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EDUCATIONAL FACILITIES PLANNING: A SYSTEMS MODEL

by

Frederick Story Withum III

Submitted in partial fulfillment of

the requirements for the degree

Doctor of Education

Interdisciplinary Doctoral Program for Educational Leaders

School of Education

Duquesne University

December, 2006

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By

Frederick Story Withum III

2006

ABSTRACT

Utilizing a primarily experiential literature base, a thematic analysis of text and a synthesis of literature from education, educational administration, architecture, and organizational sociology, a systems model of public educational facilities planning was developed. The model represents a theoretical construct from which design professionals and educators can better organize, understand, analyze, communicate, and research complex cause-effect relationships that occur when educational facilities are designed and constructed. The Systems Model for Planning of Educational Facilities attempts to: (1) identify and describe complicated social, cultural, political, and economic mechanisms at work when public schools are designed and constructed in a pluralistic democratic society, (2) make understandable the relationships between those mechanisms and educational facility planning, and (3) formalize causal inferences between social, cultural, political, and economic mechanisms, educational facility planning, and educational facilities. The goal of this study was to determine the validity of the Systems Model for Planning of Educational Facilities. In order to accomplish determine the validity of the Systems Model for Planning of Educational Facilities a sequential transformative research design, grounded in the pragmatic tradition, was employed. A sequential transformative research design capitalizes on concurrent quantitative and qualitative data collection as a means to offset the weakness inherent within one methodology with the strengths of the other methodology. The research design maximized leverage over the complexity of the systems model and provided the greatest opportunity to make generalizations to other contexts and settings. In order to examine the cohesiveness and validity of the Systems Model for Educational Facilities Planning

the research design necessitated a three-tiered approach. The first tier utilized aggregated and disaggregated data from a quantitative survey of 501 educators employed at fifteen middle schools constructed between 1990 and 2002 in the Commonwealth of Pennsylvania. The second tier of the study utilized data from a comparative case study of four purposefully selected middle schools. The four schools, each significantly different from the other fourteen in the sample, were selected from the fifteen schools surveyed during the first tier of the study. The third tier of the study utilized the quantitative and qualitative data from the first two tiers in order to cross-validate the findings of the other. Quantitatively across the aggregated and disaggregated data, qualitatively across a comparative case analysis, and further supported by a cross-validation of the data from both methodologies, the Systems Models for Educational Facilities Planning was found to be cohesive and valid.

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For my family, especially my grandfather, father, sons, and my wife.

For James A. Ryland, a mentor and friend who exemplifies what all great teachers strive to be…trusted, respected, and caring.

For the teachers who have nurtured me as a student, and the faculty, administrators, and staff who I have worked beside, especially the administrative team of the South Middleton School District, the faculty and staff of Yellow Breeches Middle School, and Boiling Springs High School.

Most of all, for the students of the South Middleton School District who I have learned more from than I have ever taught. My hope is that your children, grandchildren, and their children will have the time of their lives attending joyous schools where the freedoms of this country pass from generation to generation.

CHAPTER I

INTRODUCTION AND OVERVIEW

Background

American schools are facing tremendous pressure from three very dramatic forces. Shifting population demographics, the deteriorating condition of American educational facilities and rapid societal and technological changes are challenging the American public's long held beliefs about its schools. In response to the challenges, both educators and architects have endeavored to determine how twenty-first century educational facilities should be designed, respond to the needs of learners, and interact with the community.

The recognition by both educators and architects of the importance of this endeavor has resulted in an ongoing collaboration between the two professions. Over the last decade, this collaboration, as evidenced in a historical review of the literature, has become so vital to educational facilities planning that it has given rise to a single intertwined branch of architecture and education. Educators, architects, engineers, interior designers, artists, and environmentalists have converged on this new branch of architecture and education, and collectively represent a contemporary group of professionals who specialize in planning and designing educational facilities.

Throughout the 1990s and the initial years of this century, the marriage of architecture and education, and the new group of design professionals that it yielded, resulted in an expanded body of knowledge pertaining to: (1) the relationship between educational facilities, teaching, and learning, (see for example, Earthman and Lemasters, 1997), (2) the design and construction of educational facilities (see for example, Castaldi,

1994), and (3) the social, cultural, and physical roles that an educational facility plays in the community (see for example, the U.S. Department of Education [USDE], 2000).

Through the support of the American public, the expansion of information related to the design and construction of educational facilities has been substantially increased. A nationwide survey published in 1999 on the infrastructure of America demonstrated clear consensus regarding the importance of improving "the infrastructure of education" (Luntz Group, 1999). Two-thirds of those polled expressed that they would be willing to pay more in taxes to "ensure we have modern schools that are safe and healthy" (Luntz Group, 1999). Since that report, Americans have corroborated the findings by investing record amounts into school construction. In 2004, school districts invested a record $28.64 billion in school construction. This single year investment in educational facilities is, to date, the largest in the history of American schools (Argon, 2005).

With increasing physical, social, and technological pressures on a clearly deteriorating educational infrastructure, with a greater understanding of the role that educational facilities play in teaching, learning and the community, and with the American public clearly in support of improving our schools, one would consider it a foregone conclusion that American schools are being renovated, modernized, or replaced in order to better meet the needs of children and communities they serve. In reality, modernizing the American educational infrastructure is an issue that is dividing communities across the country. Educators, design professionals, citizens, and government officials often find themselves at odds when debating large capital improvement projects. Joe Perkins, the President of the American Association of Retired Persons (AARP), highlighted the rifts caused by large capital improvement projects for

school districts when he stated: “Schools should be a point of unity; not division between and among the generations” (USDE, 2000). The divisions among those responsible for renovating, modernizing, or replacing American public schools often result in poorly conceived capital improvement projects. As Hamity and Lines point out, “Unfortunately, all too often schools have been designed that failed to respond to the school districts’ present, let alone their future educational needs” (1999).

What is disconcerting about this dilemma is how a review of the literature reveals that educators and design professionals, backed by a decade of intense efforts, have demonstrated that they can, regardless of pedagogical philosophy or an architectural school of thought, design and build successful educational facilities.

Significance of the Problem

The contrast of a sound base for knowledge and the apparent failures of newly constructed educational facilities, raises the central research question of this work:

> If educators and design professionals have demonstrated the ability to design and construct educational facilities that meet the needs of children and the communities that they serve, what are the variables that intervene when they fail to do so?

This question is far easier proposed than answered.

Over the last two decades the literature base in educational facility planning has expanded greatly. However, this particular base remains predominantly experiential—not experimental. The experimental portion of this base for literature focuses almost exclusively on the relationships between educational facilities and learning. Although this research provides empirical justification for the record expenditures for American

educational facilities, there remains, in comparison to the investment being made, little comprehensive, research-based resources and materials which fully describe the dynamics of the public school facility planning.

Nearly fifteen years ago on the absence of experimental data from the literature, Harold Coffey wrote, “There are insufficient amounts of comprehensive, research-based resources and materials for public school facility planning” (1992). In that same year, Glen Earthman wrote, “Resources are limited in guiding administrators through the planning process. The majority of the texts and journal articles written about school facilities and the process of planning, designing, and constructing them rely heavily on descriptions of what the buildings should look like and typically do not spend a great deal of time describing the planning process” (1992). Fourteen years later, a review of the base for this literature continues to find these observations true.

Developing the Research Base

Early in the development of this study, it became evident that it was necessary to deal with the void in the research base, the complexity of the environment in which public schools are planned, and any concerns regarding the empirical assessment of schools as organizations. Therefore, a construct which endeavored to delimit and explain in a systematic way, complex patterns, interactions, and relationships between the physical, social, pedagogical, cultural, and economic components of educational facilities planning was needed. However, such a construct does not exist, nor does a broad empirical base for research on which such a construct could be built. As a result, a theoretical construct needed to be developed from which design professionals and educators can better organize, understand, analyze, communicate, and research complex

cause-effect relationships that occur when educational facilities are designed and constructed. In order to meet this goal, it is necessary to: (1) identify and describe complicated social, cultural, political, and economic mechanisms at work whenever public schools are designed and constructed in a pluralistic democratic society, (2) understand the relationships between these mechanisms and educational facility planning, and (3) validate a model which formalizes causal inferences between social, cultural, political, and economic mechanisms, educational facility planning, and educational facilities.

A thematic content analysis of text was completed in order to develop a unifying theoretical construct of educational facilities planning. The purpose of a thematic analysis of text is to identify major themes and ideas within a set of documents (Trochim, 2001). The documents analyzed for this study encompassed a detailed review of texts, journals, and internet sources that related to all aspects of educational facilities and educational facilities planning. To bolster this conceptual framework and provide a sound base for which it could be grounded on, it was also necessary to review, analyze, and synthesize literature from education, educational administration, architecture, and organizational sociology. This process is known as casing.

The processes of thematic analysis and casing led to the development of nine suppositions. These nine suppositions established categories of practices in educational facility planning, relevant patterns of planning within the categories of planning, and grounded with a synthesis of literature from architecture, education, and organizational sociology. Melded together, these suppositions constitute a systems model designed to

serve as a unifying theoretical construct, and illustrates the dynamic processes which take place when American public schools are designed and constructed.

To return to the central research question of this study, it asks: If educators and design professionals have demonstrated the ability to design and construct educational facilities that meet the needs of children and the communities they serve, what are the variables that intervene when they fail to do so? The answer to this question, established by the systems model, would state that:

> An educational facility which fails to meet the needs of its stakeholders is the result of educators and design professionals who failed to manage the dynamics of the planning environment. As a result, they did not obtain the support, services, and/or materials necessary to design and construct an educational facility that is a physical representation of a clearly articulated educational vision.

The validity of the answer established by the systems model, and in turn, the validity of the system model itself, is the basis for this study. The research methodology is designed to collect quantitative and qualitative evidence across multiple cases of public school facility planning in order to validate or invalidate the model.

Limitations and Assumptions of Related Literature

As previously stated, after a decade of effort, educators and design professionals have greatly expanded the body of knowledge pertaining to educational facilities. This expanded body of knowledge, however, remains largely experiential or perceptual, and not experimental. There remains little comprehensive, research-based resources and materials which describe the planning process for educational facilities. The absence of experimental research is a limitation, but also a guiding factor in this study.

Limitations and Assumptions of the Theoretical Construct

All literature on educational facility planning from the past decade, whether experiential or experimental, addresses one or more of four elements. These elements are: (1) the structure and nature of the organization for which planning occurs, (2) the environment in which planning takes place, (3) the purpose and method for planning, and (4) the architectural product which results from the planning. In order to define a framework and parameters for this study, it is necessary to develop well-grounded and defendable assumptions with regard to each of these elements. To accomplish this goal, it is necessary to review, analyze, apply, and synthesize literature from educational facilities planning, education, educational administration, architectural practice, and organizational sociology. These assumptions are central to the development of the systems model for educational facility planning, and both guide and delimit this study. These assumptions address the structure and nature of schools as organizations, the environment in which public schools are planned, the purpose and method of planning, and educational facilities as an architectural product.

The Structure and Nature of Schools as Organizations

Hoy and Miskel argue that "the larger social, cultural, economic, demographic, political, and technological trends all influence the internal operations of schools and districts. Because school organizations are conceptualized as part of a larger environment, an argument can be made that anything that happens in the larger environment may affect the school and vice versa" (1996). In other words, it is assumed that a school district is a product of the environment within which it resides, and in turn, the environment is partly a product of the school district that resides within it. It is not a

new theoretical framework to guide and define organizational behavior through an examination of the organization and the environment in which it resides. Following World War II, attempts to define organizational behavior through the interactions between the organization and the environment emerged as a compilation of ideas collectively known as open-systems theories (Scott, 1998).

Due to the fact that organizations, dramatically different from public schools, can be defined as open-systems, it is necessary to further refine the definition of public schools as an organization. After a review of organizational research, Richard Scott defines institutions, such as schools, as organizations that are "comprised of cognitive, normative, and regulative structures which exist to promote and sustain orderly behavior" (1995). Regulative structures consist of formal written rules as well as typically unwritten codes of conduct that underlie and supplement formal rules. An essential part of an institution is the adherence to rules and codes of conduct, and the punishments which result when they are not followed (Scott, 1998). Normative structures provide a moral framework for an organization. Unlike externally enforced rules, normative structures are internalized by participants that provide a sense of what is appropriate and a commitment to common values (Scott, 1998). Finally, cognitive structures are symbolic systems and shared meanings that provide stability, order, and cultural identity for an organization. They are the beliefs, attitudes, or modes of conduct that are deeply ingrained within the participants of an organization (Scott, 1998). In a fully developed institutional system, cognitive, normative, and regulative forces interact to promote and sustain order (Scott, 1998). Though there are other ways to describe the organizational behavior and patterns of school districts, for the purpose of this dissertation, it is assumed

that school districts are open-systems with cognitive, normative, and regulative structures.

The Environment in Which Public Schools are Planned

Building on the concept of schools as open-systems, the environment in which planning occurs can be conceptualized through organizational sociology. The Resource Dependency Theory is among the various theoretical frameworks for open-systems (Johnson, 1995). The main premise of the Resource Dependency Theory is that no organization is totally self-sufficient; therefore, it must engage the outside environment for needed resources. The flow or exchange of resources creates dependencies and power differentials between organizations that have resources and organizations that need resources. These power differentials have restraining effects on an organization's actions (Johnson, 1995). Though there are other ways to describe the relationship and interactions between a school district and the environment in which it resides, for the purpose of this dissertation, it is assumed that school districts are open-systems and resource dependant.

The Purpose and Method of Planning

If school districts are considered open-systems and resource dependant, then one of the primary purposes of planning is to reduce the restraining effects of resource dependency. Furthermore, planning must occur within the cognitive, normative, and regulative structures of both the organization and the environment in which the organization resides. Based on a review of the literature, these organizational theories evidence themselves in the practices of educational facility planning.

Design professionals have developed and/or refined five broad categories of models for planning educational facilities. Though there are overlaps in philosophy and structure of the models, each of the five categories approaches the planning and design of educational facilities differently, and each result in an architectural product with distinct features. However, regardless of the differences in process or product, all five categories address the same six domains when planning educational facilities. Those domains of planning can be termed as pedagogy, demographics, politics, culture, economics, and architectural acuity. What is germane in the light of organizational theory is the fact that though broad in nature, scope, and complexity, the hundreds of variables within the six domains of planning can easily be identified as cognitive, normative, and/or regulative structures of the school district, and/or the environment in which the school district resides.

Educational Facilities as an Architectural Product

An analysis of the literature base demonstrates that educators and architects have collectively demonstrated a firm belief that an educational facility will meet the needs of learners and the community that it serves when it is a physical representation of a clearly articulated educational vision. Reviewing the literature from the architectural field, it is apparent that design professionals, regardless of their school of thought on pedagogy or architecture, predicate the planning and design of educational facilities on one of the most basic premises for twentieth century modern architectural design: form follows function. For the purpose of this dissertation, the goal of educators and design professionals is to construct schools (architectural product) which are a clear physical representation (form) of a well-articulated educational vision (function).

Limitations of Research Design

The absence of comprehensive research-based resources and materials on educational facilities planning may evidence the complexity of the environments in which American public schools are planned. The fact that public schools in the United States are being planned and constructed in a pluralistic, democratic society makes the process of facilities planning difficult to measure and evaluate.

When writing about attempts to empirically assess organizations, such as school districts, and the environment in which they reside, Richard Scott states, "attempts have not met with marked success and have raised numerous issues. First, there is the question of whether objective or subjective measures are more appropriate. Second, assessing environmental features is made more difficult by the differentiated nature of organizations" (1998). Scott further argues that institutional systems, such as schools, are comprised of cognitive, normative, and regulative structures which exist to promote and sustain orderly behavior. Depending on whether the researcher comes from an economic, political, sociological, or cognitive-cultural approach, the focus, arguments, and assumptions of the research can be very different (Scott, 1998).

When endeavoring to design this study, the difficulty of establishing a quantitative means of describing facilities planning was quickly encountered. Due to the need to simultaneously utilize nominal, ordinal, and interval data for an adequate description of educational facilities planning, standard statistical techniques were quickly dismissed as a sole means of evaluation. For example, many of the variables such as the number of students, cost per square foot, and debt load could be collected directly. Other variables such as population growth, optimal location, and the ability to raise future

revenue need to be projected. Yet others, such as those which relate to the climate and culture of a school district, require the use of latent variables as indicators of underlying constructs. As a means to map and analyze complex relationships that occur during the course of planning educational facilities, structural equation modeling was explored. However, it again became apparent that even hybrid models which allowed both directly observed and latent variables, required sample sizes so large in order to ensure validity, that quantitative analysis through structural equation modeling was not possible (Kline, 1998).

Utilizing a pure quantitative or a pure qualitative research design is not feasible due to the complex patterns, interactions, and relationships between the physical, social, pedagogical, cultural, and economic variables contained in the systems model. However, as a means to offset the weakness inherent in a pure quantitative or a pure qualitative research design, a mixed methodological approach can be employed. A mixed methodological approach offsets the weaknesses inherent within one methodology with the strengths of the other (Creswell, 2003). A sequential transformative research design is such a methodology. As defined by Creswell (2003), sequential transformative research is a mixed methodological approach which utilizes a theoretical lens (in this case, the systems model) to ground a study. A sequential transformative research design maximizes leverage over the complexity of the systems model and provides the greatest opportunity to make generalizations to other contexts and settings.

Researcher Bias

Research was conducted on the development of current practices, thought, and trends in educational facilities planning. Due to the literature base that consists of predominately experiential not experimental text, commonalties, differences, and changes in the literature base from 1990 to 2004 were analyzed. Robert Bartos (1999) describes this type of research as historical. He defines historical research as a means of "achieving a better understanding of present institutions, practices, and problems" through the "systematic search of documents and other sources that contain facts relating to the historians questions about the past" (1999). Thematic analysis and casing of text can be utilized as a vehicle to complete historical research. Both require interpretation on the part of the researcher. The researcher's bias can affect the results of these interpretations and can limit the results of a study. This researcher was involved in the planning and construction of a middle school in south central Pennsylvania. Though the research design of this study utilizes a quantitative component to minimize the impact of the researcher's personal bias on interpretation of data collected, the qualitative component of the research will be influenced by the experience of the researcher. This potential for bias is recognized prior to data collection. The goal of the research design is to limit the bias of the researcher through purposeful sampling, data triangulation, and the recognition that bias may exist.

