive teaching and learning environments will require adaptation by those who are planning, using, and supporting these facilities. Buildings are not neutral in their effects on teaching, learning, and human performance

(Hathaway, 1988a). Facilities aid or inhibit the process they were designed to house.

Working against the ideal of including opinions from diverse constituents and allowing the curriculum to be a design determinant is the reality that schools often are designed in an information vacuum. Professional responses to the need for change have, in general, been fragmented. Educational administrators are more aware of research on curricular and teaching advances than teachers or architects. Teachers experience the first-hand results from the administrators' and architects' decisions regarding the professional teaching environment. The implications of learner needs to the facilities has received some study and description (Gatewood, 1975); however, as Pittillo found in a 1993 study, educators, particularly teachers, often believe their input is ignored. Pittillo's research (1993, 1992) indicated that communication is a key element in the development of progressive middle school facilities. Teachers, students, and administrators have important data to assist the designers of their schools. Those involved in planning educational facilities should consider the value and purpose of the spaces to provide direction; the building's function in time and space as a context; and both the internal and external clients of the facility as the building program evolves (Rowe, 1981).

An open system of planning provides an opportunity for maximizing the involvement and input of those termed "stakeholders" in the educational process (Babineau, 1992). The traditional, top-down planning hierarchy can be replaced with a circular input model that encourages involvement of all interest groups (Oates, 1994). A model similar to Owens and Steinhoff (1976) allows all facets of the community a place in the process and strives to assure responsiveness from the planners. Evidence of two-way communication is essential to the creation of consensus for the project.

Open system models promote communication between diverse interest groups. Experiences of the Lincoln Unified School District of Stockton, California (1989) indicated that groups ranging from churches, to gangs, to industry, and retail stores have an interest in, and valuable input for, the planning of schools.

Marburger (1985) delineated a school management process based upon placing the responsibility for decisions at the school site. Cyr (1992) applied similar principles to the need for shared-site decisions in facility planning. Communications, commitment, support, trust, and sharing are necessary in a planning process that will create a facility responsive to today's community and tomorrow's changing needs. The overriding emphasis should be on learning for the next century, not for the systems of the past 40 years (Graves, 1991). Taylor and Vlastos (1975) wrote that designs

for school buildings have been strongly influenced by the concepts of industrialization and mass production that have driven the nation for the last century. The schools of the past 100 years were developed to be education factories, and their product was to be an educated person produced by an assembly line of educators and administrators.

This study determined the important elements of middle school facilities as perceived by architects, administrators, and teachers who have been recently involved in the planning of such a facility. Hawkins (1993) wrote of middle schools that are demonstrating ways to link curricula and the site to create an integrated learning experience. With 50% - 75% of the school buildings in the nation needing replacement or major renovation in the next 10 years (Schlechty, 1990), an opportunity exists for educators and architects to create programs and buildings for the 21st century that can respond effectively to the uniqueness of the middle school student.

"Architects can no longer fake it by creating buildings that are merely playful or whimsical. Their work has to be backed by research" (Gunts, 1993, p.44). In comments from an architectural jury on educational facilities, the reviewers stated:

1. There seems no significantly new way of doing things,

2. There is a lack of administrative input evident in the projects,
3. The projects seemed to be left to the architects,
4. The solutions did not address the programmatic aspects of schools in today's society, and
5. It is the educator who makes the most significant contribution to educational facilities (Blurock, 1992).

The children of the "Baby Boomers" are coming into the educational system. The 1990 birthrate was higher than any year since 1962 (Smith, 1992). In the peak year of the "Boom", 1957, there were 4.3 million births, and 4.1 million were recorded in each of the years 1990, 1991, 1992 (Gunts, 1993). The reforms of the 1990s are pressing for schools to become providers of social services to their communities (Tyler Courier Times, 1992; Komoski, 1994). Futurists Karen Holmes (1992) and Kenneth Komoski (1994) believe our future is as a community of learners experiencing integrated learning, empowerment as learners, and opportunity to maximize our potential as learners. The hardest lesson to be learned, however, may be that a facility used by a live, evolving organization is never completely finished (Birch, 1975).

CHAPTER III

METHODOLOGY

Population and Sample

The purpose of this study was to determine the elements and methodologies that professionals deem critical to the design of future middle schools. The population consisted of public middle school administrators, public middle school teachers, and architects throughout the south and southeastern United States. These professionals were identified as having been involved in the planning of a new middle school constructed since 1990.

Instrumentation

Because of the size and location of the population for the study, a mail survey questionnaire was used for data collection. Borg and Gall (1983) and Smith and Glass (1987) cited the appropriate nature of the mail survey to provide valid assessment of the variable studied.

The development of the survey instrument began with a search for relevant articles and professional writings. Chapter II of this dissertation presents the results of the investigation of literature for evidence of data that would support the research questions. A number of writers describe elements they believe are critical to contemporary and future middle schools. The National Middle School Association (NMSA) has produced several publications that provide

descriptions of middle schools. Writing for NMSA in 1982, Lounsbury listed 10 essential elements of a true middle school. The Canadian Middle Years Association (1992) identified similar criteria for a successful middle school. Wiles (1976), Bondi (1972), Capelluti (1991), Castaldi (1994), and others described the middle school student, teacher, and administrator and their needs for quality teaching and learning.

As early as 1925, authors expressed a concern for the environments in which learning occurs. Davis (1925) and Procter and Ricciardi (1930) described a need for space that responds to the program that it houses. Christopher (1988b) developed 10 factors for outstanding school facilities. Castaldi (1994) evolved 10 similar items for sensitive educational facilities. Earthman and Westbrook proposed 12 items that will change the future of school buildings. Hawkins and Overbaugh (1988) identified six elements of interface between facilities and learning.

Although the factors noted above are applicable to all schools, the review of the literature revealed similar concerns for the quality of middle school programs and facilities. Two recent dissertations have particular relevance to the topic of this research. The dissertation of Dr. H. E. Coffey (1992) evaluated the future design of school facilities. Dr. Coffey elected to use a Delphi study with 13 participating experts. George Miller's (1991) dissertation

compared building characteristics of middle schools in North Carolina through a random sample of principals, teachers and architects. Comparing these two studies, the review of broader literature produced similar lists of facility design elements. This researcher elected to modify Dr. Coffey's instrument for use in this study and obtained permission from Dr. Coffey for this purpose (Appendix A).

The original 66-item survey was modified to 42 statements for review (Appendix B). A Likert scale was used with a low ranking of 1 to a high of 5. Ranking 1 indicated the item as "not applicable" as a critical element of middle school design. Ranking 2 designated the item as of "little significance". Ranking 3 indicated a "significant" statement for future middle schools. Ranking 4 determined a highly desirable item, and a 5 ranking designated an item essential to future school facility plans. The 42 statements were grouped into five topic areas: Planning, Design and Site Selection; Environmental Factors; Space Utilization; Technology; and School and Community Service Areas. These groupings appear throughout the available literature. Brubaker (1988), Castaldi (1994, 1969), Christopher (1988b), Day (1992), NASSP (1992, 1985), and others included these topics as areas of specification for schools of the future.

A demographic section of the instrument asked for gender, ethnicity and years of professional experience of those surveyed. The professional groups were also asked to

provide the student capacities or size and generic location or type of school they assisted in planning.

Procedures

Identification of the population for this study began with contact of 14 south and southeastern state departments or agencies for education during the period of January, 1993 to August, 1993. The states of Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, and West Virginia were selected as the area of study. These states represent an established region of the United States, encompass areas of both slow and rapid growth (Bureau of the Census, 1993), and offer public school management concepts ranging from the radical redesign of Kentucky public schools to the status quo maintenance of West Virginia and Mississippi schools (Steubing, 1992).

The criteria for the selection of professionals to survey was based on their involvement in middle schools constructed since 1990 or those currently being planned. A number of letters and calls were necessary in choosing those to be surveyed since many state education agencies do not keep information about facilities in easily recoverable form. Florida, North Carolina, and Virginia, were noticeably better organized in keeping consolidated records of new construction than the other states (North Carolina, 1992). These states have some approval process for facilities and retain data in

a retrievable form. No state agency contacted kept any record of individuals who were involved in the planning and design of school facilities. One-hundred-ninety-nine middle schools were ultimately identified, and the second level of contact initiated. In August of 1993, letters were mailed to the identified schools requesting the names and addresses of architects, administrators, and teachers who were involved in the facility design. One-hundred-ten schools responded, although 13 indicated that they did not meet the criteria for the study.

A population of 273 professionals representing all 14 states was identified. The population, however, was not evenly divided between the three selected professional groups. Many schools responded with several administrators' names and addresses but no teachers. The percentage of professionals surveyed were 35% architects, 41% administrators, and 24% teachers.

In October, 1993, the instrument (Appendix B) and a cover letter (Appendix C) describing the project and requesting assistance was mailed to the targeted population. A stamped, return envelope was included to encourage responses. One-hundred-forty-six responses, or 54% of the sample, were received by December 1, 1993. A second survey mailing and cover letter (Appendix D) was sent to non-respondents on December 6, 1993 resulting in receipt of an additional 57 survey responses. The targeted response rate

for the survey was 70% for the total population (McNamara, 1992). The actual response rates were 66% for architects, 94% for administrators, and 52% for teachers. A total of 203 responses were received by February 1, 1994 for a response rate of 74.7% of the population surveyed.

Data Analysis

This research used descriptive procedures to provide a logical examination of the data. The population surveyed totaled 273 professionals. Survey instruments were sent to the entire population; therefore, statistical inferences are unnecessary for comparison. The survey data was entered into the Microsoft Excel 4.0 software package. The instrument allowed the separation of data responses into three populations of architects, administrators, and teachers. The coding of the surveys allowed the researcher to separate the data by state.

The process of comparison of the collected data began with the selection of a statistical process. Comparisons of means were used as a measure of central tendency and standard deviations for variability. A comparison of categorical response percentages was also considered of statistical interest. Application of the calculation of means along a ratio scale allowed the separation of the rankings into catagories for comparison and contrast as follows:

0.0 to 1.5	Not Applicable
1.5 to 2.5	Little Importance
2.5 to 3.5	Significant
3.5 to 4.5	Highly Desirable
4.5 to 5.0	Essential.

The initial comparison of data was between the three populations of professionals. The research questions target the identification of critical design elements by each group. The calculation of mean and mode across each profession on each statement allowed the development of specific answers to the research. The measures of variability allowed further examination of the responses within the survey for significant tendencies within and across the populations.

A second level of comparison involved the selection of individual states for examination as a subset. Florida, North Carolina, and Texas were selected because of their continued growth patterns that have resulted in a greater number of new schools. Additionally, these states have contrasting controls over the development of facilities. Florida and North Carolina have strong departments of educational facilities at the state level; Texas has yet to develop significant controls and/or service for planning and constructing public school buildings.

Georgia and Kentucky were also selected for comparison in the subset. Georgia was selected because of its commitment to middle schools and active state facility overview, and Kentucky, because of the reorganization of its educational system in 1991. The population responses for

these states were separated and compared by examining the mean, mode, and variation of each profession within each state by survey statement. Comparison and contrast of the subset responses to the entire survey responses was significant. The low number of teachers responses across the survey (35) allows the concentration of responses in the subset (22 of 35) to assume greater standing in statistical consideration.

CHAPTER IV

PRESENTATION AND ANALYSIS OF DATA

The tabulated results of the survey respondents are presented in the following sections: Demography, Data Analysis Overview, Response to Survey Questions, Data Analysis for the Research Questions, Comparison of Selected State Responses.

Demography

State education agencies in the south and southeastern United States were asked to supply a list of qualified schools (Appendix E). One-hundred-ninety-nine middle schools were identified as meeting the survey criteria of having been designed and planned after 1990. Officials in these schools were contacted by letter (Appendix F) and telephone to request the names of architects, teachers, and administrators involved in the planning and design of these school facilities. Table 1 illustrates 97 qualified middle schools were identified, contacted, and responded to assist in the population selection process. The professionals identified as a population consisted of 96 architects, 112 administrators, and 65 teachers. Several of the state education agencies indicated, and further study has confirmed, that a majority of the surveyed states do not require input from or review of facility plans by teachers, parents, students, or community representatives (Steubing,

1992). The United States Constitution charges states with protection of public health and welfare; therefore, state agencies typically concentrate their regulatory efforts in the areas of building safety and code compliance. Some states, North Carolina and Florida, for example, have adopted legislation to direct school facility development (Steubing, 1992).

The responses to the data collection process yielded a return of 203 instruments from the survey population of 273 including 64 architects, 103 school administrators and 36 teachers. Table 1 indicates the dispersion of survey response throughout the targeted 14 states.

At least one response was received in each category from each state except Mississippi. No teachers were included in the responses from that state and repeated efforts by mail and telephone were unsuccessful in soliciting a response from a qualified professional.

Table 1. Survey Population Response by State and Profession

STATE	ARCHITECT	ADMINISTRATOR	TEACHER	NUMBER OF QUALIFIED MIDDLE SCHOOLS
AL	4	5	2	5
AR	1	1	1	1
FL	9	12	4	15
GA	5	12	7	10
KY	6	11	2	7
LA	1	4	1	3
MS	1	1	0	1
NC	10	14	5	15
OK	3	3	2	3
SC	2	2	3	3
TN	6	6	1	7
TX	6	16	4	11
VA	9	12	3	13
WV	1	4	1	3
TOTALS	64	103	36	97

A correlation between the number of responses per state and the growth rate of that state is possible. The population was identified from those involved in planning middle schools constructed since 1990 or currently in planning. Higher population growth states such as Florida, North Carolina, and Texas had seen a corresponding increase in school facility construction, and as expected, provided a larger number of potential respondents. The south and southeastern United States experienced an 8.76% mean growth

rate between 1980-1990 (Bureau of the Census, 1993). These 14 states had a mean growth rate of 2.68% from 1990-1992. This growth, coupled with the significant increase in birthrate for the last four years (Gunts, 1993), portends continued need for new and rejuvenated educational facilities.

Survey respondents were overwhelmingly white (70%) and male (52%), with 14 to 30 years experience in their profession (Table 2). Over 28% of those surveyed had experience ranging from 14 to 22 years. An additional 27% had experience in the 23 to 30 year category. A total of 68% of the survey population had experience above the 14-year level. The professionals surveyed have been involved in schools and school facilities for a number of years, and this high level of experience should provide validation to the responses.

Table 2. Survey Population-Demography

PROFESSION	TOTAL	M	F	YEARS IN PROFESSION		RACE
				Range	Number	
ARCHITECTS	64	63	1	0- 3	0	W -62
				4-13	5	AA - 0
				14-22	25	H - 1
				23-30	19	A - 0
				30+	15	O - 1
ADMINISTRATORS	103	72	31	0- 3	1	W -95
				4-13	4	AA - 5
				14-22	37	H - 1
				23-30	42	A - 0
				30+	19	O - 2
TEACHERS	36	6	30	0- 3	0	W -35
				4-13	7	AA - 0
				14-22	16	H - 1
				23-30	12	A - 0
				30+	1	O - 0

W = White
AA = African American
H = Hispanic
A = Asian
O = Other

Although recommendations for further study will be presented in Chapter V, it is of interest to note the lack of diversity in the respondent race and sex categories. If, in fact, decisions regarding school facilities are being made and will continue to be made by architects and administrators, an effort to acquire responses from the increasing number of minorities and women who are now involved in these professions would be of interest.

Data Analysis Overview

A statement of overview is provided to indicate the

direction and general picture of the statistical analysis. The comparisons of responses in tabular and graphic forms follow in sections specific to the survey instrument.

This research was designed to survey architects, administrators, and teachers in 14 states who had been involved in the design and planning of a new middle school facility since 1990. The total identified population for the survey consisted of 273 individuals. The entire population was surveyed. Discussions with Dr. Mark Lewis, Professor of Education at the University of Texas at Tyler, staff of the Christopher Columbus Consortium Lab at Texas A&M University, and a review of selected texts (Lewis, 1994; McNamara, 1992; Popham, 1992) indicated no inferential statistics were necessary. Measures of central tendency and variability from descriptive statistical practices indicate levels of significance in the survey responses. Statistical mode, mean, and standard deviations were calculated for contrast and comparison.

Response to Survey Questions

This research was designed to determine the elements of middle school design deemed essential to development of next century middle schools. Architects, administrators, and teachers, who have been involved in recent middle school design and planning, were selected to render their opinions about middle school design. The survey statements required that each of the populations in the professional groups

identify the critical facility design elements needed to meet the learning and development needs of middle school students.

The survey instrument consisted of 42 statements divided into five topical sections; Planning, Design, Site Selection; Environmental Factors; Space Utilization; Technology; and School and Community Service. These statements and sections are consistent with past research and literature concerning facility development. The ranking of responses from the surveyed professionals is presented by section to best compare and contrast the evaluations.

Part I: Planning, Design, Site Selection

Table 3.1 lists the 10 items comprising this section. The statements concentrate on concepts of broad, open planning and preparation for designing middle schools.

Table 3.1. Survey Statements - Part I

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1. One of the first steps in the planning process for future school facilities should be to establish a pluralistic, broad-based planning and design team composed of teachers, administrators, students, employees, architects, educational planners, parents, board and community members who are stakeholders.
2. Planning should be bottom-up, not top-down.
3. Another initial step, before the planning and design process begins, is to institute a pragmatic and thorough school survey of all facets of the present educational programs and facilities currently available in the school district.

Table 3.1. (Continued)

4. Long-range, short-range and strategic school facility plans should be developed that are proactive in nature, rather than reactive and "knee-jerk" in scope.

5. Educational programs should be clearly defined and addressed in the educational specifications by the planners before any type of school design is actually drawn up.

6. Flexibility, mobility and adaptability should be the cornerstone concepts of any school facility designed for the future.

7. Planning teams should be future-oriented and cognizant of the diverse types of spaces needed (quiet areas for individuals or groups; flexible, multi-purpose areas; tailor-made, special purpose classrooms or labs) for schools when they enter the design process.

8. The natural, environmental features of a school site should be considered for the potential contributions that they could make to curriculum areas such as science, and whenever possible, natural landscapes should be preserved to be used as nature trails and environmental teaching tools for students.

9. School sites should be selected with particular attention to those that are free of environmental hazards and restricting easements, have safe access with good availability of transportation systems, have utilities available, are not heavily impacted by adjacent development constraints and do not conflict with long-range plans of state and local governing bodies.

10. School/community partnerships of shared land resources, such as adjacent parks or recreation areas, should be planned into the conceptual design of the school.

Table 3.2 indicates the statistical mean and standard deviation for the statements by professional category.

Table 3.2. Quantified Professional Responses to Part I - Planning, Design, Site Selection

NO.	ARCHITECT		ADMINISTRATOR		TEACHER	
	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation
1	4.1406	0.9661	4.6058	0.5951	4.7500	0.5465
2	3.7812	0.9758	4.2308	0.7994	4.5556	0.5984
3	4.1094	0.8314	4.3750	0.8342	4.4722	0.7260
4	4.5625	0.6092	4.6635	0.6296	4.6111	0.6359
5	4.6094	0.6759	4.7115	0.5992	4.4722	0.7633
6	4.2813	0.8564	4.6154	0.6550	4.7500	0.5465
7	4.4531	0.7691	4.7404	0.5188	4.6944	0.4606
8	3.8281	0.8580	4.0096	0.7403	3.9167	0.7592
9	4.4770	0.7095	4.6731	0.5623	4.5278	0.4992
10	3.6719	0.7300	3.7115	0.8283	3.6389	0.8548

Statement 1 suggested development of a community-wide planning team, involving all segments of the city, town, or region. The rankings were consistently in the highly desirable category. Approximately 34% of architects ranked this item as significant to highly desirable. Administrators and teachers indicated a higher concern for inclusion of stakeholders in the design group.

Statement 2 indicated that planning should be bottom-up, not top-down. Architects gave significantly lower rankings of this item. Approximately 45% of architect respondents selected a ranking of 3 or less. Administrator and teacher categories each showed significant difference in mean responses.

Systematic surveys of existing educational facilities and programs were the focus of statement 3. Architects were again lower in their ranking of importance, but a substantial margin of all professions ranked this statement as significant to essential.

Item 4 of this survey section promoted the development of pro-active facility plans for long-range and short-range, rather than situational reaction planning. Responses from all professions indicated strong agreement that this attitude is essential to good middle school planning.