Definitions

Architectural Product – An architectural product will be defined as a completed educational facility.

Educational Vision - A feasible and attainable picture or image of what the school district can become in the future. An educational vision helps focus attention on what is important, provides purpose, motivates staff, students, and the community and increases the sense of shared responsibility for student learning (NCREL, 2002).

Organizational Systems Theories - Organizational systems theories are a collection of ideas which define the behavior of organizations through the interactions between the organization and the environment in which the organization resides (Scott, 1998). Two broad classifications exist within organizational systems theories:

> *Closed System Frameworks* - Closed system frameworks attempt to define organizational structure and processes solely within the context of the organization (Scott, 1998).
>
> *Open System Frameworks* - Open system frameworks attempt to define organizational behavior through an examination of the organization and the environment in which it resides. In other words, the larger social, cultural, economic, demographic, political, and technological trends all influence the internal operations of the organization (Scott, 1998). Resource dependency theory is an example of an open system framework. School organizations can also be considered as an open system framework (Hoy & Miskel, 1996). For the purpose of this dissertation, schools will be conceptualized as open-framed, resource-dependent systems.

Planning Models - A systematic approach to planning and designing an educational facility. Planning models are the means by which educators and design professionals transform an educational vision into an architectural product. There are five distinct categories of planning models which includes:

Bureaucratic Planning Models - Bureaucratic planning models are characterized by a linear, top-down process that relies heavily on input from teachers and administrators. It is typically organized by discipline or pedagogical practices, places the focus on the teacher, and develops highly specialized spaces within the facility.

Long-Range or Master Planning Models - Long-range or master planning models utilize a multi-disciplinary team which crosses lines of responsibility and expertise to evaluate facilities, student demographics, and educational programs in order to identify problems, evaluate alternative solutions, and determine a sound course of action.

Community Based Planning Models - Community based planning models utilize a committee of facility stakeholders that represent the demographic and ethnographic make-up of the community. The ultimate goal of this planning model is to plan a facility which can be utilized for both educational and community purposes.

Vision Planning Models - Vision planning models examine the school as a small part of a larger learning environment. Vision planning utilizes a committee of community-wide educational stakeholders to examine and challenge traditional ideas about curriculum, utilization of staff, scheduling, assessment, facilities, and

where learning can best take place in a post-industrial society. Unlike community planning which views the educational facility as the center of the community, vision centered planning views the community itself as a diverse environment in which learning can take place.

Sustainable Planning Models - Sustainable planning models focus on how learning spaces change over time. Sustainable planning focuses on three premises. The first is that an educational facility will remain the anchor for generations of learning. The second is that educational spaces within a facility need to be efficient and flexible. The final is that building materials and architectural practices must be environmentally friendly and/or increase the life span of a facility.

Resource Dependency Theory - Resource dependency theory is based on the premise that no organization is totally self-sufficient and must engage in exchanges for needed resources. The flow or exchange of those resources creates dependencies and power differentials between organizations that have resources and organizations that need resources. These power differentials have restraining effects on an organization's actions (Johnson, 1995).

Six Domains of Planning - All educational planning models address six domains when planning educational facilities. The first five domains of planning represent the physical, social, academic, cultural, and economic characteristics of both the school district for which the facility is being planned and the community in which the facility will reside. The sixth domain encompasses all physical characteristics of the facility being planned which includes the design, layout, engineering, mechanical systems, technology,

aesthetics, and materials from which the facility will be constructed. The six domains can be termed: pedagogy, demographics, politics, climate and culture, economics, and architectural acuity. Definitions of each are as follows:

Architectural Acuity - The art and science of building in which the relationship of spaces, construction materials, structural practices, mechanical systems, technology, and aesthetics are applied by architects, engineers, and design professionals in an educational facility (infoplease.com, 2002 & American Heritage, 2000).

Culture - The cognitive and normative structures which help promote and sustain order in an organization (Scott, 1998). The cognitive and normative structures represent a system of socially acquired values, beliefs, attitudes, standards, traditions, customs, and rules of conduct which delimit the range of accepted behaviors in a school district (infoplease.com, 2002 & American Heritage, 2000).

Demographics - The vital statistics which describe both the human population and the physical characteristics of a given area or market niche (Investorwords.com, 2002). For the purpose of this dissertation, demographics will refer to the vital statistics which describe both the human population and the physical characteristics of a school district or the environment in which a school district resides.

Economics - Economics is defined by the American Heritage dictionary as economically significant financial considerations (2000). Economics encompasses all significant financial considerations of a school district which include, but are not limited to, the ability to raise revenue, manage debt load, and

structure, state and federal reimbursement rates, and support for capital improvement projects, local consumer and producer indexes, welfare and poverty rates, the number of jobs in the local economy, the unemployment rate, and the economic outlook (Investorwords.com, 2002 & infoplease.com, 2002).

Pedagogy - Pedagogy is defined by Merriam-Webster's Unabridged Dictionary as the art and science of teaching. Pedagogy will be defined as the collective instructional methods and strategies employed by educators within a school district (2002).

Politics - Politics is defined as the competition between competing interest groups or individuals for power and leadership (Merriam-Webster, 2002). Politics also refers to the methods and tactics of formal and informal groups that attempt to gain control, power, or alter the direction of a government, social unit, or organization (American Heritage, 2000). For the purpose of this dissertation, politics is defined as the methods and tactics of formal and informal groups that attempt to gain control, power, or alter the direction of a school district's capital improvement project.

CHAPTER II

REVIEW OF THE LITERATURE

Introduction

Early in the development of this study, it became evident that a theoretical construct was needed in order to deal with: (1) the complexity of the research question, (2) the void in the literature base, and (3) concerns with regard to the empirical assessment of organizations. The theoretical construct must delimit, in a systematic way, the complex patterns, interactions, and relationships between the physical, social, pedagogical, cultural, and economic components of educational facilities planning. As a result, the goal of this study is to provide a theoretical construct from which design professionals and educators can better organize, understand, communicate, analyze, and research complex cause-effect relationships that occur when educational facilities are designed and constructed in a pluralistic, democratic society.

Developing the Research Base – Phase 1

In order to develop a unifying theoretical construct on which a study could be anchored, a thematic content analysis of text has been completed. The purpose of a thematic analysis of text is the identification of major themes and ideas within a set of documents (Trochim, 2001). In this case, the documents encompass a detailed review of texts, journals, and internet sources relating to all aspects of educational facilities and educational facilities planning. To bolster this conceptual framework and provide a sound base, it is also necessary to review, analyze, apply, and synthesize literature from education, educational administration, architecture, and organizational sociology. The process of developing a conceptual framework is known as casing. Casing, as detailed in

the work of Charles C. Ragin, is a process to "slice and dice the web of human social life for the goal of testing the generality of theoretical ideas" (2000).

To discern the relationship between thematic analysis and casing, it is helpful to think of the results of thematic analysis as the "guts" of a theoretical construct, while casing provides the "skeletal system" that keeps it together. Thematic analysis of text and casing provide the framework for this study; together these methodologies are central to this work.

The process of thematic analysis of text finds its roots in the methodology of analytical induction. As described and named by Florian Znaniecki, analytical induction utilizes inductive, rather than deductive reasoning, for the purpose of developing concepts and relationships to describe phenomena (Ratcliff, 2003). The ultimate goal of analytical induction is to accurately represent the reality of the situation that is being researched. In order to accurately describe the essential characteristics of a system, Znaniecki, as cited by Ratcliff, emphasizes the importance of distinguishing essential characteristics from irrelevant details that may co-occur within a system. Equally as important, analytical induction necessitates that essential elements of a system are not described in isolation, but described as they are interrelated to one another through comprehensive, logical theories and classifications (2003).

A three phase process was utilized to complete the thematic analysis of text and process of casing. The first phase began with a thematic analysis of the literature base for the purpose of identifying and categorizing practices, patterns, and themes in educational facility planning. Through constant comparison of literature sources, and the processes

of note taking, coding, classification, reclassification, and memoing, themes in educational facility planning emerged from the literature base.

The process of thematic analysis of text was open-ended and emergent. It began with no pre-designated categories for analysis. Both the sample size and the location of sources were not restricted. The only limiting factors that were placed on any literature source was that the source was: (1) scholarly and (2) demonstrated a relationship to educational facilities planning. Notes on key concepts were taken as literature sources were identified and reviewed. Coding of text documents helped identify themes, categories, and sub-categories across the literature base. As a result, underlying concepts began to emerge from the literature base. Memoing provided consistency in comparing and contrasting literature sources across an ever-increasing sample of documents. Through repeated cycles of identification of literature sources, note taking, coding, classification of new sources, and reclassification of existing sources, memoing provided a framework for constant comparison. After the initial cycle of note taking, coding, classifying, and memoing, these processes continued simultaneously until the point of saturation. The point of saturation occurred when repeated attempts to classify new ideas and concepts in literature sources failed to identify or categorize practices in educational facility planning outside the framework which emerged through memoing.

Five classifications of planning models have been identified at the point of saturation. Each of the five categories of models approaches the planning and design of educational facilities differently, and each result in an architectural product with distinct features. The five categories of planning and design models are appropriately termed

Bureaucratic, Long-Range or Master Planning, Community Based, Vision Based, and Sustainable.

The five classifications of planning models are distinguished from one another based on nine distinct criteria. The nine criteria which emerged from within the literature used to distinguish the characteristics of each of the five categories of planning models include: (1) the primary objective of the planning process, (2) the primary function of the educational facility being planned, (3) the perspective from which planning is conducted, (4) the principal participants in the planning process, (5) the means by which support for the building project is gained, (6) primary data sets collected during the planning phase, (7) secondary data sets collected during the planning phase, (8) the focus of design specifications, and (9) the method and timing of cost analysis within the planning process. *Table 1:* A Topology of Planning Models shows each of the five classifications and the unique representation of each of the nine criteria within each model.

Table 1

Topology of Planning Models

Criteria:	Bureaucratic Planning	Long-Range or Master Planning	Community Based Planning	Vision Based Planning	Sustainable Planning
The primary objective of the planning process is to design and construct an educational facility which will...	serve the needs of the school district.	serve the needs of the school district while maximizing the efficient use of resources furnished by the community.	serve the needs of the community and the needs of the school district through the efficient use of the mutual resources of both.	create a new paradigm in the way the school district and community interact to serve the needs of learners.	be flexible, efficient, environmentally friendly, and with a life span well beyond that of normal facility.
The primary function of the educational facility being planned is to provide…	highly specialized spaces designed to support established pedagogical practices.	flexible, efficient, and cost-effective spaces designed to meet the needs of teachers, students, and the school district.	a combina-tion of specialized and flexible spaces designed to serve as a center for education and the hub of community activities.	spaces as part of a larger network of locations that provide educational experiences for learners.	an anchor within the community designed and built to serve the needs of generations of learners.
Planning is conducted from the perspective(s)...	of the needs of the school district.	of the needs of the school district and the ability of the community to provide resources for the school district.	of the needs of the community and the needs of the school district.	that the school district is a small part of a much larger learning environment.	(1) that the school district will remain an anchor in the community. (2) that educational space must be efficient and flexible. (3) that building materials and architectural practices must be environmentally friendly and/or increase the life span of a facility.

Table 1 (continued).

Criteria:	Bureaucratic Planning	Long-Range or Master Planning	Community Based Planning	Vision Based Planning	Sustainable Planning
The principal participants in the planning process include…	administrators, teachers, and members of the school board.	a multi-disciplinary team of educational stakeholders from the school district and from the community.	a community -based team of educators, citizens and civic leaders responsible for providing public spaces and services. The team represents the demographic and ethnographic make-up of the community.	a team of visionary educational stakeholders from the school district and the community.	a multi-disciplinary team of educational stake-holders who can gain consensus to build a flexible, environmental friendly facility, with greater up-front costs, but less expendi-tures over the extended life cycle of the facility.
Support for the building project is gained…	from within the school district.	through the collection of objective data culminating in a detailed plan to maximize the efficient use of school district and community resources. The objective data is bolstered by ethnographic data.	by planning and designing a facility through a community-based team of citizens and civic leaders, and through a plan for public organizations to efficiently share and consume resources.	by creating strong links between the school district, the community, families, businesses, industries, and learning, by developing new educational paradigms. Planners capitalize on previously unidentified community resources to support educational programs.	by developing a plan to build a flexible, environmental friendly facility, which will serve as a durable symbol of the community's commitment to education and will cost less to build and maintain when expenses are calculated over the extended life of the facility.

Table 1 (continued).

Criteria:	Bureaucratic Planning	Long-Range or Master Planning	Community Based Planning	Vision Based Planning	Sustainable Planning
Primary data sets collected during the planning phase include...	quantitative data on the needs of the school district.	quantitative data on the needs of the school district and on the community that provides resources for the school district.	quantitative and ethnographic data on the needs of the school district, community, and community organizations.	quantitative and ethnographic data on the dynamics of community, family, work, and learning. Quantitative data on educational resources throughout the community.	quantitative data on the present needs, expected growth, and future needs of the school district and on the community.
Secondary data sets collected during the planning phase include...	quantitative data on the resources that the community can provide.	ethnographic information on the school district and the community.	quantitative data on resources which may be common to the school district, community, and community organizations.	quantitative data on the needs of the school district and needs of the community.	quantitative data on environmental impact of decisions, architectural practices, and the quality and durability of different building materials.
Design specifications ...	focus on departmentalization, specialization, or pedagogical practices.	focus on the relationships between student demographics, educational programs, and space.	focus on the needs of the community and the needs of the school district.	focus on where learning can best take place.	focus on how the need for space and the type of space will change over time. Accommodates all foreseeable changes.

Table 1 (continued).

Criteria:	Bureaucratic Planning	Long-Range or Master Planning	Community Based Planning	Vision Based Planning	Sustainable Planning
Cost analysis is...	completed early in the process and is an important factor in the development of education specifications.	completed as alternative solutions are developed and analyzed.	based on how efficiently organizations serving the public can collectively share and consume resources.	completed as new educational paradigms are evaluated.	based on "Life-Cycle Costing". Life cycle costing is an analysis of the total cost of facility over the length of ownership.

Developing the Research Base – Phase 2

Two distinct characteristics mark the second phase of thematic analysis of text and casing. First, a thematic analysis of text examines commonalities and differences across the five classifications of planning models. As in the first phase, the process was open-ended and emergent. It began with no pre-designated themes, patterns, or categories, and no limit on the quantity of identifiable relevant patterns. Second, as relevant patterns and themes emerged across the topology of planning models, and in order to generate sound suppositions for a framework on which this study could be built, it was necessary to review and analyze literature from education, educational administration, architecture, and organizational sociology.

The efforts of this phase resulted in the development of six interdependent suppositions. These six suppositions are the critical foundation on which the systems model is built and through which a framework for inquiry manifests itself. It is important to note that the six suppositions are consistent with the assumptions made regarding: (1) the structure and nature of the organization for which planning occurs, (2) the

environment in which planning takes place, (3) the purpose and method for planning, and (4) the architectural product which results from the planning. These four assumptions are detailed in chapter one of this study. The six suppositions developed from the first two phases of analysis are as follows:

Supposition 1

Educators and design professionals, though primarily experiential in nature, have a solid body of knowledge pertaining to pedagogy and the planning of educational facilities.

Supposition 2

Using a defined body of knowledge, educators and design professionals have demonstrated the ability to design and construct educational facilities that meet the needs of children and the communities they serve.

Supposition 3

In order to design and construct educational facilities that meet the needs of children and communities, educators and design professionals have developed and/or refined five broad categories of educational facilities planning models. These five categories of planning models can be suitably termed Bureaucratic, Long-Range or Master Planning, Community Based, Vision Based, and Sustainable.

Supposition 4

An examination of the five categories of planning models demonstrates that each category of models approaches the planning and design of educational facilities differently and each results in an architectural product with distinct features. However, all five categories of planning models are grounded in the same basic design principle,

and regardless of process or product, they all strive to reach a common goal of: "form following function." This concept, coined by pioneering architect Louis Sullivan and further refined by renowned architect Frank Lloyd Wright, became the basis for twentieth century modern design (Whole Building Design Guide [WBDG], 2002). In terms of educational facility planning, this design concept is evident in the fact that regardless of the school of thought on pedagogical practices, planning, or facility design, educators and design professionals consistently demonstrate the belief that if an educational facility is a clear physical representation (form) of a well articulated educational vision (function), the facility will meet the needs of those it serves.

Supposition 5

In order to design and construct educational facilities which are a physical representation of a well articulated educational vision, all planning models, to varying degrees, endeavor to address six distinct domains of planning. These six domains of planning are represented by quantitative and qualitative variables which are intimately linked and interdependent. In other words, when something occurs within one domain, there is an impact on the other five. The six domains of planning which are common in all five categories of the planning model encompass the physical, social, academic, cultural, and economic characteristics of the environments which the facility will serve, as well as all physical characteristics of the facility that is being planned. The six domains can be appropriately termed: pedagogy, demographics, politics, culture, economics, and architectural acuity.

Supposition 6

The literature denotes a clear shift away from utilizing the six domains of planning in a manner which focuses primarily on the relationship between educational programs and the educational facility, to the utilization of the six domains of planning in a manner which focuses on both the relationship between educational programs and the educational facility, and the relationship between the educational facility and the environment in which it will reside. As Hoy and Miskel reason, "Because school organizations are conceptualized as part of a larger environment, an argument can be made that anything that happens in the larger environment may affect the school and vice versa" (Hoy & Miskel, 1996). In other words, it has been recognized that an educational facility, and the teaching and learning which occurs within that facility, have a dynamic impact on the larger environment in which a facility resides. Likewise, the dynamics of the larger environment impact both an educational facility and the teaching and learning which occurs within that facility.

These six suppositions are melded together and represented graphically in the concept map labeled: *Figure 1:* Concept Map: Educational Facilities Planning. An Analysis and Synthesis of Literature From Education, Educational Administration, Architecture, and Organizational Sociology.

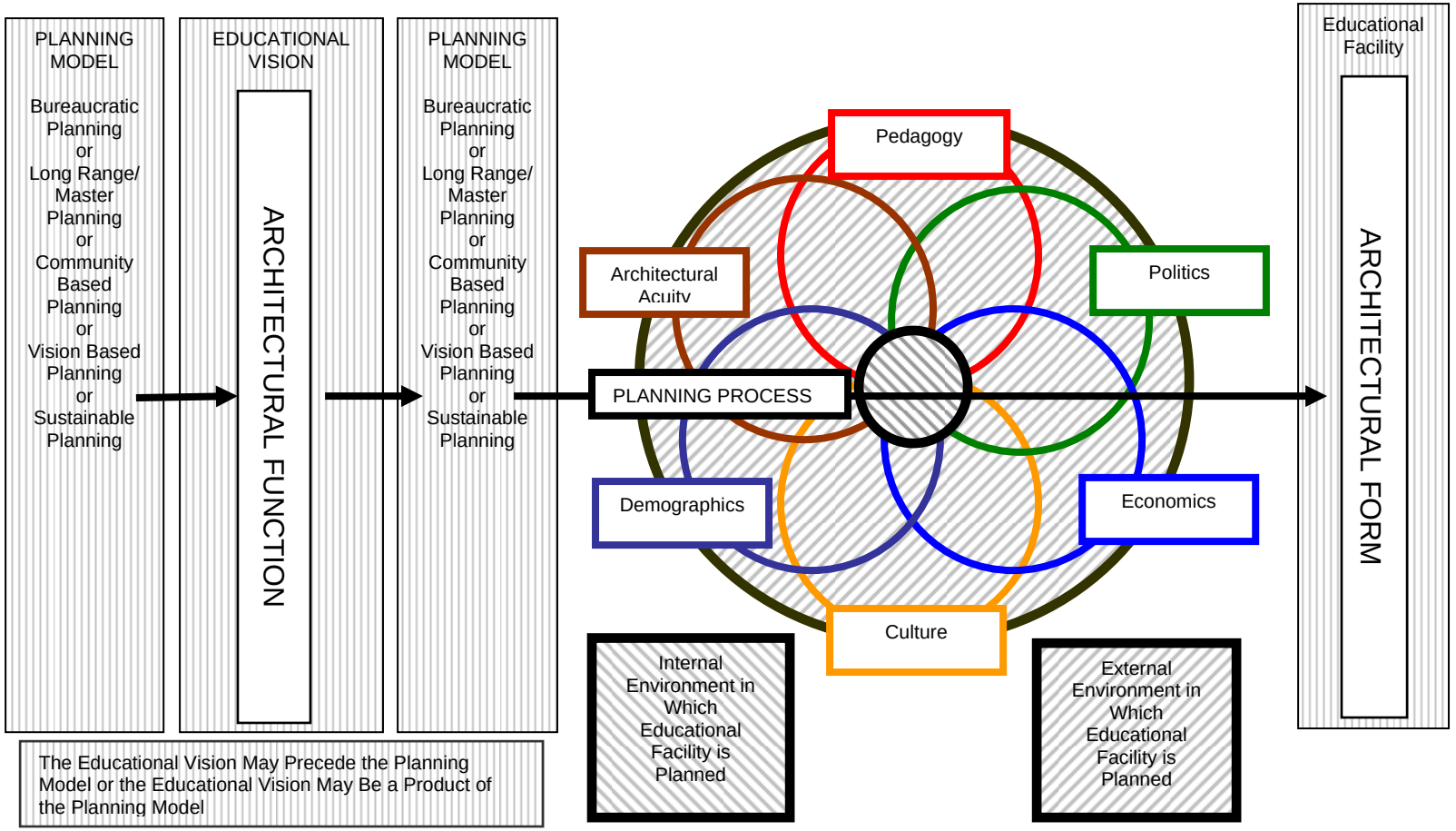

Figure 1. Concept Map: Educational Facilities Planning. An Analysis and Synthesis of Literature From Education, Educational Administration, Architecture, and Organizational Sociology

Though at first, the concept map and the suppositions on which it is based may seem complicated, for those who participate as actors in the public school arena, a careful examination of *figure 1* portrays a rather common sense description of the process of educational facilities planning in public education in the United States. Examining the model from left to right, on the left side of the diagram there are three rectangles. The middle rectangle represents the Educational Vision. On either side of the Educational Vision are rectangles which represent the five categories of learning models. This is due to the fact that the educational vision may precede the selection of a planning model, or it may be a product of the planning model. On the far right of the diagram, the rectangle represents the Educational Facility. In order to move from the educational vision to an educational facility, the planning process (i.e. the implementation of a planning model) acts as the necessary catalyst. True to the basic 21st century design premise of Sullivan and Wright, the planning process connects the theoretical world of architectural function to the physical world of architectural form. The model shows form following function.

Next, the planning process moves through the six interlocking rings labeled *pedagogy, demographics, politics, culture, economics, and architectural acuity*. These six intimately linked and interdependent rings are domains of quantitative and qualitative variables which all planning models, to varying degrees, endeavor to manage.
Since the planning of an educational facility cannot occur in a vacuum, the small circle in the center of the diagram with hash marks left to right represent the internal environment of the school district. Shown with the hash marks right to left, the large circle which encases the six domains of planning, and the internal environment of the school district represents the larger environment in which the facility resides. It is important to note that

the six interlocking rings labeled *pedagogy, demographics, politics, culture, economics, and architectural acuity* cross the line between the internal environment of the school district and the larger environment in which the school district resides. This represents the concept that the six domains of planning are functions of both the internal environment and the external environment.

Developing the Research Base – Phase 3

The first two phases of this process utilize a thematic analysis of the literature base to provide relevant themes and patterns within educational facility planning. These themes and patterns are supported through a review and analysis of related literature from education, educational administration, architecture, and organizational sociology. In order to delimit in a systematic way, the complex patterns, interactions, and relationships between educational facility planning, the structure and nature of schools as organizations, and the pluralistic, democratic environment in which schools in the United States are planned, the final phase of the review of the literature utilizes the process of casing. The most distinguishing feature of this third and final phase is that of synthesis.

Upon completion of the second phase of analysis, it is evident that it's necessary to develop and define the relationships between the internal environment of the school district and the external environment in which the school district resides. Fortunately, it is not a new theoretical framework to guide and define organizational behavior through an examination of the organization in relation to the environment in which it resides. Following World War II, attempts to define organizational behavior through interactions between the organization and the environment emerged as a collection of ideas collectively known as open systems theories (Scott, 1998). Unlike closed system theories

which attempt to define organizational structure and processes solely within the context of the organization, open system frameworks attempt to define organizational behavior through an examination of the organization and the environment in which it resides (Scott, 1998). In open systems theories, organizations are perceived as being embedded in an environment, and import resources from the environment to export products and services to the environment. In drawing a conclusion with regard to schools as open systems, Hoy and Miskel argue that "the larger social, cultural, economic, demographic, political, and technological trends all influence the internal operations of schools and districts. Because school organizations are conceptualized as part of a larger environment, an argument can be made that anything that happens in the larger environment may affect the school and vice versa" (1996).

Among the different theoretical frameworks for open systems is the Resource Dependency Theory. The main premise of this theory is that no organization is totally self-sufficient and must engage in exchanges within the external environment for necessary resources. The flow or exchange of resources creates dependencies and power differentials between organizations and the environments in which they reside. These power differentials have restraining effects on an organization's actions (Johnson, 1995). There is never a time when this is more evident in an educational setting as when a school district faces large capital improvement costs.

If the theory of resource dependency is applied as a means to define and frame the relationship between a school district and the environment in which it resides during a large capital improvement project, the following statement can be made:

> During any large capital improvement project, the flow or exchange of resources between the larger environment and a school district creates dependencies and power differentials that have a restraining effect on a school district's actions.

This statement, drawn from a synthesis of the literature from educational facility planning, educational administration, and organizational sociology, becomes the seventh supposition and the first supposition necessary for the casing of a systems model.

In light of the seventh supposition, examination the first six suppositions as represented by the concept map (*figure 1.*), immediately raises the question: Where can the restraining effects of resource dependency manifest themselves? The concept map consists of five components; moving left to right they are: (1) the Five Categories of Planning Models, (2) the Educational Vision, (3) the Six Domains of Planning, (4) the Boundaries of the Internal and External Environments, and (5) the Educational Facility. The restraining effects of resource dependency will not manifest themselves in the boundaries of the internal and external environments. They are abstract political, economic, cultural, and social boundaries over which resources flow. The five categories of planning models are categories of methods used to identify resources and reduce the effects of resource dependency. The two remaining components of the model are the educational vision and the educational facility. In architectural terms, the educational vision and the educational facility represent the form and the function of the educational facility. From the beginning of the planning process, regardless of the planning model, the educational vision (the function) may be tempered by the resources that are available in the internal and external environments, and more importantly, the resources which are allowed to flow between the two. Consequently, based on the same logic, the

construction of the facility (the form) will also be tempered by the resources that are available in the internal and external environments, and the resources which are allowed to flow between them. Therefore, the eighth supposition in this construct and the second in the process of casing the systems model states that the restraining effects of resource dependency can impede the articulation of an educational vision and/or impede an educational facility from being constructed as a physical representation of an educational vision.

Examining the group of six suppositions generated from the thematic analysis of the literature, and the seventh and eighth suppositions generated from casing, a ninth supposition can be drawn. This is the final supposition and the third supposition necessary for casing the systems model. When drawing this supposition, it is important to recall that through the analysis of the literature, the five categories of planning models all approach the planning and design of educational facilities differently and each result in an architectural product with distinct features. However, all five categories of planning models strive to design and construct facilities which are a physical representation of a well-articulated educational vision by addressing the same six domains of planning. Therefore, the ninth supposition in this theoretical construct is that the variables which design professionals attempt to control in order to reduce the restraining effects of resource dependency are represented within six domains of planning. Consistent with the assumption that school districts are open systems with cognitive, normative, and regulative structures, this supposition can also be stated as such: In order to reduce the restraining effects of resource dependency, design professionals attempt to control cognitive, normative, and regulative structures of the

organization and the environment by managing variables represented within and across six domains of planning.

Again, as with the first six suppositions generated from the thematic analysis of text, the final three suppositions generated through casing are consistent with the four basic assumptions with regard to: (1) the structure and nature of the organization for which planning occurs, (2) the environment in which planning takes place, (3) the purpose and method for planning, and (4) the architectural product which results from the planning. Equally as important, these nine suppositions are not contradictory to one another. In fact, systematically, each supposition builds on the others to provide a theoretical construct which delimits the complex patterns, interactions, and relationships between the physical, social, pedagogical, cultural, and economic components of educational facilities planning in a pluralistic, democratic environment. A summary of the nine suppositions is as follows:

Supposition 1

Educators and design professionals, though primarily experiential in nature, have a solid body of knowledge pertaining to pedagogy and the planning of educational facilities.

Supposition 2

Using their knowledge base, educators and design professionals have demonstrated the ability to design and construct educational facilities that meet the needs of children and the communities they serve.

Supposition 3

In order to design and construct educational facilities that meet the needs of children and the communities they serve, educators and design professionals have developed and/or refined five broad categories of educational facilities planning models. These five categories of planning models can be suitably termed *Bureaucratic, Long-Range or Master Planning, Community Based, Vision Based, and Sustainable.*

Supposition 4

Regardless of the school of thought on pedagogical practices, planning, or facility design, educators and design professionals consistently demonstrate the belief that if an educational facility is a clear, physical representation (form) of a well articulated educational vision (function), the facility will meet the needs of those it serves.

Supposition 5

In order to design and construct educational facilities which are a physical representation of a well articulated educational vision, all planning models, to varying degrees, endeavor to address six distinct domains of planning. These six domains of planning are represented by quantitative and qualitative variables which are intimately linked and interdependent. The six domains can be appropriately termed: *pedagogy, demographics, politics, culture, economics, and architectural acuity.*

Supposition 6

An educational facility and the teaching and learning which occur within have a dynamic impact on the larger environment in which a facility resides. Likewise, the dynamics of the larger environment impact both an educational facility and the teaching and learning which occurs within.

Supposition 7

During any large capital improvement project, the flow or exchange of resources between the larger environment and a school district creates dependencies and power differentials that have a restraining effect on a school district's actions.

Supposition 8

The restraining effects of resource dependency can impede the articulation of an educational vision and/or impede an educational facility from becoming a physical representation of an educational vision.

Supposition 9

The variables which design professionals attempt to control in order to reduce the restraining effects of resource dependency are represented within six domains of planning. Consistent with the assumption that school districts are open systems with cognitive, normative, and regulative structures, another way to state this supposition is: In order to reduce the restraining effects of resource dependency, design professionals attempt to understand and manage the cognitive, normative, and regulative structures of the school district and the environment by managing variables represented within six domains of planning.

All nine suppositions have been combined graphically into *figure 2:* Educational Facilities Planning: A Systems Model.

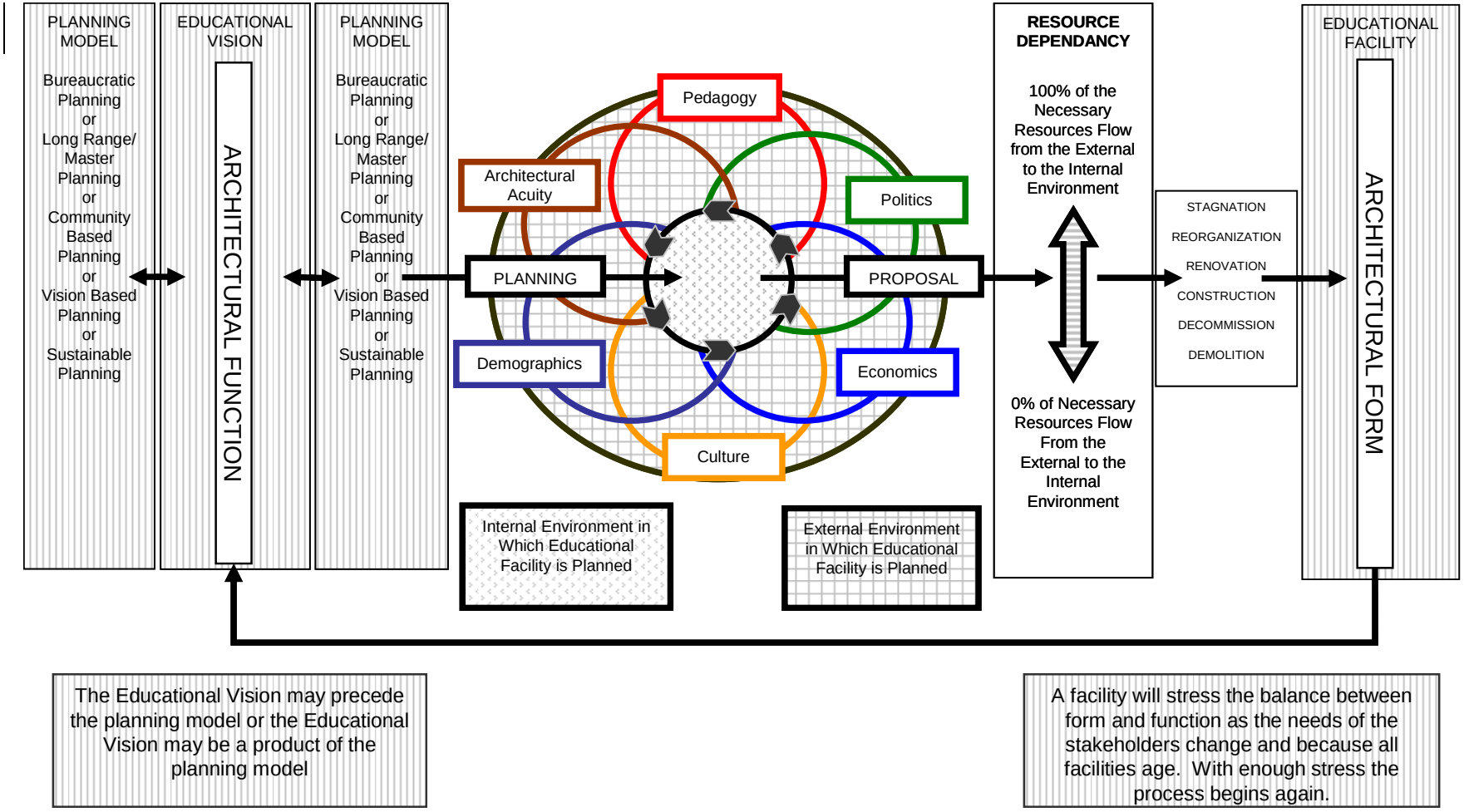

Figure 2. Educational Facilities Planning: A Systems Model

At first examination, *Figure 2*: Educational Facilities Planning: A Systems Model may seem complicated. However, for those who participate as actors in the public school arena, a careful examination of *figure 2* portrays a rather common sense description of the process of educational facilities planning in public education in the United States. On the left side of the diagram there are three rectangles. The middle rectangle represents the Educational Vision. On either side of the educational vision are rectangles which represent the five categories of learning models. This is due to the fact that the educational vision may precede the selection of a planning model or it may be a product of the planning model.

On the far right of the diagram, the rectangle represents the Educational Facility. In order to move from the educational vision to an educational facility, the planning process (i.e. the implementation of a planning model) acts as the necessary catalyst. True to the basic 21st century design premise of Sullivan and Wright, the planning process connects the theoretical world of architectural function to the physical world of architectural form. The model shows form following function.

Next, the planning process moves through the six interlocking rings labeled *pedagogy, demographics, politics, culture, economics, and architectural acuity*. These six intimately linked and interdependent rings are domains of quantitative and qualitative variables which all planning models endeavor to address to varying degrees.

Since the planning of an educational facility cannot occur in a vacuum, the small circle in the center with hash marks left to right represents the internal environment of the school district. Shown with a hash marks right to left, the large circle which encases the six domains of planning and the internal environment of the school district represents the

larger environment in which the facility resides. It is important to note that the six interlocking rings labeled *pedagogy, demographics, politics, culture, economics, and architectural acuity* cross the line between the internal environment of the school district and the larger environment in which the school district resides. This represents the concept that the six domains of planning are functions of both the internal environment and the external environment. The arrows around the circle separating the internal and external environment demonstrate the interaction of variables across the six domains of planning. That interaction of variables occurs in both the internal and external environments.