Statement 5 of the survey addressed the need for educational specifications defining the educational program requirements. The State of Texas, for example, legislated in 1993 a requirement for production of educational specifications. School districts are now responsible for the delivery of this document to the design team. The rankings for this item indicated agreement as to its importance to development of quality schools. The lower ranking by teachers is of interest, and a lack of understanding by teachers of the definition of educational specifications may be a possible explanation.

Item 6 mandated flexibility, mobility, and adaptability for future school facilities. Responses indicated agreement of the importance of these criteria for educational buildings.

Number 7 in the Planning, Design, Site Selection category called for future-oriented planning teams aware of the different needs of curricular spaces. A general agreement was indicated across the professions with architects, again, ranking this item lower than teachers or administrators.

Statement 8 established natural, environmental features as an element important to the curricular experience. This item received the second lowest ranking of all responding professional groups. Approximately 40% of teachers and architects ranked this statement in the little importance to significant categories. Architects ranked this item lowest of the three groups.

Hazard-free sites with safe access, good utilities, and isolated from adjacent development were required for good schools in statement 9. Architects, administrators, and teachers showed similar agreement that such considerations are highly desirable to essential for tomorrow's middle schools.

The final item in Part I of the survey promoted the consideration of shared community resources as an important element in planning future schools. Respondents ranked this item lowest in the section. Demographic data on the survey indicated that many of the respondents were located in areas they consider suburban. Locations away from crowded city

conditions may result in less concern for shared site conditions.

Part II: Environmental Factors

Part II of the survey statements dealt with the aesthetic, psychological, and behavioral elements of tomorrow's schools. The examination of available literature from education and environmental psychology has shown a recognition of the effects of space on the activities within that space. Table 4.1 presents the statements reviewed in this section.

Table 4.1. Survey Statements - Part II

1.	The public school facility should be child-centered and "user-friendly".
2.	The environment of the school facility is designed to offer a place with spaces where both students and teachers can learn, explore and relate to each other in creative ways and in different size groups.
3.	School facilities should be designed with environments that impart a feeling of safety, security and belongingness for students, teachers, administration and parents.
4.	Both teachers and students should have some type of individualized spaces (workrooms, lockers or "cubbies") that can be personalized.
5.	The immediate visual impression of the entire school facility should be welcoming one by the creative use of colors, graphics and decorative textures.
6.	The highest level of comfort for students, teachers, other school employees should be aspired for through the use of high-tech, well-designed climate control, acoustics and lighting systems.

Table 4.2 presents the mean and standard deviation calculations for Part II of the survey.

Table 4.2. Quantified Professional Responses to Part II - Environmental Factors

NO.	ARCHITECT		ADMINISTRATOR		TEACHER	
	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation
1	4.7813	0.4134	4.8558	0.3777	4.7500	0.4930
2	4.5625	0.6343	4.6250	0.5404	4.5556	0.6431
3	4.5469	0.6106	4.7981	0.4678	4.7500	0.5951
4	3.9531	0.7990	4.0865	0.9210	4.3333	0.8165
5	4.2500	0.7071	4.2981	0.6777	4.2220	0.8203
6	4.2344	0.7653	4.6731	0.5270	4.5833	0.5465

Statement 1 of this section represented the highest level of agreement between and among the professions. Creation of a child-centered, user-friendly facility received the highest rankings with the least variance of any of the survey statements. The mean score was the highest in all professional categories, and the standard deviation, the lowest in architect and administrator responses.

Item 2 stated the importance of variable group size spaces for teaching and learning. Item 3 suggested an environment of safety, security, and belonging for school facilities. Both items were consistently ranked as highly desirable to essential by all professional groups.

Statement 4 promoted the development of personal spaces for teachers and students for storage, work, and interaction. Responses indicated that teachers felt more strongly concerning the need for such spaces than did administrators or architects.

The visual, aesthetic presentation of the school facility and its importance as an element of the environment was ranked in the 5th item of Part II. The rankings were very similar in each grouping. The teacher responses indicated a higher degree of variation.

Climate control, acoustics, and lighting of high quality and technological control are proposed in the final statement of Part II. The three groups of professionals each ranked this item as desirable to essential with architects' responses indicating the lowest ranking and highest variance of response.

Part III: Space Utilization

Part III, the largest section of the survey, dealt with statements regarding Space Utilization. The respondents were asked to consider the instructional and special purpose spaces within the schools of the future and rank their importance. Table 5.1 lists the 14 items that comprise Part III.

Table 5.1. Survey Statements - Part III

1. The benchmark concept for designing all future public school facilities should be the flexibility of the spaces which can encourage experimentation, experiential learning, and different teaching concepts.

2. In general, classrooms should be of an appropriate size to allow for informal settings and non-traditional arrangements of desks or chairs so as to encourage group collaboration.

3. In many instances, classrooms of the future will have to be larger than usual in order to properly carry out the more complex and numerous curricular programs.

4. The Instructional Media Center should be designed to be the central focus of the facility and serve as an informational storage center and a hub for communication technology.

5. Movable partitions, demountable or folding walls and re-deployable spaces are viable ways of maximizing the flexibility of spaces in a future school facility.

6. Future classrooms should be designed in ways which will not isolate students or teachers from participation in collaborative learning or teaching.

7. Classroom spaces must be as fluid and malleable as the programs that they serve. Whenever possible, classrooms should be designed to allow the free movement of students from one location to another with ease and without obstructions.

8. The individual classroom of the future should be designed with appropriate high-technology to allow it to function as its own specialized learning center.

9. There should be quiet, private, individual spaces for parents, students, and teachers to conference.

10. Teaching staff should have individualized work areas for planning, conferencing, and preparation in close proximity to their classrooms.

Table 5.1. (Continued)

11.	Information and resource areas should be tailor-made and larger than usual with special spaces for students to read, work in groups, and conference with teachers - plus additional storage spaces to accommodate instructional and communication technology materials.
12.	At appropriate grade levels, there should be multi-purpose laboratories to be used holistically in a variety of curricular programs.
13.	There will be a need for specialized, broad-based prototypical lab spaces, tailor-made to support newly designed Instructional Technology programs.
14.	There should be special-purpose rooms designed technologically appropriately and exclusively for curricular areas, such as Band, Art, Theater, Science, and Music.

Table 5.2 represents the statistical responses for Part III.

Table 5.2. Quantified Professional Responses to Part III - Space Utilization

NO.	ARCHITECT		ADMINISTRATOR		TEACHER	
	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation
1	3.9844	0.9099	4.2719	0.7783	4.2778	0.8032
2	4.0156	0.8749	4.5385	0.6032	4.4722	0.7260
3	3.5625	1.1575	4.0962	0.7908	4.3056	0.8746
4	4.2500	0.8292	4.6442	0.5356	4.2778	0.8696
5	3.0781	1.1498	3.6250	0.9824	3.2222	1.1574
6	3.9063	1.0265	4.2981	0.7190	4.0278	0.7988
7	3.7344	1.1353	4.2308	0.8231	4.3889	0.7179
8	4.3750	0.8570	4.6731	0.5084	4.6111	0.5906
9	4.3438	0.7750	4.5385	0.7061	4.5556	0.5500
10	4.0781	0.9067	4.2019	0.8702	4.4444	0.6849
11	3.7969	0.8325	3.8750	0.8400	4.2500	0.7217
12	3.7188	0.8564	3.8654	0.8442	4.1667	0.7265
13	3.8906	0.9034	4.1250	0.7928	4.2500	0.6821
14	4.1250	0.9270	4.4615	0.7585	4.6389	0.6730

The 1st statement in Part III asked the respondents to rank the importance of flexibility of space design for the encouragement of a variety of teaching and learning experiences. The mode of architects' responses (Table 8, p. 70) was one category below that of administrators and teachers. The mean score was indicative of this ranking, and a significant variance accompanied the scores. Architects are possibly less aware of the different concepts related to teaching and learning style.

Item 2 responses again indicated a lower ranking from architects. This statement related to classrooms sized to

encourage non-traditional settings for large and small group learning. The ranking from architects appeared significant in both its lower mean and larger variance.

Statement 3 promoted the use of larger classroom space in order to better facilitate future complex curricular programs. Teachers ranked this item higher than administrators. Architects ranked the item lowest with a substantial standard deviation. Modes were of interest as architects rendered a 3, administrators a 4, and teachers a 5 ranking (Table 8). This statement received one of the most disparate rankings among the professionals.

The 4th item in this survey section promoted the focus of the Media Center of the school as hub for technology and communication. All respondents ranked the concept as highly desirable to essential. Administrators were most concerned about the inclusion of this focus in a school, and their responses show less variance than those of architects or teachers.

The concept of re-deployable spaces created by the use of movable partitions or folding walls was ranked as less important and had higher deviations than most of the other survey items. While flexibility of space size was of importance as shown in statement 1 of Part III, the use of movable partitions was not ranked highly as a method of choice to accomplish the variable spaces.

Statement 6 placed emphasis on space arrangements that encourage the concept of collaborative learning and teaching. Significant variance was evident in the responses of architects. This lower significance ranking may be a lack of understanding of the concept of collaborative curricula.

Responses to item 7 continued to show architects as less enthusiastic regarding the open access, more fluid classroom spaces. A significant variation in response is also indicated within this profession's responses and may be attributed to a lack of understanding of educational programs or language.

Statement 8 of Part III encouraged the use of the best available technologies in classrooms of the future. All responding professional groups agreed that this is a desirable or essential aspect of future facilities. Personal, individualized spaces for parent, student, and teacher conferences received rankings that place it in the highest area of need for schools of tomorrow.

The 10th statement also related to the concepts of individualized spaces and promoted work areas for staff planning and conferencing near, but separate from, classrooms. The professional groups were in agreement that this feature was desirable for new middle schools.

Teachers ranked item 11 significantly higher than administrators or architects and with less deviation. The mode of teachers' responses was also one unit higher with a

5 ranking. Large, available information and resource areas with additional storage were proposed in this review statement.

Multi-purpose labs for cross curricular programs were promoted in item 12. Teachers ranked this statement of higher importance than did the other two professions.

Statement 13 prescribed special lab spaces for industrial technology programs. Although architects ranked this item as significant, the mean response and standard deviation placed it significantly below the administrators' and teachers' rankings.

The final item in Part III promoted the need for special-purpose rooms designed for current and future use by specialized programs (e.g., Band, Fine Arts, Music, and others). All professions agreed that these elements are needed with teachers significantly in more agreement as to their importance.

Part IV: Technology

Part IV of the survey instrument concentrated on statements of the essentials of technology for tomorrow's schools. Table 6.1 presents the survey statements reviewed in Part IV.