The arrow representing the planning process leaves the six domains of planning as a "Proposal" for how educational facilities of the district can become physical representations of the educational vision. Depending on the success to which educators and design professionals identify and manage the variables within and across the six domains of planning, based on the premise of resource dependency the system model establishes three possible resulting outcomes: (1) one hundred percent of the necessary resources flow from the external environment to the internal environment. In this scenario, there is no restraining effects which are manifested in the articulation of an educational vision or the degree to which the educational facility is a physical representation of that vision, (2) no resources are allowed to flow between the external environment and the internal environment. This represents the extreme opposite of the first scenario; facility changes are fully restrained, and (3) the resources allocated are limited in some way. In this scenario, some, but not all of the facility changes are possible.

Depending on the resources that become available to facility planners, there are five possible courses of actions that are available. These actions may happen in isolation or in combination and are as follows: (1) “Stagnation”-- In this case, nothing is done, and everything is status quo. (2) “Renovation”-- In this case, existing educational facilities are refurbished. (3) “Construction”-- In this case, new facilities are constructed or additions to existing facilities are completed (4) “Decommission” -- Facilities which are decommissioned no longer serve students. They may be converted to administrative offices, sold, or left vacant for future use by the school district. (5) “Demolition” -- In this situation, the facility is destroyed. As stated, these options can be exercised in combination. For example, a new school may be constructed and the old school may be decommissioned, but refurbished to serve as district offices.

It is important to recognize that the model is dynamic and represents an environment which is always in a state of change. Depending on the environment and assets of the school district, change may come slowly or it may come quickly, but change is inevitable. Change is assured by the simple fact that all facilities age. It is change that creates an imbalance between the educational vision of the school district and the degree to which the educational facilities are a physical representation of that vision. The central research question of this study then asks:

> If educators and design professionals have demonstrated the ability to design and construct educational facilities that meet the needs of children and the communities they serve, what are the variables that intervene when they fail to do so?

As established by the systems model, the answer to this question would state:

> Educational facilities which fail to meet the needs of children and the communities they serve are the result of educators and design professionals who fail to reduce the restraining effects of resource dependency through the identification and management of some or all of the quantitative and qualitative variables represented within six domains of planning.

The validity of the answer established by the systems model and in turn, the validity of the system model itself, is the basis for this study.

CHAPTER III

METHODOLOGY

Research Tradition

Prior to describing the research design used to determine the validity of the systems model (*figure 2*), it is important to establish the epistemological foundation from which research will be conducted. Creswell's "Elements of Inquiry" and "Alternative Knowledge Claim Positions" are utilized to determine the proper epistemological foundation for this study (Creswell, 2003). These two hierarchies are utilized to consider the traditions of Advocacy/Participatory, Postpositivism, Constructivism, and Pragmatism.

In the advocacy/participatory tradition, inquiry must be intertwined with politics and a political agenda. The goal of research in this tradition is to promote meaningful change in the lives of the participants, institutions, or the researcher. This is simply not the goal to which this research strives.

The postpositivism tradition, quantitative in nature, requires that researchers are attempting to establish objective, measurable "truth statements" in order to explain a phenomena (Creswell, 2003). As previously stated, the complex patterns, interactions, and relationships of variables during the planning of an educational facility require the simultaneous examination of ordinal, ratio, and nominal variables. For a quantitative researcher, this will raise questions of validity and reliability.

During an initial inspection, constructivism appears to be a viable research tradition for this study. According to Creswell, the constructivist researcher seeks to understand the complexity and dynamics of the phenomena being studied rather than

narrowing his/her understanding into a few categories or ideas (Creswell, 2003). This understanding, however, is developed through the participant's experiences, perspectives, and explanations of the phenomena and can be influenced by the researcher's experiences and bias. This type of research is primarily qualitative, largely subjective and inductive by nature, and as a result excludes numerical descriptors and explanations of causal relationships through statistical probabilities. Since the purpose of this study is to attempt to develop a platform from which design professionals and educators can better organize, understand, communicate, analyze, and research complex cause-effect relationships operating when educational facilities are being designed and built, an absolute prerequisite for that platform must be that it can be generalized or transferred to other contexts or settings. Basing this study on participant's experiences, perspectives, and explanations limits the degree to which the results of the research can be generalized or transferred to other contexts or settings. Constructivism, by design, seeks to examine elements of phenomena which are both broad and situation specific. In order to overcome this obstacle and make the study more transferable, it would be necessary to completely describe the attributes of the school districts being studied and how those attributes affect the study as a whole. This task could become very arduous while limiting the degree to which the results could be confirmed or corroborated by others.

In the pragmatic tradition of research, the truth of a proposition is measured by its correspondence with experimental results and by its practical outcome (Columbia, 2001). In this light, pragmatic research is problem-centered and is always conducted in a social, historical, political and other context. Central to pragmatic inquiry is the research problem, not the research methodology. Pragmatic inquiry frees the researcher to select

from methods, techniques and procedures that maximizes the quality of experimental results and the practical benefits of the study (Creswell, 2003).

Even a cursory review of the preconditions for pragmatic research draws an immediate and strong parallel with the purpose of this study. As stated, the goal of this study is to develop and provide a construct from which design professionals and educators can better organize, understand, communicate, analyze, and research complex cause-effect relationships that occur when educational facilities are designed and constructed in a pluralistic, democratic society. This goal, by its very nature, is pragmatic and therefore requires that the validity of the systems model being examined be measured by its experimental results and by the practicality of its use.

A pragmatic view of educational facilities planning, like the systems model, assumes that educational facilities planning in a democratic society arise out of actions, situations, and consequences rather than antecedent conditions. For these reasons, this study and the selection of the research design will be grounded in the pragmatic tradition.

Selection of Research Design

Equally as important to establishing the epistemological foundation from which this study is to be conducted are the principal justifications for the selection of a research design within the pragmatic tradition. As previously discussed, the complexity of the environment in which public schools are planned may account for the void in the literature base. However, the absence of research and the record expenditures on public schools emphasize the need for a construct from which design professionals and educators can better organize, understand, communicate, analyze, and research complex cause-effect relationships that occur when educational facilities are designed and

constructed in a pluralistic, democratic society. From the literature review it is clear that developing such a construct is a difficult task. As previously cited, Richard Scott's review of studies in organizational sociology indicates that empirically assessing organizations is difficult. In his work, he suggests three major reasons for these findings. First, there is the concern whether objective or subjective measures are more appropriate for assessing organizations. Second, he indicates that assessing environmental features is made more difficult by the differentiated nature of organizations. Finally, he raises the issue that the focus, arguments, and assumptions of the research can be very different if researcher comes from an economic, political, sociological, or cognitive-cultural approach (Scott, 1998). Coinciding with the development of the systems model and consistent with the concerns raised by Scott, four critical considerations arise regarding the methodology of the research design for this study. These four considerations are as follows:

> (1) The complex patterns, interactions, and relationships between the physical, social, pedagogical, cultural, and economic components of the environments in which educational facilities planning requires the simultaneous examination of both quantitative and qualitative variables. This consideration is consistent with the assumption that schools are open systems with cognitive, normative, and regulative structures and the supposition that design professionals attempt to control these structures by managing variables represented within six domains of planning. Therefore, in order to develop and validate a comprehensive systems model, the simultaneous examination of both quantitative and qualitative

variables which represent cognitive, normative, and regulative structures within the six domains of planning is an absolute prerequisite.

(2) The exclusive use of quantitative methods with ordinal, ratio, and nominal variables quickly raise questions of validity and reliability. Variables such as enrollment and the cost per square foot are easily calculated. Other variables, relating to the culture and politics within a school district, require the use of latent variables as indicators of underlying constructs. Finally, other variables like pedagogical practices and the clarity of an educational vision can only be identified and ranked on a Likert or summative scale. Structural equation modeling is explored as a means to map and analyze complex relationships that occur during the planning of educational facilities. However, it again becomes apparent that even the most sophisticated models which allow a simultaneous examination of ordinal, ratio, and nominal variables require sample sizes so large in order to ensure validity that analysis through structural equation modeling is not possible (Kline, 1998).

(3) The use of qualitative methods allows the application and synthesis of ideas for the purpose of structuring and delimiting complex descriptions of our world. Empirical research can be perceived as culminating in theoretically structured descriptions (Ragin, 2000). The exclusive use of qualitative methods, however, excludes numerical descriptors and explanations of causal relationships through statistical probabilities.

(4) The use of concurrent quantitative and qualitative data collection is a means to offset the weakness inherent within one method with the strengths of the other

method and maximize the opportunity to make generalizations to other contexts or settings (Creswell, 2003).

Due to these reasons, it is evident that a pure quantitative or a pure qualitative research design cannot be utilized. The application of a mixed methodological approach, however, offsets the weakness inherent within one method with the strengths of the other method (Creswell, 2003). Furthermore, a mixed methodological approach can address many of the issues in organizational sociology regarding empirically assessing organizations (Scott, 1998). For these reasons, this study employs a sequential transformative research design. As defined by Creswell (2003), sequential transformative research is a mixed methodological approach which utilizes a theoretical lens (in this case, the systems model) to ground a study. A sequential transformative research design maximizes leverage over the complexity of the systems model and provides the greatest opportunity to make generalizations to other contexts and settings.

Research Parameters

As stated earlier, this study is an attempt to develop and determine the validity of a unifying theoretical construct from which design professionals and educators can better organize, understand, analyze, communicate, and research complex cause-effect relationships that occur when educational facilities are designed and constructed. In order to meet this goal, the research design strives to: (1) identify and describe complicated social, cultural, political, and economic mechanisms at work when public schools are designed and constructed in a pluralistic democratic society, (2) understand the relationships between those mechanisms and educational facility planning, and (3) validate a systems model which formalizes causal inferences between social, cultural,

political, and economic mechanisms, educational facility planning, and educational facilities.

It is recognized that the complexity of the phenomenon being studied, the difficulty in establishing valid causal inferences in social research of this nature, and the need for high generalizability creates a daunting challenge for any research design. Nonetheless, this study attempts to utilize a research design that is creative, multi-layered, and grounded in sound methodological practices.

Utilizing the systems model as a lens, the research design of this study conducts the investigation in two sequential stages. The first phase of the investigation utilizes quantitative methods to describe the sample population and examine, through univariate analysis and multiple regression, the validity of the core components of the systems model and the systems model as a whole. The second phase of the investigation utilizes qualitative methods to complete a comparative analysis of four purposefully selected case studies, and for the purpose of examining the validity of core components of the systems model and the systems model as a whole.

By comparing and contrasting the results of two distinct methodologies, the research design provides the greatest opportunity to: (1) describe complicated social, cultural, political, and economic mechanisms at work when public schools are designed and constructed in a pluralistic democratic society, (2) elaborate on the relationships between those mechanisms and educational facility planning, and (3) cross-validate, through quantitative and qualitative methods, a systems model which formalizes causal inferences between social, cultural, political, and economic mechanisms, educational

facility planning, and educational facilities. The research design is represented graphically in *figure 3.*

Research Design – Phase One

Target Population and the Survey Instrument

The investigation into the validity of the systems model will utilize all middle schools constructed and opened in the Commonwealth of Pennsylvania between 1992 and 2003. During this time period, the Pennsylvania Department of Education (PDE) reports that thirty-six middle school facilities were constructed (2004). This twelve year time period allows each of the schools in the population to have been operating for a minimum of two years prior to the study. At the same time, it does not extend so far back that the majority of educators, architects, design professionals, artifacts, and records have been lost through attrition. The investigation will begin by collecting data, on each of the thirty-six schools, through the use of a survey instrument. Like the research design, the survey was constructed using the systems model as a framework. The 65-question survey instrument was developed by the researcher and is broken into three components (see appendix 1).

The first component of the survey collects basic demographic information for purposes of description and to assist in the selection of four schools for qualitative comparative analysis. To accomplish these goals, demographic data on the educators in each school will be examined to determine: (1) years of service in the school district, (2) years of service in the facility under study, and (3) the number of educators within each school involved in the planning process (see appendix 1 questions 1-5).

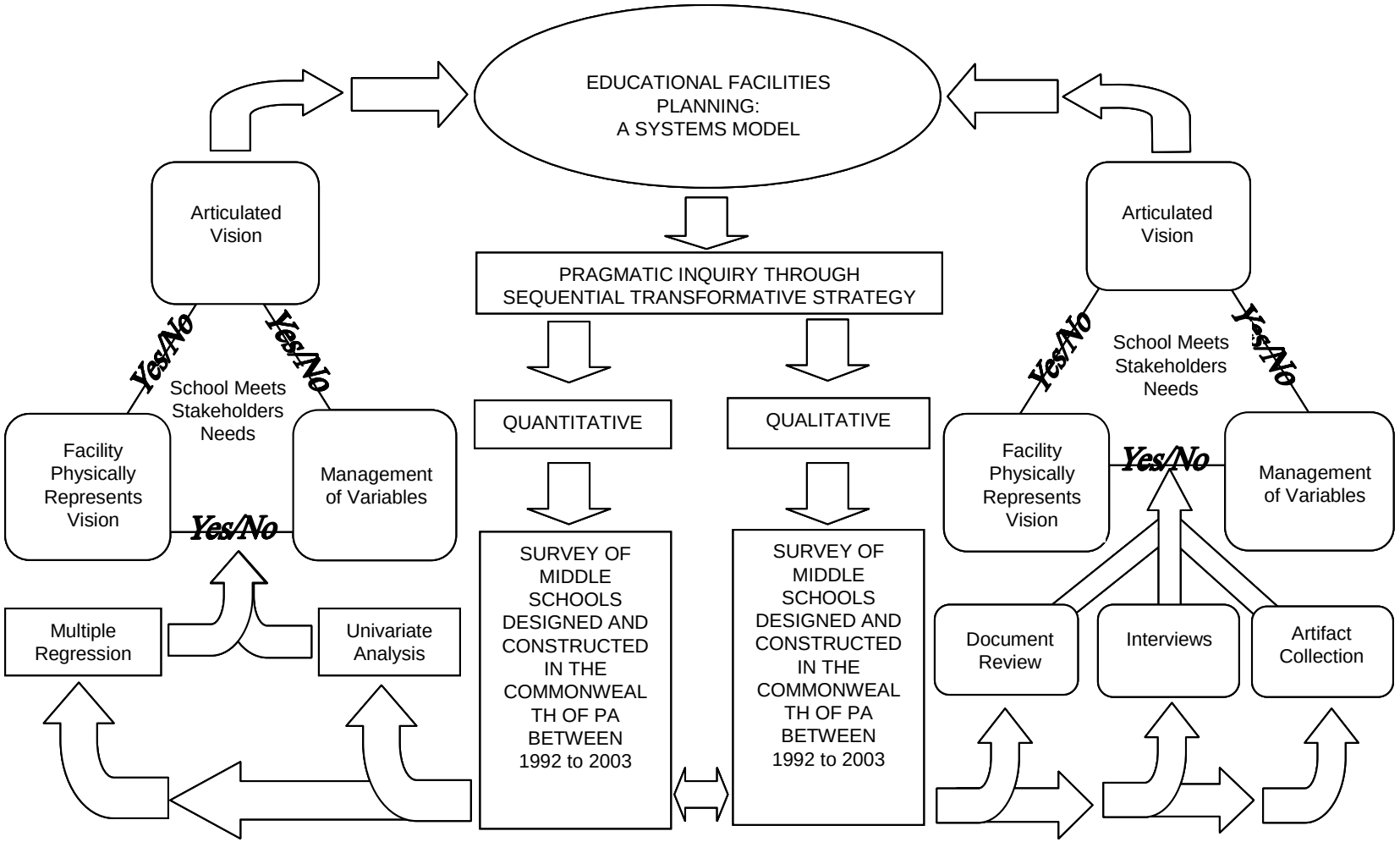

Figure 3. Research Design.

The second component of the survey utilizes a Lickert scale to determine the degree to which educators in each school believe: (1) their school has an articulated vision, (2) those responsible for planning their facility understood and managed variables within each of the six domains of planning, (3) those responsible for planning their facility understood and managed the interaction of variables across the six domains of planning, (4) their facility is a physical representation of their educational vision and (5) their facility meets the needs of the stakeholders (see appendix 1, questions 6-59).

The third section of the survey asks educators to respond to a series of statements designed to determine if, since the opening of the facility, there have been any changes: (1) in teaching practices, (2) size, composition or needs of the student body, and/or (3) the economics, politics, or culture of the school district or community. The section also determines if respondents believe that if since the facility opened, if it has been used as intended by the designers (see appendix 1, questions 60-65).

The content validity of the survey is established by three methods. First, the survey questions are grounded in the definitions formulated by the systems model. Second, two facility planning experts and a superintendent of schools with a background in public school renovation and new construction review the instrument. Finally, the instrument is field-tested by a forty-five member middle school faculty and a five member administrative team from the researcher's school district. Though the middle school falls within the parameters for inclusion in the study, due to the relationship of the researcher with the middle school and the school district, it is not considered part of the population. This is due to the potential for researcher bias during qualitative analysis.

The educators are, however, appropriate for establishing the content validity of the survey instrument.

Determining the Validity of the Systems Model through Univariate Analysis and Multiple Regression

The quantitative phase of this investigation, through univariate analysis and multiple regression, will seek the answers to five critical research questions. Each of these questions represents a critical component of the Systems Model for Educational Facility Planning and collectively represents the model as a whole. Through an examination of the individual components and the model as a whole, a determination of soundness of can be estimated. The five critical research questions ask: (1) Does the school have an articulated educational vision? (2) Did the design professionals and educators manage variables within the six domains of planning when designing the facility? (3) Did the design professionals and educators manage the interaction of variables across the six domains of planning when designing the facility? (4) Is the facility a physical representation of that vision? and (5) Does the educational facility meet the needs of the stakeholders?