Table 6.1. Survey Statements - Part IV

1. School facilities designs should be as open-ended as possible to allow for future technological growth by the incorporation of larger cable trays and conduit, multiple communication lines (e.g., fiber optics), and extra "clean" power sources for computers, etc.

2. High-technology growth should be facilitated by the judicious use of pre-wired, multi-purpose labs that are flexible enough to serve divergent programs.

3. Future schools should be cognizant of the need to network by means of satellite learning and long distance telecommunications technology, as a means of equitably sharing resources and promoting global awareness for students.

4. Electronic technology, such as voice mail, and computer and video communication/networking to other schools and geographical areas, should be evidenced in schools of the future.

5. "Smart Buildings" with energy efficient, high-technology HVAC control systems should be employed in schools of the future.

6. Classrooms in future schools should have some computer modules and learning centers linked to a central media center for individualized instruction via the computer, ETV, or satellite systems.

7. Flexibility, movability, and open-ended adaptability to add on new technology as needed are the key linchpins in schools built for the future.

Table 6.2 presents the mean and standard deviation calculations.

Table 6.2. Quantified Professional Responses to Part IV - Technology

NO.	ARCHITECT		ADMINISTRATOR		TEACHER	
	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation
1	4.4688	0.7064	4.6923	0.5203	4.5833	1.0026
2	3.9688	0.9008	4.5238	0.6616	4.4167	0.7949
3	4.2969	0.7842	4.5962	0.6581	4.5000	0.6872
4	4.0462	0.8681	4.4712	0.7590	4.2500	0.7949
5	4.0313	0.9180	4.6923	0.6662	4.3333	0.6667
6	4.2813	0.7388	4.6346	0.6659	4.5833	0.7217
7	4.1719	0.9110	4.6250	0.5404	4.5833	0.5951

Statement 1 of this section asked for rankings of the concept of open-ended design allowing for expansion and addition of future technologies. Each of the three professional groups ranked this need extremely high. The teachers' rankings, however, did present a higher than typical standard deviation indicating a higher degree of variability among the scores.

Item 2 stated that flexible, pre-wired, multi-purpose laboratories would facilitate growth in the technological studies. Architects were significantly less impressed with this concept. The mean of their responses was more than 0.5 below responses from teachers and administrators, and the mode was a full point below.

Statement 3 promoted long distance learning allowing a sense of global awareness to be taught and an extended

sharing of resources. Each of the professional groups ranked this item highly desirable to essential.

Electronic communications such as E-mail, voice mail, and networking within and without tomorrow's schools were essential items in statement 4 of Part IV. The three professions agreed that these technologies would play a part in future teaching and learning.

Responses to item 5 indicated that administrators were more strongly committed to smart buildings. Architects showed the least favorable ranking with the highest variability. Items 6 and 7 of Part IV received similar rankings. Computer links and networks to central media systems and open, adaptable technologies are promoted as necessary for schools of the future. Architects, administrators, and teachers ranked these items as highly desirable for the next century middle school.

Part V: School and Community Service

The final section of the survey dealt with the school as a part of the community. The development of schools as delivery points for additional services in the community was presented in a series of 5 statements. Table 7.1 lists the items considered in Part V.

Table 7.1. Survey Statements - Part V

1.	Whenever possible, schools should attempt to find ways to share resources and facilities with their community.
2.	Future school facilities should reflect the need for increased daycare, and before- and after-school care of infants and children of students, teachers, employees, and community members.
3.	Schools should serve as an integral community hub for medical, social, family-support, and occupational services for students and parents.
4.	Schools of the future should be facilities that are designed to serve as lifelong learning centers for both students and community citizens.
5.	Future schools should be designed and planned with a new spirit of two-way openness, whereby students will use the community as a learning resource center by utilizing libraries, museums, businesses, and citizenry as tools for learning, and adults will come into the schools more often for learning services, recreation, and community activities.

Table 7.2 presents the statistical analysis of responses within Part V of the survey document.

Table 7.2. Quantified Professional Responses to Part V - School and Community Service

NO.	ARCHITECT		ADMINISTRATOR		TEACHER	
	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation
1	4.2190	0.7388	4.3750	0.6820	4.1111	0.8089
2	3.3281	1.0905	3.5000	1.2935	2.9722	1.2357
3	3.0625	1.1302	3.4327	1.1666	3.2222	1.1574
4	3.7188	1.1655	4.2596	0.8204	3.9444	1.0787
5	3.7656	1.1144	4.1923	0.7854	3.9722	0.9856

Statement 1 received the highest rankings in this section. Schools that share resources and facilities within the community were seen as highly desirable by all the professional groups.

The remaining 4 items in this section received the lowest rankings in the survey and some of the higher variability rankings. Statement 2 that describes a school providing day care, before school, and after school programs for community infants and children was the lowest ranked item in the survey scoring. Administrators' responses provided a 3.5 mean, a 1.29 standard deviation with a mode of 5.

Statement 3 described schools as a community center for delivery of medical, social services, and support services to the community. The survey respondents indicated a less

favorable attitude toward this concept with higher variability among their rankings.

The concept of schools as lifelong learning centers for the community at large was proposed in item 4. The group responses were lower, and architects' rankings were highly variable.

The last survey statement addressed the concepts of students learning in the community (e.g., using museums, businesses, and citizenry), and the community using the schools for learning and community activities. Administrators were more supportive of these ideas than were architects or teachers.

The survey section, School and Community Service, was consistently ranked low as a critical element for new school development. A correlation may be made to the age and experience level indicated in the demographics of the survey responses. The high level of experience in all professions and the typically lower rankings in this section warrant additional study. The five additional sections of the survey instrument, Planning, Design and Site Selection, Environmental Factors, Space Utilization, and Technology received positive responses, but with areas of contrast among the three professional perceptions. Architects consistently ranked items at a lower level of significance than did administrators or teachers.

Data Analysis for the Research Questions

The statistical mode of the responses indicating the most frequent ranking in statement category presents interesting comparisons in Table 8.

Table 8. Statistical Mode of Survey Statements by Profession

SURVEY SECTION	QUESTION NUMBER	ARCHITECTS	ADMINISTRATORS	TEACHERS
PART I - Planning, Design, Site Selection				
	1	5	5	5
	2	4	5	5
	3	4	5	5
	4	5	5	5
	5	5	5	5
	6	5	5	5
	7	5	5	5
	8	4	4	4
	9	5	5	5
	10	4	4	4
PART II - Environmental Factors				
	1	5	5	5
	2	5	5	5
	3	5	5	5
	4	4	5	5
	5	4	4	5
	6	5	5	5
PART III - Space Utilization				
	1	4	5	5
	2	4	5	5
	3	3	4	5
	4	5	5	5
	5	3	4	4
	6	4	5	4
	7	4	5	5
	8	5	5	5

Table 8. (Continued)

SURVEY SECTION	QUESTION NUMBER	ARCHITECTS	ADMINISTRATORS	TEACHERS
	9	5	5	5
	10	4	5	5
	11	4	4	5
	12	4	4	4
	13	4	4	4
	14	5	5	5
PART IV - Technology				
	1	5	5	5
	2	4	5	5
	3	5	5	5
PART IV - Technology				
	4	4	5	4
	5	4	5	4
	6	4	5	5
	7	5	5	5
PART V - School and Community Service				
	1	4	5	4
	2	3	5	3
	3	3	4	4
	4	5	5	4
	5	4	4	5

Tabulation of architects responses indicate a mode of 5 on 18 (43%) of the statements. Administrators rankings resulted in a mode of 5 on 32 statements (76%), and teacher responses yielded a mode of 5 on 30 statements (71%) of the items. A mode of 5 in each of the professional categories occurred in only 17 (40%) of the 42 statements.

The comparison of professional group responses reveals further indications of some variation in rankings. Architects' response means yielded no items below a 3 or significant ranking. The category highly desirable falls within the 3.5 to 4.5 mean rankings and architects ranged 14 items in the 3.5 to 4.0 range and 20 items between 4.0 to 4.5. Five statements received a statistical mean between 4.5 to 5 or the essential ranking category.

Administrators ranked only Part V, statement 3, Schools as Community Centers for Social Services, below 3.5 or highly desirable. Five items were ranked 3.5 to 4.0 and 16 were in the 4.0 to 4.5 range for 50% in the highly desirable catagory. The remaining 20 statements were ranked by administrators at 4.5 to 5.0 or essential to middle school design.

Teacher responses to the survey yielded the only survey item with a mean at 3 or below. Statement 2 in Part V, which deals with schools providing day care for the community, received a mean ranking of 2.9722. Twenty-two items received 3.5 to 4.5 statistical mean rankings, and 17 statements were at the 4.5 to 5.0 essential level.

Architects' responses provided the lowest scoring and the largest standard deviations. The mean ranking by architects' responses was lowest in 35 statements or 83% of the survey items. Teachers and administrators shared the highest mean rankings at 33% and 67% of survey statements,

respectively. Architects had zero items with the highest mean response. Fifty percent of the mean calculations of item ranking resulted in a descending order of administrators to teachers to architects.

A mean at the 4.5 to 5.0 level occurred in all professional groups for only 4 statements (Table 9). Part I, item 4 stresses pro-active school plans. Part II, items 1, 2, and 3 promote, respectively, child-centeredness, positive learning environments, and safe, secure facilities. These 4 items were judged essential by all three professional groups.

Table 9. Survey Items Ranked Essential by Architects, Administrators, and Teachers

SURVEY SECTION	QUESTION NUMBER	ITEM
PART I	4	PROACTIVE LONG-RANGE, SHORT-RANGE, AND STRATEGIC FACILITY PLANS
PART II	1	CHILD-CENTERED, USER FRIENDLY FACILITY
PART II	2	ENVIRONMENT OF SPACES FOR STUDENTS AND TEACHERS TO LEARN, EXPLORE, AND RELATE
PART II	3	ENVIRONMENTS OF SAFETY, SECURITY, AND BELONGINGNESS

The architect population of the survey ranked 25 statements in the 4.0 to 5.0 range or highly desirable to essential classifications. Only 5 items were ranked above 4.5. Table 9 lists 4 of the statements. Number 5 of Part I,

dealt with clearly defined educational specifications and is the additional item of essential rank.

Table 10. Additional Survey Items Ranked Essential by Administrators

SURVEY SECTION	QUESTION NUMBER	ITEM
PART I	1	BROAD, COMMUNITY-WIDE PLANNING TEAM OF STAKEHOLDERS
PART I	5	PROGRAM DEFINED BY EDUCATIONAL SPECIFICATIONS
PART I	6	FLEXIBILITY, MOBILITY, ADAPTABILITY KEYS TO FUTURE FACILITIES
PART I	7	FUTURE ORIENTED PLANNING TEAMS
PART I	9	CAREFULLY CHOSEN SCHOOL SITES
PART II	6	WELL DESIGNED CLIMATE, ACOUSTIC, AND LIGHTING CONTROL
PART III	2	APPROPRIATE SIZE CLASSROOMS FOR FLEXIBLE ARRANGEMENT
PART III	4	INSTRUCTIONAL MEDIA CENTER AS INFORMATION AND COMMUNICATION HUB
PART III	8	AVAILABLE TECHNOLOGY WITH ADAPTABLE SYSTEMS
PART III	9	PRIVATE SPACES FOR CONFERENCES
PART IV	1	OPEN-ENDED GROWTH POTENTIAL FOR TECHNOLOGIES
PART IV	2	PREWIRED, MULTI-PURPOSE LABS
PART IV	3	LONG DISTANCE LEARNING CAPABILITY
PART IV	5	ENERGY EFFICIENT SMART BUILDINGS
PART IV	6	NETWORKS THROUGHOUT SCHOOL
PART IV	7	OPEN-ENDED ADAPTABILITY FOR TECHNOLOGIES

Administrators ranked 20 items at 4.5 to 5.0 and ranked an additional 14 statements between 4.0 to 4.5. Table 10 presents 16 items ranked essential.

Teachers ranked 17 items in the essential category (Table 11) and 18 additional statements between 4.0 to 4.5.

Table 11. Additional Survey Items Ranked Essential by Teachers

SURVEY SECTION	QUESTION NUMBER	ITEM
PART I	1	BROAD, COMMUNITY-WIDE PLANNING TEAM OF STAKEHOLDERS
PART I	2	BOTTOM-UP PLANNING, NOT TOP-DOWN
PART I	6	FLEXIBILITY, MOBILITY, ADAPTABILITY KEYS TO FUTURE FACILITIES
PART I	7	FUTURE ORIENTED PLANNING TEAMS
PART I	9	CAREFULLY CHOSEN SCHOOL SITES
PART II	6	WELL DESIGNED CLIMATE, ACOUSTIC, AND LIGHTING CONTROL
PART III	8	AVAILABLE TECHNOLOGY WITH ADAPTABLE SYSTEMS
PART III	9	PRIVATE SPACES FOR CONFERENCES
PART III	14	SPECIAL PURPOSE ROOMS FOR MUSIC, FINE ARTS, AND OTHERS
PART IV	1	OPEN-ENDED GROWTH POTENTIAL FOR TECHNOLOGIES
PART IV	3	LONG DISTANCE LEARNING CAPABILITY
PART IV	6	NETWORKS THROUGHOUT SCHOOL
PART IV	7	OPEN-ENDED ADAPTABILITY FOR TECHNOLOGIES

Four of the 20 items ranked essential by administrators were unique to their population, Part III-2, Part III-4, Part IV-2, and Part IV-5. Teachers uniquely ranked Part I-2 and Part III-14 as essential elements. Architects found agreement in all 5 of their essential statements.

It is significant that no item in Part V - School and Community Service was found to have a mean above 4.5 ranking. These statements that dealt with social service and schools active within the community service, were consistently ranked at the lowest levels in the survey by all of the population.

Selected State Responses

Florida, Georgia, Kentucky, North Carolina, and Texas were selected as a subset for comparison. These five states held 48 qualified middle schools, or 50%, of the survey population of school facilities and represent a wide variety of facility development concepts. Significant variation in survey response exists within the subset both in total number of items ranked as essential and the dispersion within the professional groups.

Florida has experienced rapid growth over the last decade. Middle school facilities have been constructed throughout the State with the State providing an active role in standards and policy for buildings. North Carolina, likewise, has experienced rapid growth in the last decade and many areas of that state have developed significant facility programs in recent years. North Carolina education agency

has an active state facility program and provides standards for design guidance (North Carolina, 1992).

Georgia has an active middle school department within its state education agency and provides minimum standards and active direction to facility development. Kentucky has reorganized its entire educational system in a great experiment to rebuild confidence and create an optimum teaching and learning system.

Texas has seen growth but has also faced severe recession and upheaval in the state educational system regarding funding and facilities. Texas has had no state facility program and no minimum standards.

North Carolina and Florida, however, offer significant direction and review at the state level. The comparison and contrast of the responses of the professionals within these states provides significant validation to the survey statistics.

The professional responses in these 5 states represented 56% of the architects, 64% of the administrators, and 61% of the teachers in the survey population. The 124 professionals from the 5 selected states represent 61% of the total survey responding population.

The survey research was designed to determine the essential ranking of critical elements. A statistical mean of 4.5 or better was required to be considered an essential item. Table 12 presents the comparisons by state.

Table 12. Numbers of Statements Ranked as Essential by Professionals in Selected States

STATE	PROFESSION	NUMBER OF RESPONDENTS	NUMBER OF ESSENTIAL ITEMS
Florida	Architects	9	12
	Administrators	13	20
	Teachers	4	25
Georgia	Architects	5	7
	Administrators	12	22
	Teachers	7	19
Kentucky	Architects	6	25
	Administrators	11	14
	Teachers	2	24
North Carolina	Architects	10	4
	Administrators	14	21
	Teachers	5	5
Texas	Architects	6	13
	Administrators	16	13
	Teachers	4	27

Florida architects ranked 12 statements as essential, administrators labeled 20 items at the 4.5 or above level, and teachers found 25 statements essential to future middle schools. Georgia professionals ascribed essential rankings to 7 items by architects, 22 by administrators, and 19 by teachers. Kentucky architects ranked 25 items as essential, the only instance in this portion of comparison for which architects rank more items essential than the other 2 professional groups. Administrators in Kentucky selected 14

statements at 4.5 or above, and teachers ranked 24 items essential.

North Carolina administrators ranked 21 items between 4.5 and 5.0. Architects and teachers, respectively, ranked 4 and 5 items essential. Texas architects and administrators selected 13 items as essential, and teachers ranked 27 items at this highest level.

Note must be made of the low number of teachers who responded to the survey. A comparison of state-to-state responses was not significant. The subset responses do present a more powerful statistical basis for such comparisons.

Within each state the survey responses were compared to determine those items that all three professional groups ranked at the 4.5 to 5.0 level. Appendix G provides the statistical presentation of the selected states professional responses by statement section and number. Table 13 presents a graphic representation of the items ranked essential by all populations within the selected 5 states and the total survey population. Florida professionals agreed on 9 items; Georgia professionals agreed on 3 statements; Kentucky professionals selected 7 essential components; North Carolina professionals agreed on only 2 items; and Texas educators and designers ranked 8 of the survey statements as essential.

Table 13. Survey Items Ranked Essential by Population in Selected States

SURVEY SECTION	QUESTION NUMBER	SURVEY	FLORIDA	GEORGIA	KENTUCKY	NORTH CAROLINA	TEXAS
PART I	1				K		
	2						
	3						
	4	S	F				T
	5		F				T
	6		F				
	7		F		K		T
	8						
	9						T
	10						
PART II	1	S	F		K	NC	T
	2	S			K		T
	3	S	F			NC	T
	4						
	5						
	6			G			
PART III	1						
	2				K		
	3						
	4						
	5						
	6						
	7						
	8		F	G			
	9						
	10						
	11						
	12						
	13						
	14						
PART IV	1		F	G	K		T
	2						
	3						

Table 13. (Continued)

SURVEY SECTION	QUESTION NUMBER	SURVEY	FLORIDA	GEORGIA	KENTUCKY	NORTH CAROLINA	TEXAS
PART IV	4						
	5						
	6		F		K		
	7						
PART V	1						
	2						
	3						
	4						
	5						
TOTALS		4	9	3	7	2	8

Four of the survey statements were notable by 3 or more of the state populations. Part II, item 1, a child-centered, user friendly facility was ranked essential by 4 states. Part II, item 3, an environment of safety, security, and belongingness present agreement of 3 states' populations with the total survey ranking. Statement 7 of Part I describing future oriented planning teams was ranked essential by 3 state professional survey populations. Part IV, statement 1 calls for open-ended school design to accommodate future technological growth and is unique in that 4 states' professional populations ranked this concept as essential, but the idea did not receive agreement in the total survey statistics.

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APPENDIX A

PERMISSION LETTER FROM DR. H. E. COFFEY

April 22, 1994

Mr. A. Lee Burch, AIA
3025 South Southeast Loop 323
Tyler, Texas 75701

Dear Mr. Burch:

You have my permission to use the survey instrument from my dissertation document as needed in your research. Good luck on your study.

Sincerely,

H. E. Coffey

H. E. Coffey, Ed.D.

APPENDIX B

SURVEY INSTRUMENT

The following questionnaire is designed to determine the essential elements in planning future middle school facilities. Three populations throughout the southern and southeastern United States are being surveyed for comparison and contrast. Architects, teachers and school administrators, who have recently been involved in the creation of a new school, comprise the study population.

DEMOGRAPHIC INFORMATION

1.	Gender	[ ]Female [ ]Male
2.	Race	[ ]Anglo [ ]Afro-American [ ]Hispanic [ ]Asian [ ]Other
3.	Profession	[ ]Architect [ ]Administrator [ ]Teacher
4.	Years Experience In Profession	[ ]0 to 3 years [ ]4 to 13 years [ ]14 to 22 years [ ]23 to 30 years [ ]over 30 years
5.	School size	[ ] 0 - 299 [ ] 300 - 499 [ ] 500 - 699 [ ] 700 - 899 [ ] over 900
6.	Type of School	[ ]Rural [ ]Urban [ ]Small City

DIRECTIONS

1. Please read each item thoroughly and carefully.

2. Please answer each item as to whether that element is (5) ESSENTIAL, (4) HIGHLY DESIRABLE, (3) SIGNIFICANT, (2) LITTLE IMPORTANCE, (1) NOT APPLICABLE.