Collectively these five questions examine two primary suppositions of the Systems Model for Educational Facilities Planning. Those suppositions state: (1) If a school has an educational vision and if those responsible for designing and constructing the facility manage the interaction of economic, political, and social forces as well as the needs of teachers and students, then using the resources available, design professionals and educators can design and construct an educational facility that is a physical representation of an educational vision and (2) If an educational facility is a physical

representation of an educational vision, it will meet the needs of its stakeholders.

Univariate analysis will be utilized to examine the distributional properties of central tendencies of educators' responses of: (1) the degree to which they believe their school has an educational vision, (2) the degree to which they believe those responsible for planning their facility understood variables within the six domains of planning, (3) the degree to which they believe those responsible for planning their facility understood the interaction of variables across the six domains of planning, and (4) the degree to they believe their facility is a physical representation of the school's educational vision. The examination of central tendencies will be completed in order to: (1) develop a thorough description of the responses of each variable being examined; (2) provide a descriptive analysis of the convergence and divergence of central tendencies across different variables; and (3) as means to determine the appropriateness of multivariate analysis.

In order to determine the validity of the core components of the Systems Model for Educational Facility and the model as a whole, a multiple regression analysis will be conducted. The degree to which educators report that their facility is a physical representation of the schools educational vision will be identified as the dependent variable. The degree educators report their school has an educational vision, facility planners understood the six domains of planning, and facility planners understood the interaction of the variables across the six domains will be entered as the independent variables.

A second univariate analysis will examine the distributional properties of central tendencies of educators' responses of the degree to which they believe their facility is a physical representation of the school's educational vision and the degree to which they

believe their facility meets the needs of stakeholders. Again, the examination of central tendencies will be completed in order to: (1) develop a thorough description of the responses of each variable being examined; (2) provide a descriptive analysis of the convergence and divergence of central tendencies across different variables; and (3) as means to determine the appropriateness of multivariate analysis.

A multiple regression analysis will be conducted with the degree to which educators report that their facility is a physical representation of the school's educational vision as the dependent variable. The degree to which educators report that their facility meets the needs of stakeholders will serve as the dependent variable.

If the two primary suppositions of the Systems Model for Educational Facilities Planning are valid, the validity of the systems model as a whole can be further determined. By comparing, for each school in the sample, what the model predicts and what was actually measured by the survey, the validity of the systems model can be further determined. For example, if an individual school has an articulated vision, the facility is a physical representation of the educational vision, and was constructed through the management of variables within and across the six domains of planning, the systems model predicts the facility will meet the needs of the stakeholders. If the survey reveals the facility meets the needs of the stakeholders, the model is valid. However, if the survey reveals that the facility does not meet the needs of the stakeholders, the model would not be valid. All totaled, there are eight possible combinations of answers to the first three questions listed above. For each unique set of combinations, the system model predicts whether the facility will or will not meet the needs of the stakeholders. For a complete listing of the possible combinations, see tables 6-13: Truth Table One through

Truth Table Eight. By comparing what has been predicted and what is measured, one can quantitatively determine the validity of the systems model.

Table 2

Truth Table One

Does The School Have An Articulated Vision?	Is The Facility A Physical Represen-tation Of The Educational Vision?	Do Design Professionals And Educators Manage Variables Within The Six Domains Of Planning When Designing The Facility?	Resulting Statement	What Does The Model Predict Based On The Resulting Statement?	School Meets The Needs Of Stake-Holders	Validity Of Model
Yes	Yes	Yes	There is an articulated vision for the school. The facility is a representation of that vision. During the planning of the facility the physical, social, pedagogical, cultural, and economic components of the environment were managed.	The school will meet the needs of the stakeholders.	Yes	Model is valid.
					No	Model is not valid.

Table 3

Truth Table Two

Does The School Have An Articulated Vision?	Is The Facility A Physical Represen-tation Of The Educational Vision?	Do Design Professionals And Educators Manage Variables Within The Six Domains Of Planning When Designing The Facility?	Resulting Statement	What Does The Model Predict Based On The Resulting Statement?	School Meets The Needs Of Stake-Holders	Validity Of Model
No	No	No	There is not an articulated vision for the school. The facility is not a representation of that vision. During the planning of the facility the physical, social, pedagogical, cultural, and economic components of the environment were not managed.	The school will not meet the needs of the stakeholders.	Yes	Model is not valid.
					No	Model is valid.

Table 4

Truth Table Three

Does The School Have An Articulated Vision?	Is The Facility A Physical Represen-tation Of The Educational Vision?	Do Design Professionals And Educators Manage Variables Within The Six Domains Of Planning When Designing The Facility?	Resulting Statement	What Does The Model Predict Based On The Resulting Statement?	School Meets The Needs Of Stake-Holders	Validity Of Model
Yes	Yes	No	There is an articulated vision for the school. The facility is a representation of that vision. During the planning of the facility the physical, social, pedagogical, cultural, and economic components of the environment were not managed.	The school should meet the needs of the stakeholders. The management of the physical, social, pedagogical, cultural, and economic components of the environment was limited or non existent. However, a scenario existed which allowed the acquisition of the necessary resources from the external environment. An example of such a scenario would be a district which required minimal resources from an environment with extensive resources.	Yes	Model is valid.
					No	Model is not valid.

Table 5

Truth Table Four

Does The School Have An Articulated Vision?	Is The Facility A Physical Represen-tation Of The Educational Vision?	Do Design Professionals And Educators Manage Variables Within The Six Domains Of Planning When Designing The Facility?	Resulting Statement	What Does The Model Predict Based On The Resulting Statement?	School Meets The Needs Of Stake-Holders	Validity Of Model
No	Yes	Yes	There is not an articulated vision for the school. The facility is a representation of that vision. During the planning of the facility the physical, social, pedagogical, cultural, and economic components of the environment were managed.	Though the planning of the facility included management of the physical, social, pedagogical, cultural, and economic components of the environment, the lack of a vision results in a school which does not meet the needs of the stakeholders.	Yes	Model is not valid.
					No	Model is valid.

Table 6

Truth Table Five

Does The School Have An Articulated Vision?	Is The Facility A Physical Represen-tation Of The Educational Vision?	Do The Design Professionals And Educators Manage Variables Within The Six Domains Of Planning When Designing The Facility?	Resulting Statement	What Does The Model Predict Based On The Resulting Statement?	School Meets The Needs Of Stake-Holders	Validity Of Model
Yes	No	Yes	There is an articulated vision for the school. The facility is not a representation of that vision. During the planning of the facility the physical, social, pedagogical, cultural, and economic components of the environment were managed.	Though there was an articulated vision for the building it will not meet the needs of the stakeholders. Even though the physical, social, pedagogical, cultural, and economic components of the environment were managed, the building is not a physical representation of that vision. An example of such a scenario would be a district which had a vision and the necessary resources, but limited architectural acuity.	Yes	Model is not valid.
					No	Model is valid.

Table 7

Truth Table Six

Does The School Have An Articulated Vision?	Is The Facility A Physical Represen-tation Of The Educational Vision?	Do Design Professionals And Educators Manage Variables Within The Six Domains Of Planning When Designing The Facility?	Resulting Statement	What Does The Model Predict Based On The Resulting Statement?	School Meets The Needs Of Stake-Holders	Validity Of Model
No	No	Yes	There is not an articulated vision for the school. The facility is not a representation of that vision. During the planning of the facility the physical, social, pedagogical, cultural, and economic components of the environment were managed.	This facility should not meet the needs of stakeholders because it has no articulated vision unless by chance the management of the environment freed the resources to build a facility which does not match the physical representation of the poor vision, but ends up meeting the needs of the stakeholders.	Yes	Model may be valid
					No	Model is valid

Table 8

Truth Table Seven

Does The School Have An Articulated Vision?	Is The Facility A Physical Represen-tation Of The Educational Vision?	Do Design Professionals And Educators Manage Variables Within The Six Domains Of Planning When Designing The Facility?	Resulting Statement	What Does The Model Predict Based On The Resulting Statement?	School Meets The Needs Of Stake-Holders	Validity Of Model
Yes	No	No	There is an articulated vision for the school. The facility is not a representation of that vision. During the planning of the facility the physical, social, pedagogical, cultural, and economic components of the environment were not managed.	This facility should not meet the needs of the stake holders because it is not a physical representation of the articulated vision. Variables within the six domains of planning were not managed.	Yes	Model is not valid.
					No	Model is valid

Table 9

Truth Table Eight

Does The School Have An Articulated Vision?	Is The Facility A Physical Represen-tation Of The Educational Vision?	Do Design Professionals And Educators Manage Variables Within The Six Domains Of Planning When Designing The Facility?	Resulting Statement	What Does The Model Predict Based On The Resulting Statement?	School Meets The Needs Of Stake-Holders	Validity Of Model
No	Yes	No	There is not an articulated vision for the school. The facility is a representation of that vision. During the planning of the facility, the physical, social, pedagogical, cultural, and economic components of the environment were not managed.	This facility should not meet the needs of the stakeholders because there is not an articulated vision. The facility is a physical representation of a poor vision, and the components of the environment in which it was planned were not managed.	Yes	Model is not valid.
					No	Model is valid

Research Design – Phase Two

Research Parameters

As stated earlier, it is recognized that the complexity of the phenomenon being studied, the difficulty in establishing valid causal inferences in social research, and the need for high generalizability creates daunting challenges for any research design. This is especially true for the qualitative phase of this study.

Of these challenges, generalizability presents a particularly difficult obstacle for qualitative research. As Johnson and Christensen (2000) point out, generalizability is traditionally not the purpose of qualitative research because of two reasons. First, a random selection of the population being studied is rarely performed. Second, most qualitative researchers are interested in the documentation of "particularistic" findings rather than "universalistic" findings (Johnson & Christensen, 2000). However, Johnson and Christensen go on to cite experts who believe that "rough generalizations" can be made through the utilization of qualitative research. Johnson and Christensen believe defendable generalizations can be made in qualitative research through the examination and identification of commonalities between people, circumstances, or phenomena in the original research, and the people, circumstances, or phenomena to which the research is applied (Johnson & Christensen, 2000).

Replication logic is a strategy for strengthening what Johnson and Christensen (2000) termed "defendable generalizations." The basic logic behind the argument of replication in qualitative studies is consistent with the logic of replication in quantitative studies. Yin, as summarized by Jones, Smaling, and Tillis, reasons that the more times a

qualitative research finding is shown to be true with different sets of people and/or in different contexts, the more confidence one can place in the finding and in the conclusion that the finding can be generalized beyond the original study (Jones, 2003; Smaling, 2003; Tillis, 1997).

A final means of gaining generalizability is through maximum variation sampling. As summarized by Patton (2002), maximum variation sampling is a method of purposeful sampling which "aims at capturing and describing the central themes that cut across the greatest variation. For small samples, a great deal of heterogeneity can be problematic because individual cases are unique. The maximum variation strategy turns that weakness into a strength by applying the following logic: Any common patterns that emerge from great variation are of particular interest and value in capturing the core experiences, along with central, shared dimensions of a setting or phenomenon" (Patton, 2002).

The research design of this study capitalizes on the three concepts and strategies defined by Johnson and Christensen, Yin, and Patton in order to provide the optimum opportunity for in-depth understanding of the core components of the systems model, generate the greatest influence over internal validity, and maximize generalizability. First, as Patton argues, "any common patterns that emerge from great variation are of particular interest and value in capturing the core experiences, along with central, shared dimensions of a setting or phenomenon" (Patton, 2002). Therefore, the research design requires that the sites selected for case study demonstrate the greatest variation in two core components of the systems model. Those two core components are the degree to which each school has an educational vision (the educational form) and the degree to

which each school is a physical representation of that vision (the architectural function). Utilizing data from the survey completed in phase one of this study, four schools are selected through maximum variation sampling for participation in a multi-site case study of comparative analysis. Maximum variation sampling reduces researcher bias, increases internal validity, and provides a means of replication. Once selected, methods of cross-verification at each site are utilized to compare what the system model predicts, what the quantitative data yields about the site, and the qualitative data collected. The exact method of selecting these schools will be discussed later in this chapter.

Second, as Johnson and Christensen believe, the more similar people and circumstances in a particular case are to the people and circumstances in another case, the more defensible a generalization will be, and the more readily generalizations can be made (Johnson & Christensen, 2000). Therefore, while the sites selected for case study show the greatest variation to the degree in which each school has an educational vision and the degree to which each school is a physical representation of that vision, they are all middle schools built and opened in the Commonwealth of Pennsylvania between 1992 and 2003. Selecting middle schools built and opened in the Commonwealth of Pennsylvania between 1992 and 2003 creates commonalities in the: (1) geographic region, (2) age of the facilities, (3) statues and regulations under which the facilities were built, (4) teaching certifications required, (5) age range of students, and (6) fact that curriculum, instructional practices, and programs at the sites are designed to meet the needs of early adolescents.

The third strategy utilized is based on Yin's premise that the more times a qualitative research finding is shown to be true with different sets of people and/or in

different contexts, the more confidence one can place in the finding and in the conclusion that the finding can be generalized beyond the original study (Jones, 2003; Smaling, 2003; Tillis, 1997). To this end, four sites are selected for comparative analysis. In treating each of the four cases as unique and separate entities, but holding the methodology constant, leverage over generalizability is gained through replication logic.

Selection of Sites for Comparative Analysis: Tier One

Consistent with the pragmatic tradition in which this study is grounded, the qualitative phase of this study requires that the validity of the systems model be measured by its experimental results and by the practicality of its use. Driven by the need for sound experimental procedures and generalizability of the results, the selection of schools for qualitative study is the most critical step of this phase.

As stated earlier, the complex patterns, interactions, and relationships of the environment in which educational facilities are planned make it difficult to evaluate the validity of the systems model based on only quantitative data. Therefore, the survey will also be used to determine the degree to which each school in the sample: (1) has an articulated vision, (2) is a physical representation of that vision, (3) is designed and constructed through the management of variables within and across the six domains of planning, and (4) meets the needs of the stakeholders.

The four schools selected for comparative analysis are chosen based on a two-tiered process. On the first tier, schools will be sorted based on two variables: (1) the degree of articulation of the educational vision and (2) the degree to which the facility is a physical representation of that vision. The selection of the four schools over the widest possible continuum of these two variables is consistent with the maximum variation

strategy and better addresses concerns of validity, transferability, and researcher bias which often arise during a qualitative analysis of this nature.

In order to make a valid selection over the widest continuum, it is necessary to return to Louis Sullivan's basic design principle of form follows function. Through the literature review it has been established that regardless of the fact that all five categories of models approach the planning and design of educational facilities differently and each result in an architectural product with distinct features, Louis Sullivan's basic design principle of form follows function is found at the core of educational facility planning models. In other words, regardless of the school of thought on pedagogical practices, planning, or facility design, architects and design professionals consistently demonstrate the belief that if an educational facility is a clear physical representation (form) of a well articulated educational vision (function), the facility will meet the needs of those it serves. If one considers the two basic elements of this belief as separate but intersecting continua, they can be placed on an x and y axis. The x axis represents the degree of clarity of the educational vision and the y axis represents the degree to which the educational facility is a physical representation of that vision. The intersection of these axis yields four distinct contingencies (see *figure 4*).

The quadrant labeled "1" represents a clearly articulated educational vision and a facility that is a clear, physical representation of that vision. This quadrant illustrates the fulfillment of the basic design principle to which all facility planning models strive. In addition, it provides a means of illustrating why the systems model predicts that some newly constructed schools become vital to the success of students and critical to the health of the community.

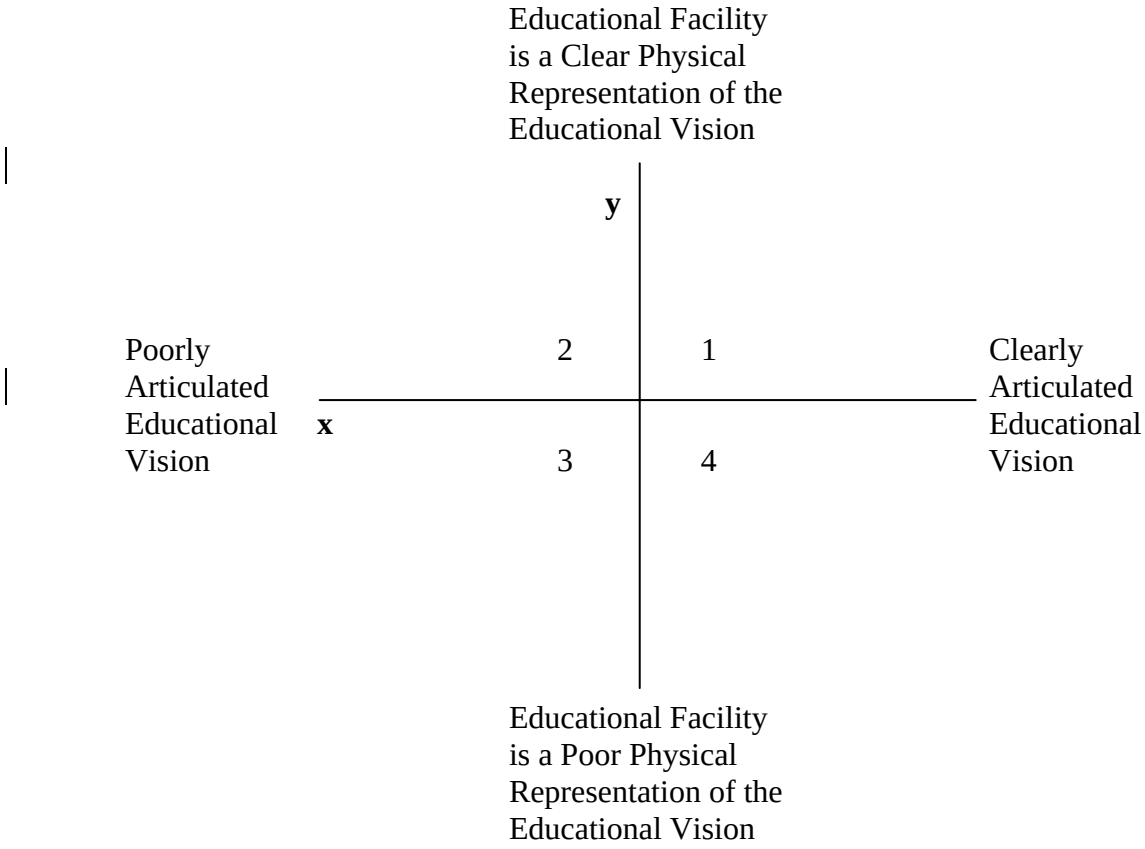

Figure 4. Articulation of An Educational Vision v. the Degree to Which an Educational Facility is a Physical Representation of an Educational Vision

The quadrant labeled "2" results from an educational vision that is poorly articulated and a facility that is a clear, physical representation of a poorly articulated vision. The quadrant labeled "3" represents an educational vision which is poorly articulated and a facility which is a poor physical representation of that vision. Quadrants 2 and 3 are based on the premise that a clearly articulated educational vision does not exist. At this point, the degree to which a facility is a physical representation of that vision is a moot point. From the onset, these two quadrants cannot fulfill Sullivan's basic

design principle, and the resulting facility cannot meet the needs of those it serves. In other words, without a clearly defined function, a successful form can not follow. This is a very plausible explanation that illustrates why the systems model predicts how some newly constructed facilities fail to meet the needs of children and/or the community.