CODE	RATING	EXPLANATION
5	ESSENTIAL	NECESSARY TO FUTURE MIDDLE SCHOOL PLANNING
4	HIGHLY DESIRABLE	NOT ABSOLUTELY NECESSARY BUT OF FUNCTIONAL VALUE IN PLANNING MIDDLE SCHOOLS
3	SIGNIFICANT	NOT NECESSARY BUT OF SOME FUNCTIONAL VALUE IN PLANNING MIDDLE SCHOOLS
2	LITTLE IMPORTANCE	LITTLE VALUE, BUT NOT HARMFUL IN PLANNING MIDDLE SCHOOLS
1	NOT APPLICABLE	NO VALUE IN PLANNING OF FUTURE MIDDLE SCHOOLS

PLEASE CIRCLE ONE RATING BELOW EACH ITEM.

FACILITY QUESTIONNAIRE

PART I - PLANNING, DESIGN AND SITE SELECTION GUIDELINE ELEMENTS

1. One of the first steps in the planning process for future school facilities should be to establish a pluralistic, broad-based planning and design team composed of teachers, administrators, students, employees, architects, educational planners, parents, board and community members who are stakeholders.

   5 4 3 2 1

2. Planning should be bottom-up, not top-down.

   5 4 3 2 1

3. Another initial step, before the planning and design process begins, is to institute a pragmatic and thorough school survey of all facets of the present educational programs and facilities currently available in the school district.

   5 4 3 2 1

4. Long-range, short-range and strategic school facility plans should be developed that are proactive in nature, rather than reactive and "knee-jerk" in scope.

   5 4 3 2 1

5. Educational programs should be clearly defined and addressed in the educational specifications by the planners before any type of school design is actually drawn up.

   5 4 3 2 1

6. Flexibility, mobility and adaptability should be the cornerstone concepts of any school facility designed for the future.

   5 4 3 2 1

7. Planning teams should be future-oriented and cognizant of the diverse types of spaces needed (quiet areas for individuals or groups; flexible, multi-purpose areas; tailor-made, special purpose classrooms or labs) for schools when they enter the design process.

   5 4 3 2 1

8. The natural, environmental features of a school site should be considered for the potential contributions that they could make to curriculum areas such as science, and whenever possible, natural landscapes should be preserved to be used as nature trails and environmental teaching tools for students.

5 4 3 2 1

9. School sites should be selected with particular attention to those that are free of environmental hazards and restricting easements, have safe access with good availability of transportation systems, have utilities available, are not heavily impacted by adjacent development constraints and do not conflict with long-range plans of state and local governing bodies.

5 4 3 2 1

10. School/community partnerships of shared land resources, such as adjacent parks or recreation areas, should be planned into the conceptual design of the school.

5 4 3 2 1

PART II - ENVIRONMENTAL FACTORS
AESTHETIC, PSYCHOLOGICAL AND BEHAVIORAL GUIDELINE ELEMENTS

1. The public school facility should be child-centered and "user-friendly."

5 4 3 2 1

2. The environment of the school facility is designed to offer a place with spaces where both students and teachers can learn, explore and relate to each other in creative ways and in different size groups.

5 4 3 2 1

3. School facilities should be designed with environments that impart a feeling of safety, security and belongingness for students, teachers, administration and parents.

5 4 3 2 1

4. Both teachers and students should have some type of individualized spaces (workrooms, lockers or "cubbies") that can be personalized.

5 4 3 2 1

5. The immediate visual impression of the entire school facility should be welcoming one by the creative use of colors, graphics and decorative textures.

5 4 3 2 1

6. The highest level of comfort for students, teachers, other school employees should be aspired for through the use of high-tech, well-designed climate control, acoustics and lighting systems.

5 4 3 2 1

PART III - SPACE UTILIZATION GUIDELINE ELEMENTS

1. The benchmark concept for designing all future public school facilities should be the flexibility of the spaces which can encourage experimentation, experiential learning and different teaching concepts.

5 4 3 2 1

2. In general, classrooms should be of an appropriate size to allow for informal settings and non-traditional arrangements of desks or chairs so as to encourage group collaboration.

5 4 3 2 1

3. In many instances, classrooms of the future will have to be larger than usual in order to properly carry out the more complex and numerous curricular programs.

5 4 3 2 1

4. The Instructional Media Center should be designed to be the central focus of the facility and serve as an informational storage center and a hub for communication technology.

5 4 3 2 1

5. Movable partitions, demountable or folding walls and re-deployable spaces are viable ways of maximizing the flexibility of spaces in a future school facility.

5 4 3 2 1

6. Future classrooms should be designed in ways which will not isolate students or teachers from participation in collaborative learning or teaching.

5 4 3 2 1

7. Classroom spaces must be as fluid and malleable as the programs that they serve. Whenever possible, classrooms should be designed to allow the free movement of students from one location to another with ease and without obstructions.

5 4 3 2 1

8. The individual classroom of the future should be designed with appropriate high-technology to allow it to function as its own specialized learning center.

5 4 3 2 1

9. There should be quiet, private, individual spaces for parents, students and teachers to conference.

5 4 3 2 1

10. Teaching staff should have individualized work areas for planning, conferencing and preparation in close proximity to their classrooms.

5 4 3 2 1

11. Information and resource areas should be tailor-made and larger than usual with special spaces for students to read, work in groups and conference with teachers - plus additional storage spaces to accommodate instructional and communication technology materials.

5 4 3 2 1

12. At appropriate grade levels, there should be multi-purpose laboratories to be used holistically in a variety of curricular programs.

5 4 3 2 1

13. There will be a need for specialized, broad-based prototypical lab spaces, tailor-made to support newly designed Instructional Technology programs.

5 4 3 2 1

14. There should be special-purpose rooms designed technologically appropriately and exclusively for curricular areas, such as Band, Art, Theater, Science and Music.

5 4 3 2 1

PART IV - TECHNOLOGY GUIDELINE ELEMENTS

1. School facilities designs should be as open-ended as possible to allow for future technological growth by the incorporation of larger cable trays and conduit, multiple communication lines (e.g., fiber optics) and extra "clean" power sources for computers, etc.

   5 4 3 2 1

2. High-technology growth should be facilitated by the judicious use of pre-wired, multi-purpose labs that are flexible enough to serve divergent programs.

   5 4 3 2 1

3. Future schools should be cognizant of the need to network by means of satellite learning and long distance telecommunications technology, as a means of equitably sharing resources and promoting global awareness for students.

   5 4 3 2 1

4. Electronic technology, such as voice mail, and computer and video communication/networking to other schools and geographical areas should be evidenced in schools of the future.

   5 4 3 2 1

5. "Smart Buildings" with energy efficient, high-technology HVAC control systems should be employed in schools of the future.

   5 4 3 2 1

6. Classrooms in future schools should have some computer modules and learning centers linked to a central media center for individualized instruction via the computer, ETV or satellite systems.

   5 4 3 2 1

7. Flexibility, movability and open-ended adaptability to add on new technology as needed are the key linchpins in schools built for the future.

   5 4 3 2 1

PART V - SCHOOL AND COMMUNITY SERVICE AREAS GUIDELINE ELEMENTS

1. Whenever possible, schools should attempt to find ways to share resources and facilities with their community.

   5 4 3 2 1

2. Future school facilities should reflect the need for increased daycare, and before- and after-school care of infants and children of students, teachers, employees and community members.

   5 4 3 2 1

3. Schools should serve as an integral community hub for medical, social, family-support and occupational services for students and parents.

   5 4 3 2 1

4. Schools of the future should be facilities that are designed to serve as lifelong learning centers for both students and community citizens.

   5 4 3 2 1

5. Future schools should be designed and planned with a new spirit of two-way openness, whereby students will use the community as a learning resource center by utilizing libraries, museums, businesses and citizenry as tools for learning and adults will come into the schools more often for learning services, recreation and community activities.

   5 4 3 2 1

APPENDIX C

INITIAL LETTER TO POPULATION

November 23, 1993

Name~
Address~
state~

RE: reference~

Dear salutation~:

We are asking for your assistance in completing research on the design of middle schools for the twenty-first century. Our dissertation study seeks to determine the critical importance of elements for next century schools by surveying architects, school administrators and teachers who have recently been involved in the design of a middle school. The above referenced school has been identified by your State Department of Education as meeting our criteria for study.

We ask you to complete the enclosed survey. The survey responses will remain anonymous. No individual or firm will be identified. The results will be a part of a study of two hundred schools in fourteen (14) states.

Your opinions are important to the study. Please contact us if you have any questions regarding any portion of the survey or study. Thank you very much for your assistance and time.

Sincerely,

Arnold Oates, Ph.D.
Professor

A. L. Burch, A.I.A., C.E.F.P.I.
Doctoral Candidate

/mm
Enclosure

APPENDIX D

FOLLOW-UP COVER LETTER TO NON-RESPONDENTS

December 6, 1993

Name~
Address~
state~

RE: reference~

Dear salutation~:

About four weeks ago we wrote seeking your opinions regarding middle schools. As of today, we have not yet received your completed survey. Our research seeks to determine the critical elements for middle schools of the next century by surveying architects, school administrators and teachers who have recently been involved in the creation of a new middle school.

We write to you again because of the significant role each survey plays in the usefulness of this study. You are one of only 261 professionals selected throughout fourteen states to participate in this study. In order for the results of the study to be truly representative, it is essential each person in the sample return the survey.

In the event that your survey has been misplaced, a replacement survey is enclosed. Your cooperation is greatly appreciated.

Sincerely,

Arnold Oates, Ph.D.
Professor

A. L. Burch, A.I.A., C.E.F.P.I.
Doctoral Candidate

/mm
Enclosure

APPENDIX E

LETTER TO STATE EDUCATION AGENCIES

March 19, 1993

Name
DEPARTMENT OF EDUCATION
Address
City, State Zip

Dear salutation:

The Department of Educational Administration at Texas A & M University is interested in researching the design of middle schools for the 21st century through our doctoral program. Mr. Burch, doctural student, and I need your assistance to identify middle schools that have been constructed since 1990.

We would appreciate the name, address and a contact person at any such school or school district in your state. If your office is not the appropriate resource, please forward this request to the proper department with your approval.

Your timely assistance is greatly appreciated. We will be pleased to share the results of the research with you upon completion.