The quadrant labeled "4" represents a clearly articulated educational vision, but the facility is a poor representation of that vision. Unlike quadrants 2 and 3, this quadrant assumes that a clearly articulated educational vision does exist. The facility, however, fails to become a physical representation of that vision. In this case, the function exists, but the form does not follow. This too, is a plausible explanation which illustrates why the systems model predicts how some newly constructed facilities fail to meet the needs of children and/or the community.

Selection of Sites for Comparative Analysis: Tier Two

The second tier of the selection process will utilize the demographic data compiled with the first component of the survey and the univariate analysis of the degree to which educators within each school believe their school: (1) has an articulated educational vision, (2) is a physical representation of their educational vision, (3) is designed by the design professionals and educators who manage variables within and across the six domains of planning, and (4) meets the needs of the stakeholders. The purpose of this second tier of selection is to ensure that along with the strategy of greatest variation, the sites that are selected are information-rich and provide the greatest opportunity to yield insights and understanding.

Qualitative Comparative Analysis

With the identification of the four schools for case study, a qualitative comparative analysis will be completed. Comparative analysis, as detailed by Charles Ragin (2000), involves representing each case study as a combination of causal and outcome conditions and then comparing those combinations of conditions across multiple sites. Ragin's strategy utilizes "truth tables" which are developed by coding the presence or absence of each attribute of interest. The information in the truth table displays the different combinations of conditions that produce a specific outcome. Through the systematic identification of causal and outcome conditions, similarities and differences can be explored while preserving the uniqueness of each case (Ragin, 2000).

In phase one of this research design, univariate analysis and multiple regression is utilized to examine eight possible combinations of conditions predicted by the systems model. These eight combinations are represented in *tables 6-13*: Truth Tables One, Two, Three, Four, Five, Six, Seven, and Eight. Through a utilization of these same tables for phase two of the study, three highly desired outcomes are achieved: (1) consistency is provided across the quantitative and qualitative phases of the investigation, (2) the research design of the qualitative phase maintains focus to determine the validity of the systems model, and (3) through the comparison of what has been predicted and what is measured, one can qualitatively determine the validity of the systems model.

Using the systems model as a lens, the answers to five critical questions for each of the four schools will be sought. These questions directly reflect the core components of the systems model and are identical to the questions sought in the quantitative phase of this study. These questions are: (1) Does the school have an articulated educational

vision? (2) Is the facility a physical representation of that vision? (3) Do the design professionals and educators manage variables within the six domains of planning when designing the facility? (4) Do the design professionals and educators manage variables across the six domains of planning when designing the facility? and (5) Does the educational facility meet the needs of the stakeholders? For the purpose of this study, the four questions have only one of two possible answers: “yes” or “no”.

The strategy of data triangulation will be utilized to qualitatively determine the answers to the five questions listed above and to establish a sound method of cross-verification. According to Denzin, data triangulation is a process of authenticating observations through the use of a variety of data sources in a study (1989). Three separate data sources will be collected for each site. Within each set of data sources, evidence will be sought to qualitatively determine the answers to questions which directly reflect the core components of the systems model. These data sources will include text documents, interviews, and artifacts.

The case study for each site will begin with a thorough review of text documents in the form of public construction records housed at the Pennsylvania Department of Education. These records, collectively known as PlanCon, represent a set of documents required for every public school construction project that seeks reimbursement from the Commonwealth of Pennsylvania. The PlanCon documents provide in-depth information about the: (1) description of a proposed project and the justification for its need, (2) technical review of the conceptual drawings, site plan, and educational specifications, (3) site acquisition, (4) estimated project costs and various tests of a district's financial ability to make payments, (5) review of architectural aspects of a project when the design is fully

developed, (6) architectural aspects of the project and documentation that other state and local agency requirements have been met or will be met before entering into construction contracts, (7) construction bids, and (8) financing and final costs (PlanCon, 2003).

Second, at each site, interviews will be conducted with representatives from each of the following subgroups: (1) teachers, (2) administrators, and (3) the building architects and/or design professionals. The interviews will follow a standardized open-ended format. The standardized open-ended format as described by Patton (2002) requires that the exact wording and sequencing of the questions be determined in advance, and that all interviewees are asked the same base set of questions in the same order. However, the questions are worded in a completely open-ended format. The interviews are taped, transcribed, and analyzed. The transcripts are analyzed using the strategy of thematic analysis of text and memoing. This is the same strategy utilized in the analysis of the literature base and described in chapter one.

Like the survey instrument used in phase one of this investigation, the interview questions are broken into three components (see appendix 2). The first component collects basic demographic information about each respondent which includes: (1) years of service, (2) their role in the school district and school, and (3) involvement with the planning the facility. The second component of the interview determines if the respondent recognizes the presence of an educational vision, variables within the six domains of planning, interaction between the domains of planning, if the facility is a physical representation of the educational vision, and if the facility meets the needs of the stakeholders. The final component of the interview asks the respondent for each of the six domains of planning to explain: (1) the importance of each domain with regard to

facility planning, (2) if those responsible for planning the facility understand the domain, and (3) the degree to which variables within the domain impact the final design.

Finally, in order to gain a more thorough understanding of the data uncovered during the document analysis and interviews, the presence or absence of artifacts will be utilized to complete the third element of triangulation. Artifacts represent how people use and conceptualize objects. In the broadest sense, Creswell defines artifacts as what people make and use (1998). Artifacts are examined from any number of perspectives, including where the objects are, how many there are, their functional role, their conversational role, their physical characteristics, or their flexibility of use through different situations (Usability Glossary, 2004). As with the first two data sources, physical artifacts will be used to indicate: (1) the presence or absence of an articulated vision, (2) if a school is or is not a physical representation and educational vision, (3) if design professionals and educators do or do not manage variables within and across the six domains of planning when designing the facility, and (4) if the educational facility meets or does not meet the needs of the stakeholders. Artifacts may include, but are not limited to: ways in which educators, students, parents, and the community utilize the building, building design, reflections of the culture of the school district in architecture, spaces to showcase or support the history, traditions, and success of the school, minutes from meetings, informational flyers, newsletters, and any physical objects from the design and construction of the facility. In addition, the absence of artifacts also serves as indications of the absence of a variable. For example, a school with a well articulated vision may have a formal place for the posting of their mission statement. On the other hand, a school with a poorly articulated educational vision may have no such space.

Cross-Validation

Upon completion of both phases of the research design and through an examination of the similarities and differences in the conclusions of each, the transformative sequential research design grounded in the pragmatic tradition, provides the opportunity to measure the validity of the systems model by both quantitative and qualitative experimental results. In turn, the cross-validation between the two methodologies provides a better opportunity to examine its generalizability and practicality of its use.

Assuming that the proper degree of validity exists, the systems model formalizes causal inferences between social, cultural, political, and economic mechanisms, the planning of educational facilities. This provides insight and promotes discussion on the complicated social, cultural, political, and economic mechanisms at work when public schools are designed and constructed in a pluralistic democratic society. In turn, elaboration's are made on the relationships between those mechanisms, educational facility planning, and educational facilities.

CHAPTER IV

ANALYSIS OF DATA

Introduction

This study attempts to develop a theoretical construct from which design professionals and educators can better organize, understand, analyze, communicate, and research complex cause-effect relationships that occur when educational facilities are designed and constructed. Through the utilization of a primarily experiential literature base, a thematic analysis of text, and a synthesis of literature from education, educational administration, architecture, and organizational sociology, a systems model of public educational facilities is developed. This model represents an attempt to develop a theoretical construct from which design professionals and educators can better organize, understand, analyze, communicate, and research complex cause-effect relationships that occur when educational facilities are designed and constructed. The Systems Model for Educational Facilities Planning attempts to: (1) identify and describe complicated social, cultural, political, and economic mechanisms at work when public schools are designed and constructed in a pluralistic democratic society, (2) make understandable the relationships between those mechanisms and educational facility planning, and (3) formalize causal inferences between social, cultural, political, and economic mechanisms, educational facility planning, and educational facilities. The goal of this study is to determine the validity of the Systems Model for Planning of Educational Facilities.

It is recognized that the complexity of the phenomenon being studied, the difficulty in the establishment of valid causal inferences in social research of this nature, and the need for high generalizability creates a daunting challenge for any research

design. A sequential transformative research design grounded in the pragmatic tradition is employed. As defined by Creswell (2003), sequential transformative research is a mixed methodological approach which utilizes a theoretical lens (in this case, the systems model) to ground a study. A sequential transformative research design capitalizes on concurrent quantitative and qualitative data collection as a means to offset the weakness inherent within one methodology with the strengths of the other methodology (Creswell, 2003). A sequential transformative research design maximizes leverage over the complexity of the systems model and provides the greatest opportunity to make generalizations to other contexts and settings.

Through the utilization of the systems model as a lens, this study is conducted to use a research design with two sequential stages. The first phase of the investigation utilizes quantitative methods to describe the sample population and examine, through univariate analysis and multivariate analysis, the validity of the core components of the systems model and the systems model as a whole. Data collection is accomplished through the use of a fifty question survey instrument (see Appendix A). The second phase of the investigation utilizes qualitative methods to complete a comparative case study analysis of four purposefully selected case studies, and like the first phase, it does so to examine the validity of core components of the systems model and the systems model as a whole.

Both the quantitative study and qualitative study examine five critical research questions. Those questions, identical in both sequential stages of the research, directly reflect the core components of the Systems Model for Educational Facilities Planning and the systems model as a whole. The five critical research questions were as follows: (1)

Does the school have an articulated educational vision? (2) Do the design professionals and educators manage variables within the six domains of planning when designing the facility? (3) Do the design professionals and educators manage the interaction of variables across the six domains of planning when designing the facility? (4) Is the educational facility a physical representation of the educational vision? and (5) Does the educational facility meet the needs of the stakeholders?

By comparing and contrasting the results of two distinct methodologies, the research design provides the greatest opportunity to: (1) describe complicated social, cultural, political, and economic mechanisms at work when public schools are designed and constructed in a pluralistic democratic society, (2) elaborate on the relationships between those mechanisms and educational facility planning, and (3) cross-validate, through quantitative and qualitative methods, a systems model which formalizes causal inferences between social, cultural, political, and economic mechanisms, educational facility planning, and educational facilities.

Quantitative Data: Survey Information and Results

Survey Overview

The survey instrument (appendix A) is designed to collect data regarding educators' beliefs on the degree to which: (1) their school has an articulated vision, (2) their educational facility is a physical representation of the educational vision, (3) design professionals and educators responsible for planning the building manage physical, social, pedagogical, cultural, and economic components of the environment, and (4) the educational facility meets the needs of the stakeholders.

The superintendents and principals of fifteen schools granted permission to

conduct research in their school district. The fifteen schools in which the survey was administered were all middle facilities built and opened in the Commonwealth of Pennsylvania between 1992 and 2003. Selecting middle schools built and opened in the Commonwealth of Pennsylvania between 1992 and 2003 created commonalities in the: (1) geographic region, (2) age of the facilities, (3) statues and regulations under which the facilities were built, (4) teaching certifications required of the faculty, (5) age range of students, and (6) fact that curriculum, instructional practices, and programs at the sites are designed to meet the needs of early adolescents. Collectively, the fifteen schools employed 792 educators (PDE, 2004). With the consent of the superintendent of schools and building principals, surveys were mailed to each facility, voluntarily completed and returned in August, September, and October of 2005. The survey had a return rate 63.26% with 501 of the potential 792 educators responding.

Survey Validity

In order to validate the survey developed for this study, it is reviewed by nationally recognized experts in educational facility planning and by university faculty acknowledged for their expertise in data collection and analysis. In addition, the survey is field tested with the faculty of a newly constructed middle school that met all the criteria to be in the sample population, but would be excluded from participating in the research study. Through these procedures, content validity is attained. Finally, when the surveys are returned, the responses are analyzed to evaluate their internal consistency reliability. The estimate of the internal consistency for the surveys as a whole is very high, with a reliability coefficient of 0.975. The estimates for the internal consistency of

individual categories of items are also high, with the reliability coefficients ranging from 0.818 to 0.920 (see table 10).

Table 10

Cronbach's Alpha Scores for Full Survey and Question Groupings

Survey Section	Survey Questions	Cronbach's Alpha
Respondent Background	1-3	N/A
All Questions (Other Than Background)	4-50	.975
Educational Vision	4, 14, 15, 16, 17, 18	.867
Building is Physical Representation of Educational Vision	5, 19, 20, 21, 22, 23	.919
Demographics	6, 24, 25. 26	.849
Pedagogy	7, 27, 28, 29	.855
Culture	8, 30, 31, 32, 33, 34	.872
Economics	9, 35, 36, 37	.827
Politics	10, 38, 39, 40	.818
Architectural Acuity	11, 41, 42, 43, 44	.862
Facility Meets the Needs of Stakeholders	12, 45, 46, 47	.920
Interaction of Variables Within and Across the Six Domains of Planning	13, 48, 49, 50	.842

Survey Design

The fifty item survey consists of three questions and forty-seven statements to which educators are asked to respond. The survey statements are designed so that a response does not require direct involvement with planning the educational facility. The responses are made using a Likert scale. Written instructions on the survey inform

participants that, “responding to many of the statements require that you answer based on your impressions or interpretations of this school, community, facility, and/or the planning and design of public schools. Statements requiring the use of impressions or interpretations were included with intent. Furthermore, the instructions request that participants “respond to the statements based on their experience teaching in this facility (building).”

The survey is divided into eight distinct sections. In order to build a profile of the respondents, the first section contains three questions with the first being: “Were you involved in the planning of this facility?” Out of the 501 participants, 179 or 36.03% respond “yes” to this question. The responses to this statement are used as secondary criterion in determining schools selected for a comparative case study. The second asks: “Since the opening of this facility (building), do you believe that it has been used as intended by the designers?” In response to this question, 88.93% answer “yes”. Again, the data serves as secondary criterion in the selection of four schools for a comparative case study. The final question of this section is as follows: “How many years have you worked in the facility (building)?” Through an analysis of the responses to this question in the context of the year that each facility opened, estimations are made with regard to the potential quantity and quality of data which is collected during qualitative analysis. This too is important secondary criterion in the determination of a school to be selected for a comparative case study.

In the second section of the survey, educators are asked to respond to two statements, using a six-point Likert scale. The first of these statements is as follows: “Within this school and the community that it serves, there is a shared sense of purpose

and a focus on what is important for students." This statement is designed to measure the degree to which an educational vision exists. The second statement, designed to determine the degree to which the facility contributes to the attainment of the educational vision reads: "This facility contributes to a shared sense of purpose and a focus on what is important for students." The mean responses from these two statements are utilized as the primary criteria in a two-tiered selection process to choose the four schools for comparative case analysis. The research design of this study specifies that the four schools selected for qualitative analysis have the widest possible values of the means of the responses to the two statements. This is consistent with the maximum variation strategy and better helps to offset concerns of external validity, transferability, and researcher bias which often arise during qualitative analysis. The second tier of the selection process utilizes the profile of the respondents developed from information gained from the questions in the first section of the survey. The purpose of the second tier of selection is to ensure that along with the strategy of greatest variation, the sites selected are information-rich and provide the greatest opportunity to yield insights and understanding.

Table 11:

Demographics of Survey Participants

Question Number	Demographics of Respondents	Response	Count	Percent
	Number of Schools		15	
	Possible Participants		792	
	Total Participants		501	63.26%
1	Involved in Planning	Yes	179	36.02%
		No	318	63.98%
2	Years Spent in Facility	0 to 2	68	13.65%
		3 to 4	149	29.92%
		5 to 6	101	20.28%
		7 to 8	68	13.65%
		9 to 10	26	5.22%
		10+	86	17.27%
3	Facility Utilized As Designed	Yes	434.00	88.93%
		No	54.00	11.07%
	Total		488.00	100.00%

The third section of the survey contains eight questions, which again, uses a six-point Likert scale; the participants respond to a series of statements designed to determine the degree to which those responsible for planning their school understand each of the six domains of planning, the interaction of these domains, and the degree to which the facility meets the needs of faculty, staff, students, and the community.

The remaining sections of the survey utilizes a seven-point Likert scale. Three positive and three negative choices on either side of a neutral response is utilized in order to divide the responses into positive and negative groupings, with three on either side of the neutral response. This was done for the purpose of completing analysis through logistic regression. However, when the survey responses are analyzed, a disproportionate number of positive responses make analysis through logistic regression impossible. The

fourth section of the survey contains five statements. The first four statements are designed to determine the degree to which: (1) educators, (2) parents, (3) the community, and (4) students each have a shared sense of purpose and a focus on what is important for students. The fifth statement directly requires educators to respond to the statement: "This school has an educational vision."

The fifth section of the survey also contains five statements. The first four statements require educators to respond with the degree to which the facility helps promote a shared sense of purpose and focus on what is important for students among: (1) educators, (2) parents, (3) the community, and (4) students. The fifth question directly requires educators to respond to the statement: "The design and appearance of this facility conveys the educational vision of the school."