Sincerely,

Arnold Oates, Ph.D., Professor

A. Lee Burch, A.I.A., C.E.F.P.I.
Doctoral Candidate

ADO/mm

APPENDIX F

LETTER TO QUALIFIED MIDDLE SCHOOLS

June 30, 1993

Name~
school~
address~
city~, state~ zip~

RE: MIDDLE SCHOOL SURVEY

Dear salutation~:

The Department of Educational Administration at Texas A & M University is interested in researching the design of middle schools for the twenty-first century through our doctoral program. Mr. Burch, doctoral student, and I need your assistance in identifying the program and design team for your school.

Your State Department of Education furnished the name of your school as having been constructed since 1990. We would appreciate the names and addresses of the architect, administrator and teacher who were involved in the programming and design of your school.

Your timely assistance will be greatly appreciated.

Sincerely

Arnold Oates, Ph.D., Professor

A. Lee Burch, A.I.A., C.E.F.P.I.
Doctoral Candidate

ALB/mm

APPENDIX G

QUANTIFIED SURVEY RESPONSES

SUBSET OF FIVE STATES

TABLE G.1 Florida

Section	No.	Architect Median	Architect Std. Dev.	Architect Mode	Admin. Median	Admin. Std. Dev.	Admin. Mode	Teacher Median	Teacher Std. Dev.	Teacher Mode
Part I	1	4	0.942809	3	4.461538	0.634324	5	4.5	0.5	5
	2	3.88889	1.286204	5	4	0.784465	4	4.5	0.5	5
	3	4.11111	0.993808	5	4.538462	0.498519	5	4	1	5
	4	4.77778	0.41574	5	4.538462	1.082404	5	4.5	0.5	5
	5	4.77778	0.41574	5	4.769231	0.421325	5	4.75	0.433013	5
	6	4.66667	0.471405	5	4.615385	0.624926	5	4.5	0.866025	5
	7	4.77778	0.41574	5	4.923077	0.266469	5	4.5	0.5	5
	8	4.22222	0.785674	5	4	0.784465	4	4.75	0.433013	5
	9	4.44444	0.831479	5	4.692308	0.461538	5	5	0	5
	10	3.33333	0.666667	3	4.307692	0.461538	4	4	1	5
Part II	1	5	0	5	4.846154	0.360801	5	5	0	5
	2	4.77778	0.41574	5	4.307692	0.721602	5	5	0	5
	3	4.66667	0.471405	5	4.769231	0.421325	5	5	0	5
	4	4	0.816497	4	3.923077	0.828487	3	3.75	1.299038	5
	5	4.66667	0.471405	5	4.307692	0.461538	4	4.5	0.866025	5
	6	4.44444	0.955814	5	4.769231	0.421325	5	4.5	0.5	5
Part III	1	4.44444	0.684935	5	4.5	0.5	4	4	1	5
	2	4.22222	0.785674	5	4.538462	0.634324	5	4	1	5
	3	2.66667	1.490712	3	4.384615	0.624926	4	3.75	1.299038	5
	4	4.11111	1.286204	5	4.692308	0.461538	5	4.75	0.433013	5
	5	2.88889	1.099944	3	3.846154	0.769231	3	2.75	1.089725	3
	6	3.88889	1.286204	5	4.307692	0.821314	5	4.25	0.829156	5
	7	3.77778	1.133115	4	4.230769	0.799408	5	4	0.707107	4
	8	4.55556	0.955814	5	4.769231	0.421325	5	4.75	0.433013	5
	9	4.66667	0.666667	5	4.384615	0.923077	5	4.5	0.5	5
	10	4.22222	1.030402	5	4.384615	0.624926	4	4.25	0.829156	5
	11	3.44444	0.831479	3	4.076923	0.615385	4	4.25	0.829156	5
	12	3.55556	0.955814	3	3.923077	0.729756	4	4.25	0.829156	5
	13	4.22222	0.628539	4	4.384615	0.73782	5	4.5	0.5	5
	14	4.22222	1.030402	5	4.615385	0.486504	5	4.5	0.5	5
Part IV	1	4.55556	0.955814	5	4.923077	0.266469	5	5	0	5
	2	4.33333	0.816497	5	4.692308	0.605693	5	4.5	0.866025	5
	3	4.22222	0.916246	5	4.846154	0.360801	5	5	0	5
	4	4.22222	1.227262	5	4.846154	0.360801	5	4.75	0.433013	5
	5	3.55556	1.342561	5	4.461538	0.84265	5	4.75	0.433013	5
	6	4.55556	0.955814	5	4.769231	0.57564	5	5	0	5
	7	4.22222	1.030402	5	4.692308	0.461538	5	4.75	0.433013	5
Part V	1	4.33333	0.666667	5	4.230769	0.696568	4	4	1	5
	2	3.11111	1.196703	3	4	1.037749	5	2.5	1.118034	#N/A
	3	3.11111	1.286204	3	3.692308	0.991085	4	2.5	1.118034	#N/A
	4	4.44444	0.831479	5	4.307692	0.721602	5	4	0.707107	4
	5	4.22222	1.030402	5	4.076923	0.729756	4	4	1	5

TABLE G.2 Georgia

Section	No.	Architect Median	Architect Std. Dev.	Architect Mode	Admin. Median	Admin. Std. Dev.	Admin. Mode	Teacher Median	Teacher Std. Dev.	Teacher Mode
Part I	1	3.6	1.0198	4	4.91667	0.27639	5	4.85714	0.34993	5
	2	3.4	1.0198	3	4.33333	0.62361	4	4.71429	0.45175	5
	3	4	0.89443	5	4.41667	0.6401	5	4.57143	0.49487	5
	4	4.4	0.4899	4	4.75	0.43301	5	4.57143	0.72843	5
	5	3.8	0.9798	4	4.91667	0.27639	5	4.85714	0.34993	5
	6	3.8	1.16619	5	4.5	0.6455	5	4.42857	0.72843	5
	7	3.8	0.9798	4	4.75	0.43301	5	4.71429	0.45175	5
	8	3.4	1.0198	3	3.91667	0.6401	4	3.57143	0.49487	4
	9	5	0	5	4.58333	0.6401	5	4.42857	0.49487	4
	10	4.4	0.4899	4	3.58333	0.6401	3	3.28571	0.69985	4
Part II	1	4.4	0.4899	4	4.91667	0.27639	5	4.57143	0.72843	5
	2	4.6	0.4899	5	4.66667	0.4714	5	4.42857	0.72843	5
	3	4.4	0.8	5	4.91667	0.27639	5	4.71429	0.45175	5
	4	3.4	0.4899	3	4.16667	0.89753	5	4.28571	0.69985	5
	5	4.6	0.4899	5	4.16667	0.55277	4	4.28571	0.69985	5
	6	4.6	0.4899	5	4.66667	0.4714	5	4.57143	0.49487	5
Part III	1	4	0.89443	5	4.33333	0.74536	5	4.42857	0.72843	5
	2	4.2	0.4	4	4.5	0.6455	5	4.57143	0.49487	5
	3	4.2	0.74833	5	3.58333	1.03749	4	4.42857	0.49487	4
	4	4.4	0.8	5	4.83333	0.37268	5	4.42857	0.72843	5
	5	2.8	0.74833	2	2.91667	1.32025	4	3.28571	1.16058	4
	6	3.4	1.0198	3	4	0.91287	4	4.28571	0.45175	4
	7	3.4	1.0198	3	4.5	0.6455	5	4.57143	0.72843	5
	8	4.6	0.4899	5	4.91667	0.27639	5	4.85714	0.34993	5
	9	4.4	0.8	5	4.66667	0.62361	5	4.42857	0.49487	4
	10	4.6	0.4899	5	4.25	0.59512	4	4.57143	0.49487	5
	11	4.4	0.4899	4	3.75	0.92421	3	4.28571	0.69985	5
	12	3.4	1.0198	3	4	0.8165	4	4	0.53452	4
	13	4.2	0.74833	5	4.58333	0.49301	5	3.85714	0.83299	4
	14	3.8	0.74833	4	4.25	0.92421	5	4.57143	0.72843	5
Part IV	1	4.6	0.4899	5	4.75	0.59512	5	4.85714	0.34993	5
	2	4.2	0.4	4	4.58333	0.7592	5	4.57143	0.49487	5
	3	4.2	0.74833	5	4.58333	0.6401	5	4.71429	0.45175	5
	4	4	1.09545	4	4.16667	0.79931	5	4.14286	0.34993	4
	5	4.2	0.74833	4	4.66667	0.62361	5	4.28571	0.45175	4
	6	4.4	0.4899	4	4.58333	0.49301	5	4.85714	0.34993	5
	7	3.8	0.74833	4	4.66667	0.4714	5	4.71429	0.45175	5
Part V	1	3.4	0.8	4	4.41667	0.6401	5	4	0.53452	4
	2	3.2	1.16619	2	3.41667	1.25554	4	3.14286	1.12486	3
	3	2.8	1.16619	2	3.83333	0.79931	4	3.42857	0.49487	3
	4	2.6	1.0198	3	4.41667	0.86201	5	4	0.75593	4
	5	2.6	1.2	4	4.41667	0.6401	5	4.28571	0.69985	5