The next six sections of the survey presents educators with statements with regard to the degree to which: (1) a detailed understanding of each of the six domains is necessary for planning an educational facility, (2) those responsible for planning the respondent's school understand each of the six domains, and (3) variables within each domain impact the final design of the facility.

The seventh section consists of three statements. Each statement requires respondents to state the degree to which the facility meets the individual needs of: (1) teachers, (2) students, and (3) the community.

The eighth section requires educators to respond to three statements with regard to the degree to which: (1) a detailed understanding of the interaction of the variables across the six domains of planning is necessary for planning an educational facility, (2) those responsible for planning the respondent's school understand the interaction of variables

across the six domains, and (3) the interaction of variables across the six domains impact the final design of the facility.

Across the entire survey, the statements to which educators respond are grouped into twelve categories. The categories of statements reflect the critical components of the Systems Model for Educational Facilities Planning and the model as a whole, and are designed to collect information on the process of educational facilities planning and/or the impact of educational facilities planning on the final design of an educational facility. In addition, the categories of questions are utilized as a means to cross-validate the responses of individuals and faculties as a whole. These categories are used to cross-validate responses that reflect critical components of the educational facilities planning model and the model as a whole. The twelve categories and their descriptions are as follows: (1) Respondent Background – Information on survey participants, (2) All Questions Other Than Respondent Background – Survey statements which collectively examine the model as a whole, (3) Educational Vision – Survey statements which examine the shared sense of purpose and focus on what is important for students within the school district and community, (4) The Facility as a Physical Representation of the Educational Vision – Survey statements which examine the degree to which a facility contributes to a shared sense of purpose and focus on what is important for students, (5) Demographics – Survey statements which examine the size, composition, and needs of the student body, (6) Pedagogy – Survey statements which examine methods of instruction and how students learn, (7) Culture – Survey statements which examine the values, attitudes, beliefs standards, traditions, and customs of the school district and community, (8) Economics – Survey statements which examine the economics of the

school district and community, (9) Politics – Survey statements which examine the relationships between educators, elected officials, parents, community groups and citizens within the community, (10) Architectural Acuity – Survey statements which examine the ability of an architect and design professionals to understand the needs of a school district and community, and their ability to design a school which is a physical representation of the educational vision, (11) The Degree to Which the Facility Meets the Needs of Stakeholders – Survey statements which examine the degree to which a facility meets the needs of faculty, staff, students, and the community (12) The Interaction of Variables Within and Across the Six Domains of Planning – Survey statements which examine the interaction of economic, political, and social forces, as well as the needs of teachers and students.

Table 12

Summary of Survey Statements/Questions and Analysis of Responses

Survey Number	Summary of Statement/Question	n	Mean	SD	SE
4	Shared Purpose and Focus – Vision	501	5.026	0.9388	0.0419
5	Facility Contributes to Vision	500	5.056	0.9223	0.0412
6	Those responsible for planning understood size, needs, composition of the student body – Demographics	496	4.139	1.2960	0.0582
7	Those responsible for planning understood teaching and learning – Pedagogy	498	4.494	1.1598	0.0520
8	Those responsible for planning understood values, attitudes, beliefs, standards, traditions, and customs – Culture	497	4.674	1.0523	0.0472
9	Those responsible for planning understood economics of school district and community – Economics	495	4.709	1.0437	0.0469
10	Those responsible for planning understood relationships between educators, elected officials, parents, community groups, and citizens – Politics	493	4.527	0.9989	0.0450
11	The architect and design professionals understood needs – Architectural Acuity	491	4.271	1.1526	0.0520
12	Facility meets needs of faculty, staff, students, and the community	499	4.202	1.3343	0.0597
13	Those responsible for planning understood the interaction of economic, political, and social forces, as well as needs of teachers and students – Interaction	490	4.288	1.0876	0.0491
14	Educators have a shared sense of purpose and focus	499	6.056	1.0064	0.0451
15	Parents have a shared sense of purpose and focus	500	5.296	1.1309	0.0506
16	Community has a shared sense of purpose and focus	498	5.253	1.1224	0.0503
17	Students have a shared sense of purpose and focus	500	5.168	1.0873	0.0486
18	School has an educational vision	498	6.046	1.0671	0.0478
19	Facility helps promote sense of Purpose and focus for educators	497	5.658	1.2097	0.0543

Table 12 (continued).

Survey Number	Summary of Statement/Question	n	Mean	SD	SE
20	Facility helps promote sense of Purpose and focus for parents	499	5.515	1.0761	0.0482
21	Facility helps promote sense of Purpose and focus for community	498	5.448	1.0998	0.0493
22	Facility helps promote sense of Purpose and focus for students	498	5.490	1.1281	0.0505
23	Design and appearance of facility Conveys educational vision of school	498	5.526	1.3094	0.0587
24	Planning requires detailed understanding of demographics	496	5.760	1.2859	0.0577
25	Those responsible for planning facility understand demographics	495	4.810	1.6883	0.0759
26	Demographics impacted final design of the facility	495	4.766	1.6064	0.0722
27	Planning requires detailed understanding of pedagogy	495	5.487	1.2611	0.0567
28	Those responsible for planning facility understood pedagogy	492	4.915	1.4444	0.0651
29	Pedagogy impacted final design of the facility	491	4.931	1.5184	0.0685
30	Planning requires detailed understanding of culture	490	5.416	1.1450	0.0517
31	Those responsible for planning facility understand culture	491	5.004	1.3340	0.0602
32	Culture impacted final design of the facility	489	5.039	1.3059	0.0591
33	Facility promotes sense of community	495	5.329	1.4519	0.0653
34	Facility promotes school pride	492	5.772	1.2097	0.0545
35	Planning requires detailed understanding of economics	487	5.559	1.1332	0.0513
36	Those responsible for planning facility understood economics	489	5.284	1.2959	0.0586
37	Economics impacted final design of the facility	489	5.558	1.2016	0.0543
38	Planning requires detailed understanding of politics	489	5.311	1.1863	0.0536
39	Those responsible for planning facility understood politics	489	5.000	1.3306	0.0602
40	Politics impacted final design of the facility	486	4.912	1.3677	0.0620
41	Planning requires detailed understanding of architectural acuity	487	5.544	1.1375	0.0515

Table 12 (continued).

Survey Number	Summary of Statement/Question	n	Mean	SD	SE
42	Those responsible for planning facility understood architectural acuity	488	4.857	1.4627	0.0662
43	Architectural acuity impacted final design of the facility	489	4.939	1.4071	0.0636
44	Arrangement of spaces, materials, mechanical and electrical systems, and overall appearance demonstrate architects expertise in turning the vision into a facility	487	4.600	1.6966	0.0769
45	Facility meets needs of teachers	494	4.899	1.6269	0.0732
46	Facility meets needs of students	496	4.988	1.6068	0.0721
47	Facility meets needs of community	492	5.244	1.3842	0.0624
48	Planning requires detailed understanding of Interaction of variables within and across the domains of planning	491	5.436	1.1471	0.0518
49	Those responsible for planning facility understood interaction of variables within and across the domains of planning	488	4.881	1.3872	0.0628
50	Interaction of variables within and across the domains of planning impacted final design of the facility	489	4.926	1.4050	0.0635

Survey Results: Educational Vision

The quantitative phase of this investigation, through univariate analysis and multiple regression, yields the answers to five critical questions. Each of these questions represents a critical component of the Systems Model for Educational Facility Planning. Through an examination of the individual components as well as the model, as a whole, a determination of soundness of the model can be estimated.

The first of these five critical questions is as follows: “Does the school have an educational vision?” For the purpose of this study, an educational vision is defined as a feasible and attainable picture or image of what the school district can become in the

future. An educational vision helps focus attention on what is important, provides purpose, motivates staff, students, and the community, and increases a sense of shared responsibility for student learning (NCREL, 2002). Educators respond to the statement: "This school has an educational vision." A summary of the mean responses to this statement, number 18 in the survey, can be reviewed in *table* 13, column C. The mean responses from each of the fifteen schools are ranked from high to low in *table* 14, column B. In addition, the ranking in the *table* 14 is separated into a top, middle, and bottom third.

Table 13

Summary of Mean Responses to Survey Questions Designed to Examine Critical Pieces of the Systems Model for Educational Facility Planning and the Model as a Whole

A	B	C	D	E	F	G	H	I	J	K	L	M
School	n	Degree to Which School has an Educational Vision (18)	Those Responsible for Planning Understood Demographics (6)	Those Responsible for Planning Understood Pedagogy (7)	Those Responsible for Planning Understood Culture (8)	Those Responsible for Planning Understood Economics (9)	Those Responsible for Planning Understood Politics (10)	Those Responsible for Planning Understood Arch. Acuity (11)	Average of Means of Six Domains of Planning (Average of Last 6 Columns)	Those Responsible for Planning Understood Interaction of Domains (13)	Design/ Appearance Conveys Vision (23)	Building Meets the Needs (12)
All Schools	501	5.658	4.139	4.494	4.674	4.709	4.527	4.271	4.469	4.288	5.526	4.202
School 01	36	6.278	2.750	3.917	4.417	4.278	4.278	3.639	3.880	3.611	4.861	3.111
School 02	29	6.069	4.310	4.621	5.000	4.897	4.690	4.379	4.649	4.483	5.793	4.138
School 03	12	6.000	4.000	4.400	4.900	4.700	4.400	3.700	4.350	3.900	5.500	3.300
School 04	42	5.533	4.370	4.600	4.622	4.587	4.568	4.341	4.515	4.477	5.689	4.391
School 05	67	6.478	4.603	4.768	4.884	4.940	4.788	4.582	4.761	4.463	5.824	4.362
School 06	37	5.946	4.243	4.514	4.622	4.730	4.622	4.297	4.505	4.459	5.324	4.297
School 07	32	6.688	4.419	4.969	5.156	5.000	4.719	4.656	4.820	4.781	6.281	4.813
School 08	55	5.745	4.185	4.455	4.491	4.407	4.055	4.296	4.315	4.204	5.691	4.418
School 09	12	5.909	4.636	4.636	4.818	4.727	4.636	4.545	4.667	4.364	6.273	4.545
School 10	13	5.333	3.750	4.167	4.417	4.333	4.000	3.917	4.097	3.917	5.167	3.750
School 11	31	6.645	4.903	5.194	5.355	5.323	5.129	4.968	5.145	4.968	6.323	5.129
School 12	33	6.818	5.242	5.406	5.500	5.485	5.182	5.061	5.313	5.063	6.485	5.333
School 13	52	5.404	3.981	4.132	4.250	4.490	4.314	4.080	4.208	4.082	5.038	3.981
School 14	11	5.909	4.545	4.636	4.636	4.545	4.727	4.455	4.591	4.273	5.545	4.818
School 15	35	5.629	2.147	3.057	3.486	4.114	3.857	2.735	3.233	2.943	4.171	2.371

Table 14

Schools Ranked High to Low on the Educators Mean Response to the Statement: "This school has an educational vision."

	A Rank Based on Mean Response High to Low	B Degree to Which School has an Educational Vision (18)
Top Third	1	School 12
	2	School 07
	3	School 11
	4	School 05
	5	School 01
Middle Third	6	School 02
	7	School 03
	8	School 06
	9	School 09
	10	School 14
Bottom Third	11	School 08
	12	School 15
	13	School 04
	14	School 13
	15	School 10

Survey Results: Management of Variables within the Six Domains of Planning

The second critical question is as follows: "Do the design professionals and educators manage variables within the six domains of planning when designing the facility?" Statements six through eleven on the survey are designed to examine the degree to which educators believe that those responsible for planning their school understand each of the domains of planning. The six domains of planning each represent a collection of quantitative and qualitative variables organized around a central theme.

The six domains include: (1) Architectural Acuity, (2) Culture, (3) Demographics, (4) Economics, (5) Pedagogy, and (6) Politics, and are defined as follows:

Architectural Acuity - The art and science of building in which the relationship of spaces, construction materials, structural practices, mechanical systems, technology, and aesthetics are applied by architects, engineers, and design professionals in an educational facility (infoplease.com, 2002 & American Heritage, 2000).

Culture - The cognitive and normative structures which help promote and sustain order in an organization (Scott, 1998). The cognitive and normative structures represent a system of socially acquired values, beliefs, attitudes, standards, traditions, customs, and rules of conduct which delimit the range of accepted behaviors in a school district (infoplease.com, 2002 & American Heritage, 2000).

Demographics - The vital statistics which describe both the human population and/or the physical characteristics of a given area or market niche (Investorwords.com, 2002). For the purpose of this research, demographics refer to statistics which describe the size, composition, and needs of the student body.

Economics - Economics is defined by the American Heritage dictionary as economically significant financial considerations (2000). Economics encompasses all significant financial considerations of a school district including, but not limited to, the ability to raise revenue, debt load and structure, state and federal reimbursement rates, and support for capital improvement projects, local consumer and producer indexes, welfare and poverty rates, the number of jobs in the local economy, the unemployment rate, and the economic outlook (Investorwords.com, 2002 & infoplease.com, 2002).

Pedagogy - Pedagogy is defined by Merriam-Webster's Unabridged Dictionary as the art

and science of teaching. Pedagogy is defined as principals, methods of instruction, and how students learn (2002).

Politics - Politics is defined as the competition between competing interest groups or individuals for power and leadership (Merriam-Webster, 2002). Politics also refers to the methods and tactics of formal and informal groups that attempt to gain control, power, or alter the direction of a government, social unit, or organization (American Heritage, 2000). For the purpose of this dissertation, politics is defined as the methods and tactics of formal and informal groups that attempt to gain control, power, or alter the direction of a school district's capital improvement project. For purposes of clarity, these concepts are summarized as the relationships between educators, elected officials, parents, community groups, and citizens within a community.

Statements six through eleven on the survey are designed to examine each of these six domains. However, in order to gain a single measure of the degree to which educators believe those responsible for designing their facility understand variables within the six domains, an average score is determined through a calculation of the mean of the responses for each of the six questions. The value which results is a single score for the purpose of modeling, provided that the average degree to which educators in each school believe that those responsible for planning their school understand the six domains of planning. A summary of the mean responses for each of the six domains of planning can be reviewed in table 13, columns D, E, F, G, H, and I. The average of the means calculated for the purpose of this study can be found in column J of the same table. The mean of the means is used to rank, from high to low; the fifteen schools participating in the study appears in table 15, column D. Column C of that table includes, with intent, the

same data and ranking from table 14 at the degree to which educators believe their school has an educational vision.

Table 15

Schools Ranked High to Low on the Mean of the Mean Responses at the Degree to Which Educators Believe Planners Understand Each of the Six Domains of Planning

A	B	C	D
	Rank Based on Mean Response High to Low	Degree to Which School has an Educational Vision (18)	Average of Means of Six Domains of Planning
Top Third	1	School 12	School 12
	2	School 07	School 11
	3	School 11	School 07
	4	School 05	School 05
	5	School 01	School 09
Middle Third	6	School 02	School 02
	7	School 03	School 14
	8	School 06	School 04
	9	School 09	School 06
	10	School 14	School 03
Bottom Third	11	School 08	School 08
	12	School 15	School 13
	13	School 04	School 10
	14	School 13	School 01
	15	School 10	School 15

Survey Results: Management of the Interaction of Variables Across the Six Domains of Planning

The third critical question is as follows: "Do the design professionals and educators manage the interaction of variables across the six domains of planning when designing the facility? This question is examined through educators' responses to statement 13 on the survey. Statement 13 reads: "Those responsible for designing this facility understand the interaction of economic, political, and social forces, as well as the needs of teachers and students." The Systems Model for Educational facilities planning postulates that changes in variables within one of the six domains of planning affect variables in the other five domains. It should be noted that the suppositions on which the systems model is built considers the interaction of variables across the domains distinctly different from the management of variables within a single domain. Recognition of the differences in these two components of the model serve to underscore the dynamic nature of the environment in which American public schools are planned. A summary of the mean responses for statement 13 is reviewable in table 13, column K. The mean responses from each of the fifteen schools are ranked from high to low in table 16, column E. Columns C and D contain the ranking from the educators' response with regard to educational vision and the average of the means of the degree to which educators' believed planners understood each of the six domains of planning. These were the same data and ranking from tables 14 and 15.

Table 16

Schools Ranked High to Low on the Educators Mean Response to the Statement: "Those responsible for designing this facility understood the interaction of economic, political, and social forces as well as the needs of teachers and students."

A	B	C	D	E
	Rank Based on Mean Response High to Low	Degree to Which School has an Educational Vision (18)	Average of Means of Six Domains of Planning	Those Responsible for Planning Understood Interaction of Domains (13)
Top Third	1	School 12	School 12	School 12
	2	School 07	School 11	School 11
	3	School 11	School 07	School 09
	4	School 05	School 05	School 07
	5	School 01	School 09	School 14
Middle Third	6	School 02	School 02	School 05
	7	School 03	School 14	School 06
	8	School 06	School 04	School 09
	9	School 09	School 06	School 14
	10	School 14	School 03	School 08
Bottom Third	11	School 08	School 08	School 13
	12	School 15	School 13	School 10
	13	School 04	School 10	School 03
	14	School 13	School 01	School 01
	15	School 10	School 15	School 15

Survey Results: Supposition I

As exploration of the data continues throughout this chapter, tables are built to include data from each of the five critical questions evaluated. This is done in order to examine trends within the data that emphasize critical pieces of the systems model, and how the pieces relate to one another and the systems model as a whole. The next column added to the table is critical in to understand if continued exploration of the model is

warranted. With the next step in this process, the first examination of the model as a whole is made.

As a whole, the Systems Model for Educational Facilities Planning is built on the primary supposition that if a school has an educational vision, and if those responsible for the design and construction of a facilities manage the interaction of economic, political, and social forces, as well as the needs of teachers and students, then by using the resources available, design professionals and educators can design and construct an educational facility that is a physical representation of an educational vision. As a result, the fourth critical question asks: "Is the educational facility a physical representation of the educational vision?" Survey statement 23 reads: "The design and appearance of this facility conveys the educational vision of the school" and is designed to evaluate this premise. A summary of the mean responses for statement 23 is reviewable in table 13, column L. The mean responses from each of the fifteen schools are ranked from high to low in table 17, column F.