TABLE G.3 Kentucky

Section	No.	Architect Median	Architect Std. Dev.	Architect Mode	Admin. Median	Admin. Std. Dev.	Admin. Mode	Teacher Median	Teacher Std. Dev.	Teacher Mode
Part I	1	4.833333	0.372678	5	4.72727	0.44536	5	5	0	5
	2	3.833333	1.067187	4	4	1.12815	4	5	0	5
	3	4.333333	0.471405	4	4.36364	0.77139	5	5	0	5
	4	5	0	5	4.27273	0.74966	5	4	1	#N/A
	5	5	0	5	4.27273	0.96209	5	3.5	1.5	#N/A
	6	4.333333	0.471405	4	4.72727	0.44536	5	5	0	5
	7	4.5	0.5	5	4.54545	0.65555	5	4.5	0.5	#N/A
	8	4	0.57735	4	4	0.8528	3	5	0	5
	9	4.666667	0.745356	5	4.63636	0.48105	5	4	0	4
	10	4	0.57735	4	3.36364	0.77139	3	4	0	4
Part II	1	4.666667	0.471405	5	4.81818	0.57496	5	5	0	5
	2	4.833333	0.372678	5	4.54545	0.49793	5	4.5	0.5	#N/A
	3	4.666667	0.471405	5	4.63636	0.64282	5	3.5	1.5	#N/A
	4	4.666667	0.471405	5	4.09091	0.79253	4	4.5	0.5	#N/A
	5	4.166667	0.372678	4	4.09091	0.66804	4	4.5	0.5	#N/A
	6	4.166667	0.897527	5	4.54545	0.65555	5	5	0	5
Part III	1	4.333333	0.471405	4	4.36364	0.77139	5	3.5	1.5	#N/A
	2	4.5	0.5	5	4.63636	0.64282	5	5	0	5
	3	4.666667	0.745356	5	4.18182	0.8332	5	5	0	5
	4	4.5	0.763763	5	4.36364	0.48105	4	2.5	1.5	#N/A
	5	3.833333	1.067187	5	4.27273	0.44536	4	3.5	0.5	#N/A
	6	4.666667	0.471405	5	4.54545	0.49793	5	3.5	0.5	#N/A
	7	4.666667	0.471405	5	4.36364	0.64282	5	4.5	0.5	#N/A
	8	4.666667	0.471405	5	4.45455	0.65555	5	4.5	0.5	#N/A
	9	4.5	0.5	5	4.36364	0.64282	5	4	0	4
	10	4.166667	0.897527	5	3.81818	1.02852	4	5	0	5
	11	4.166667	0.687184	4	3.72727	0.86244	4	4.5	0.5	#N/A
	12	4	0.816497	5	3.90909	0.66804	4	4	1	#N/A
	13	4.333333	0.745356	5	3.54545	0.78203	4	4.5	0.5	#N/A
	14	4.5	0.763763	5	4.09091	0.89995	5	5	0	5
Part IV	1	4.666667	0.471405	5	4.54545	0.49793	5	4.5	0.5	#N/A
	2	4	1.414214	5	4.54545	0.65555	5	4	1	#N/A
	3	4.5	0.5	5	4.36364	0.48105	4	3.5	0.5	#N/A
	4	4.5	0.5	5	4.18182	0.71582	4	4.5	0.5	#N/A
	5	4.666667	0.471405	5	4.63636	0.64282	5	3	0	3
	6	4.833333	0.372678	5	4.72727	0.44536	5	5	0	5
	7	4.5	0.763763	5	4.36364	0.48105	4	5	0	5
Part V	1	4.833333	0.372678	5	4.27273	0.44536	4	4	0	4
	2	3.5	1.384437	5	3.45455	0.89072	3	2	1	#N/A
	3	3.5	1.384437	5	3.09091	1.23983	2	2.5	1.5	#N/A
	4	4.333333	0.745356	5	4	0.73855	4	4.5	0.5	#N/A
	5	4.666667	0.471405	5	4	0.73855	4	2.5	1.5	#N/A

TABLE G.4 North Carolina

Section	No.	Architect Median	Architect Std. Dev.	Architect Mode	Admin. Median	Admin. Std. Dev.	Admin. Mode	Teacher Median	Teacher Std. Dev.	Teacher Mode
Part I	1	4.1	1.13578	4	4.71429	0.451754	5	4.6	0.489898	5
	2	3.7	0.64031	4	4.35714	0.717848	5	4.2	0.748331	4
	3	4.1	0.7	4	4.42857	0.979379	5	4.2	0.979796	5
	4	4.3	0.78102	5	4.92857	0.257539	5	4.6	0.8	5
	5	4.6	0.4899	5	4.92857	0.257539	5	4.4	0.8	5
	6	4.2	0.6	4	4.85714	0.349927	5	4.8	0.4	5
	7	4.4	0.66332	5	4.92857	0.257539	5	4.4	0.489898	4
	8	3.7	0.9	4	4.07143	0.59333	4	3.8	0.748331	4
	9	4.4	0.4899	4	4.71429	0.589015	5	4.4	0.489898	4
	10	3.6	0.66332	4	3.71429	0.958315	4	3.8	0.748331	4
Part II	1	4.9	0.3	5	5	0	5	4.6	0.489898	5
	2	4.4	1.0198	5	4.78571	0.410326	5	4.2	0.748331	4
	3	4.7	0.45826	5	4.85714	0.349927	5	4.6	0.489898	5
	4	3.8	1.07703	4	4.14286	0.832993	5	4.4	0.489898	4
	5	4.6	0.4899	5	4.35714	0.610286	4	3.6	1.019804	4
	6	4.2	0.74833	5	4.64286	0.479157	5	4.4	0.489898	4
Part III	1	3.8	0.74833	4	4.14286	0.638877	4	4	0.632456	4
	2	4.1	0.7	4	4.35714	0.479157	4	4.2	0.748331	4
	3	3.4	0.8	4	4.14286	0.515079	4	4.2	0.979796	5
	4	4.2	0.74833	5	5	0	5	4.2	0.748331	5
	5	2.8	1.16619	4	3.5	0.731925	3	2.6	1.356466	2
	6	3.7	0.78102	4	4.28571	0.451754	4	4	0.894427	3
	7	3.8	0.87178	4	4.35714	0.610286	4	4.2	0.748331	4
	8	3.9	0.83066	4	4.85714	0.349927	5	4.4	0.8	5
	9	4.2	0.87178	5	4.78571	0.410326	5	4.4	0.8	5
	10	3.8	0.9798	4	4.14286	1.124858	5	4.4	0.8	5
	11	3.5	0.80623	4	3.92857	0.59333	4	4	0.894427	3
	12	3.8	0.4	4	3.78571	0.939496	4	4	0.632456	4
	13	3.6	0.91652	4	4.07143	0.883523	4	4	0.632456	4
	14	4.2	0.74833	5	4.57143	0.494872	5	4.2	0.979796	5
Part IV	1	4.1	0.7	4	4.78571	0.410326	5	4.2	0.748331	5
	2	3.7	0.64031	4	4.5	0.5	5	4.4	0.8	5
	3	3.9	1.04403	4	4.71429	0.451754	5	4.2	0.979796	5
	4	3.8	0.74833	4	4.64286	0.610286	5	4	0.894427	3
	5	4	0.63246	4	5	0	5	4.2	0.748331	5
	6	4	0.89443	4	4.71429	0.795395	5	4	0.894427	3
	7	4.1	0.83066	4	4.64286	0.479157	5	4.4	0.8	5
Part V	1	4.3	0.45826	4	4.42857	0.494872	4	4.2	1.16619	5
	2	3.4	0.8	3	4.14286	0.989743	4	3.4	1.356466	4
	3	3	0.44721	3	3.57143	0.820652	3	3.4	1.019804	3
	4	3.6	0.66332	4	4.21429	0.673856	4	3.8	0.979796	4
	5	3.8	0.6	4	4.21429	0.557875	4	4	0.632456	4

TABLE G.5 Texas

Section	No.	Architect Median	Architect Std. Dev.	Architect Mode	Admin. Median	Admin. Std. Dev.	Admin. Mode	Teacher Median	Teacher Std. Dev.	Teacher Mode
Part I	1	4.33333	0.74536	5	4.375	0.780625	5	5	0	5
	2	4.5	0.76376	5	4.1875	0.634306	4	5	0	5
	3	4.33333	0.4714	4	4.1875	1.073473	5	4.75	0.43301	5
	4	4.66667	0.4714	5	4.625	0.484123	5	4.75	0.43301	5
	5	4.66667	0.4714	5	4.625	0.780625	5	4.75	0.43301	5
	6	4.33333	1.10554	5	4.4375	0.933324	5	4.75	0.43301	5
	7	5	0	5	4.5625	0.704339	5	5	0	5
	8	4.33333	0.74536	5	3.75	0.75	3	4.25	0.82916	5
	9	4.83333	0.37268	5	4.5625	0.704339	5	4.75	0.43301	5
	10	3.83333	0.89753	3	3.4375	0.933324	4	4	0.70711	4
Part II	1	4.83333	0.37268	5	4.8125	0.390312	5	4.75	0.43301	5
	2	4.66667	0.4714	5	4.5625	0.496078	5	4.5	0.5	4
	3	4.5	0.5	4	4.5625	0.704339	5	5	0	5
	4	3.66667	0.94281	4	4.1875	1.01358	4	4.25	0.82916	5
	5	3.66667	0.94281	4	4.4375	0.704339	5	4.25	0.43301	4
	6	4.33333	0.74536	5	4.5625	0.704339	5	5	0	5
Part III	1	4.33333	1.10554	5	4	0.935414	4	4.5	0.5	4
	2	4	1.1547	5	4.625	0.484123	5	4.5	0.5	4
	3	3.5	0.95743	4	3.875	0.856957	4	4.5	0.5	4
	4	4.66667	0.4714	5	4.4375	0.609175	5	4	0.70711	4
	5	3.66667	1.37437	5	3.5	0.790569	4	4	0.70711	4
	6	3.83333	1.06719	5	4.1875	0.726184	4	4.25	0.82916	5
	7	4	1	3	4.0625	0.899218	5	4.25	0.82916	5
	8	4.66667	0.4714	5	4.375	0.484123	4	4.5	0.5	4
	9	4	0.8165	3	4.4375	0.704339	5	4.5	0.5	4
	10	4.16667	0.68718	4	4.125	0.780625	4	4.5	0.86603	5
	11	4	0.8165	3	3.5625	0.788095	3	4.25	0.82916	5
	12	3.66667	0.74536	3	3.5625	0.704339	4	4	0.70711	4
	13	4	0.8165	4	4	0.707107	4	4.5	0.86603	5
	14	4.66667	0.4714	5	4.375	0.927025	5	4.5	0.86603	5
Part IV	1	4.66667	0.4714	5	4.6875	0.463512	5	4.75	0.43301	5
	2	4.33333	0.4714	4	4.5	0.790569	5	4	0.70711	4
	3	4.83333	0.37268	5	4.3125	0.91643	5	4.5	0.5	4
	4	4.5	0.76376	5	3.875	1.053269	5	4.5	0.5	4
	5	4	1.1547	5	4.5625	0.609175	5	5	0	5
	6	4	0.8165	3	4.25	0.968246	5	4.25	0.82916	5
	7	4.16667	0.68718	4	4.5	0.707107	5	4.5	0.5	4
Part V	1	4.16667	0.68718	4	4.1875	0.726184	4	4.75	0.43301	5
	2	2.83333	1.46249	1	3.25	1.391941	5	3.25	0.82916	4
	3	2.5	1.38444	1	3.125	1.316957	4	3.75	0.43301	4
	4	2.66667	1.49071	1	4.0625	1.087931	5	4.5	0.5	4
	5	2.66667	1.49071	1	3.875	0.927025	5	4.25	0.82916	5

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