Table 17

Schools Ranked High to Low on the Educators Mean Response to the Statement: "The design and appearance of this facility conveys the educational vision of the school"

A	B	C	D	E	F
	Rank Based on Mean Response High to Low	Degree to Which School has an Educational Vision (18)	Average of Means of Six Domains of Planning	Those Responsible for Planning Understood Interaction of Domains (13)	Design/ Appearance Conveys Vision (23)
Top Third	1	School 12	School 12	School 12	School 12
	2	School 07	School 11	School 11	School 11
	3	School 11	School 07	School 07	School 07
	4	School 05	School 05	School 02	School 09
	5	School 01	School 09	School 04	School 05
Middle Third	6	School 02	School 02	School 05	School 02
	7	School 03	School 14	School 06	School 08
	8	School 06	School 04	School 09	School 04
	9	School 09	School 06	School 14	School 14
	10	School 14	School 03	School 08	School 03
Bottom Third	11	School 08	School 08	School 13	School 06
	12	School 15	School 13	School 10	School 10
	13	School 04	School 10	School 03	School 13
	14	School 13	School 01	School 01	School 01
	15	School 10	School 15	School 15	School 15

Supposition I: A Descriptive Analysis

A visual examination of the data in table 17 yields a discernable pattern. The most obvious pattern is the fact that seven of the fifteen schools (07, 10, 11, 12, 13, 14, 15) remain exclusively within the same one third for all four variables listed. For example, school seven is ranked the second highest for educational vision and third highest for the average of the six domains of planning, the interaction of the domains, and

the degree to which the facility is a physical representation of an educational vision. Considered as independent, the first three variables (columns C, D, E) for school 07 are in the top third, while the fourth dependent variable (column F), is also in the top third. In total, this occurs three times in the top third (schools 07, 11, 12), once in the middle third (school 14), and three times in the bottom third (schools 10, 13, and 15).

The Systems Model for Educational Facilities Planning is built on the premise that if a school has an educational vision and if those responsible for the design and construction of that facility manage the interaction of economic, political, and social forces, as well as the needs of teachers and students, then by using the resources available, design professionals and educators can design and construct an educational facility that is a physical representation of an educational vision. The fact that these seven schools demonstrate a distinct relationship between the educational vision, the degree to which planners understand the variables within the six domains and the interaction of the variables across the domains, and the degree to which the facility is a physical representation of the educational vision, all provides justification for further investigation.

Of the remaining eight schools, six schools (02, 03, 05, 06, 08, 09) have variables split between the top third and middle third or between the middle third and the bottom third. In other words, in the case of these six schools, variables never fall outside of adjacent thirds. Of the remaining two schools, one (school 01) has an educational vision in the top third, yet the other variables are in the bottom third; the degree to which the design and appearance is a physical representation ranks in the majority of the variables in the bottom third. This is consistent with what the Systems Model for Educational

Facilities Planning predicts. In this case, the systems model predicts that if a school has an articulated educational vision, but those responsible for planning the facility do not manage variables within and across the six domains of planning, then the school is not a physical representation of the educational vision. The final school (04) has each of the three independent variables in different thirds. The educational vision for school 04 is ranked in the bottom third, the degree to which planners understand the domains of planning as being ranked in the middle third, and the degree to which the facility planners understand the interaction of the domains as being the bottom of the top third. The degree to which the design and appearance is a physical representation ranks in the middle third.

For the eight schools that do not have the three independent and dependent variables within the same third, it is important to note that at no time do any of the fifteen schools with a majority of the independent variables that rank in the top third with a dependent variable that ranks in the bottom third. Likewise, at no time do any of the fifteen schools with a majority of the independent variables that rank in the bottom third have a dependent variable which ranks in the top third.

The relevance of these patterns is even greater if it is considered that amongst the fifteen schools, the difference between the maximum and minimum mean response for the educational vision sorts the ranking of the fifteen schools over a range of 1.485. The difference of the maximum and minimum means for the average degree to which facility planners understand the six domains of planning rank the schools over a range of 2.080. The difference in the mean responses for the degree to which educational facility planners understand the interaction of the domains of planning is 2.120. The maximum

and minimum mean responses of the degree to which the educational facility is a physical representation of the educational vision ranks the fifteen schools over a range of 2.313.

Given the fact that a pattern in the data emerges through a high to low ranking of the mean responses of educators', and indicates a possible relationship between the three independent variables and the dependent variable provides justification for further analysis. This justification is further supported by the fact that the difference between the minimum and maximum mean responses of all the variables result in each variable containing a unique range over which it was ranked.

Table 18

Summary of the Difference between the Minimum and Maximum Mean Responses for the Three Independent Variables and Dependent Variables

Degree to Which Educators Report that the School has an Educational Vision		
Max.	Min.	Difference
6.818	5.333	1.485

Average of Means of Degree to Which Educators Report that Facility Planners Understand Each of the Six Domains of Planning		
Max.	Min.	Difference
5.313	3.233	2.080

Degree to Which Educators Report Facility Planners Understand Interaction of Variables Across the Six Domains of Planning		
Max.	Min.	Difference
5.063	2.943	2.120

Degree to Which Educators Report that the Design of the Facility Conveys the Educational Vision of the School		
Max.	Min.	Difference
6.485	4.171	2.313

Supposition I: A Regression Analysis

As a result of the univariate analysis, the main objective at this juncture of the study is to determine the predictive value of the degree to which an educational facility is a physical representation of an educational vision. Multiple regression analysis is used to ascertain if: (1) the degree to which the school has an educational vision, (2) the degree to which facility planners understand the six domains of planning, and (3) the degree to which facility planners understand how the interaction of variables across the six domains of planning explain the degree to which the educational facility is a physical representation of the educational vision. A multiple regression analysis is conducted to the degree at which educators report that their facility is a physical representation of the schools educational vision (survey statement 23) as the dependent variable. The degree to which the school has an educational vision (survey statement 18), the degree to which facility planners understand the six domains of planning (the mean of the means of survey statements 6 to 11), and the degree to which facility planners understand the interaction of variables across the six domains (survey statement 13) are entered as the independent variables. These variables account for a significant percentage of the variance in the model. The coefficient of determination (R^2) is 0.513, which indicates that these variables explain 51 percent of the variance to the degree at which an educational facility is a physical representation of the educational vision. The multiple regression analysis is significant at a confidence interval of 95%.

Table 19

Regression Model Supposition I: Based on the Premise that if a School has an Educational Vision and if those Responsible for Designing the Facility Manage the Variables within the Six Domains of Planning and the Interaction of Variables Across the Six Domains of Planning then an Educational Facility will be a Physical Representation of an Educational Vision.

Variables Entered	R	R Squared	Adjusted R Square	Std. Error of the Estimate
Survey Statements 13, 18, and the Avg. Mean of Six Domains of Planning	0.717	0.513	0.51	0.909

Note. Dependent Variable: 23
$p < .05$

Survey Results: Supposition II

The second primary supposition of the Systems Model for Educational Facilities Planning states that a school which is a physical representation of an educational vision meets the needs of its stakeholders. Examining this premise is the purpose of survey statement 12 which reads: "This facility meets the needs of faculty, staff, parents, and the community." A summary of the mean responses for statement 12 is reviewable in table 13, column M. The mean responses from each of the fifteen schools are ranked from high to low in table 20, column G. Like the previous tables, the ranking in the table is divided into a top, middle, and bottom third, and the table contains data from the critical components of the Systems Model previously analyzed.

Table 20

Schools Ranked High to Low on the Educators Mean Response to the Statement: "This facility meets the needs of faculty, staff, parents, and the community"

A	B	C	D	E	F	G
	Rank Based on Mean Response High to Low	Degree to Which School has an Educational Vision (18)	Average of Means of Six Domains of Planning	Those Responsible for Planning Understand Interaction of Domains (13)	Design/ Appearance Conveys Vision (23)	Building Meets the Needs of the Stakeholders (12)
Top Third	1	School 12	School 12	School 12	School 12	School 12
	2	School 07	School 11	School 11	School 11	School 11
	3	School 11	School 07	School 07	School 07	School 14
	4	School 05	School 05	School 02	School 09	School 07
	5	School 01	School 09	School 04	School 05	School 09
Middle Third	6	School 02	School 02	School 05	School 02	School 08
	7	School 03	School 14	School 06	School 08	School 04
	8	School 06	School 04	School 09	School 04	School 05
	9	School 09	School 06	School 14	School 14	School 06
	10	School 14	School 03	School 08	School 03	School 02
Bottom Third	11	School 08	School 08	School 13	School 06	School 13
	12	School 15	School 13	School 10	School 10	School 10
	13	School 04	School 10	School 03	School 13	School 03
	14	School 13	School 01	School 01	School 01	School 01
	15	School 10	School 15	School 15	School 15	School 15

Supposition II: A Descriptive Analysis

Examination of table 20 yields a trend which validates the justification for more in-depth analyses. Most notable, eleven of the fifteen schools (01, 02, 04, 07, 08, 09, 10, 11, 12, 13, 15) remain exclusively within the same third for both variables. Of the remaining 4 schools, one school (05) is in the top third at the degree to which the appearance conveys the educational vision, and the middle third at the degree to which

the facility meets the needs of the stakeholders. One school (14) is in the middle third at the degree to which the appearance conveys the educational vision, and in the top third at the degree to which the facility meets the needs of the stakeholders. School (03) is in the middle third at the degree to which the appearance conveys the educational vision is in the bottom third. The degree to which the facility meets the needs of the stakeholders is in the bottom third. The final school (06) is in the bottom third at the degree to which the appearance conveys the educational vision, and middle third for the degree to which the facility meets the needs of the stakeholders.

For the four schools not exclusively in one of the thirds, three of the four (3, 5, and 6) fall in the separation between two of the thirds. Again, as in the previous analysis, at no time does a school with one of the two variables found in the top third have a ranking of the other variable in the bottom third. Likewise, at no time does a school found with one of the two variables in the bottom third have a ranking of the other variable in the top third. The significance of these observations is even greater to the consideration that amongst the fifteen schools, the range of mean responses to the degree at which the educational facility is a physical representation of educational vision is 2.313 while the range of the degree to which the facility meets the needs of faculty, staff, students, and the community is 2.962 (see table 18).

Table 21

Summary of the Difference between the Minimum and Maximum Mean Responses of the Degree to Which an Educational Facility is a Physical Representation of the Educational Vision and the Degree to Which the Facility Meets the Needs of Faculty, Staff, Students, and the Community

Degree to Which Educators Report that the Design of the Facility Conveys the Educational Vision of the School		
Max.	Min.	Difference
6.485	4.171	2.313

Degree to Which Educators Report that the Facility Meets the Needs of Faculty, Staff, Students, and the Community		
Max.	Min.	Difference
5.333	2.371	2.962

Supposition II: A Regression Analysis

As a result of the univariate analysis, the main objective at this juncture of the study is to determine the predictive value of the degree to which an educational facility meets the needs of its stakeholders. Multiple regression analysis is used to ascertain if the degree to which an educational facility is a physical representation of the educational vision that can explain the degree to which the educational facility meets the needs of faculty, staff, students, and the community. A multiple regression analysis is conducted to the degree at which educators report that their facility meets the needs of faculty, staff, students, and the community (survey statement 12) as the dependent variable. The degree to which educators report that their facility is a physical representation of the educational vision (survey statement 23) is entered as the independent variable. This single variable accounts for a significant percentage of the variance in the model. The coefficient of determination (R^2) is 0.392, which indicates that these variables explain 39

percent of the variance to the degree at which an educational facility meets the needs of faculty, staff, students, and the community. The multiple regression analysis is significant at a confidence interval of 95%.

Table 22

Regression Model Based Supposition II: Based on the Premise that if an Educational Facility is a Physical Representation of an Educational Vision then it will Meet the Needs of the Stakeholders

Variables Entered	R	R Squared	Adjusted R Square	Std. Error of the Estimate
23	0.626	0.392	0.390	1.042

Note. Dependent Variable: 12
$p < .05$

Qualitative Data

Introduction

The second phase of the investigation utilizes qualitative methods to complete a comparative analysis of four purposefully selected case studies. This is done, like in the first phase of the study, for the purpose of the examination of the soundness of core components of the systems model and the systems model as a whole. Consistent with the pragmatic tradition, the qualitative phase of this study requires that the validity of the systems model be measured by its experimental results and by the practicality of its use. Driven by the need for rigorous experimental procedures and generalizability of the results, the selection of schools for qualitative study is the most critical step of this phase.

Selection of Schools for Comparative Case Study

The four schools selected for comparative analysis are based on a two-tiered process. The purpose of the two-tiered process ensures that the sites selected demonstrate the greatest possible variation and are information-rich. On the first tier, schools are sorted based on two variables. These variables are as follows: (1) the degree to which educators report that within the school and community that it serves there is a shared sense of purpose and focus on what is important for students (educational vision), and (2) the degree to which the facility contributes to a shared sense of purpose and a focus on what is important for students. The selection of the four schools is made over the widest possible continuum of these two variables. This is consistent with the maximum variation strategy, and better helps offset concerns of external validity, transferability, and researcher bias which often arise during qualitative analysis. Based on the primary criterion, schools 9, 10, 12, and 15 are selected for further evaluation. The distribution of schools in the sample across this tier are shown in *figure 5.*

On the second tier of the selection process, the broad profile of the respondents within each school collected through the use of the survey instrument is utilized to ensure that with the strategy of greatest variation, the sites which are selected are information-rich and provide the greatest opportunity to yield insights and understanding. The number of faculty that responds to the survey, the percentage of educators in each facility involved with the planning process, and the number of educators employed in the building since its opening are all evaluated as a means of evaluating the potential quality and quantity of the data at each site.

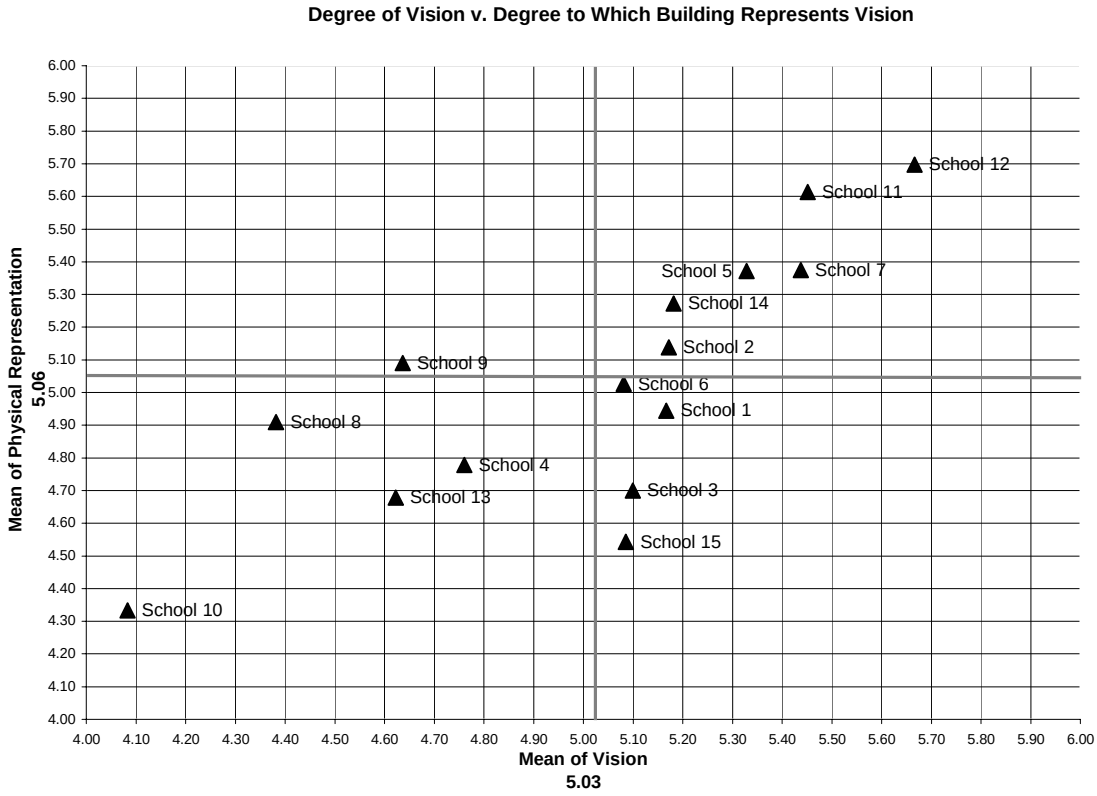

Figure 5. Tier-One: The Distribution of Schools Based on the Degree to Which Educators Report Educational Vision and the Facility is a Physical Representation of the Vision

ANOVA and Post Hoc Analysis of the Least Significant Differences (LSD)

ANOVA and a Post Hoc Analysis of the Least Significant Differences (LSD) are performed on the means of the survey responses from each of the four schools considered for study for the purpose of assuring that the four schools selected demonstrated the greatest possible variance from each other and across the variables being researched. It is found that four schools under consideration are significantly different from one another

(refer to table 23). In addition, Post Hoc Analysis (LSD) is performed on the variables in question across the four schools. It is determined that the majority of the variables which represent the five critical research questions are significantly different across the four schools, and that no other schools within the population can provide a larger spread over the variables (refer to tables 24 through 28). These are the same variables used to develop the regression models in the quantities phase of the study. As a result schools 9, 10, 12, and 15 that are consistent with the maximum variation strategy, provide the greatest continuum over the sample as a whole and the variables under study, and as a result, best offset the concerns of external validity, transferability, and researcher bias.

Table 23

ANOVA

		Sum of Squares	Df	Mean of Square	F	Sig.
18	Between Groups	132.633	14	9.474	10.094	.000
	Within Groups	445.794	475	.939		
	Total	578.427	489			
Mean of 6 (Mean of Means Survey Statements 6-11)	Between Groups	110.051	14	7.861	8.328	.000
	Within Groups	455.886	483	.944		
	Total	565.938	497			
13	Between Groups	122.064	14	8.719	13.902	.000
	Within Groups	294.139	469	.627		
	Total	416.203	483			
23	Between Groups	185.970	14	13.284	9.631	.000
	Within Groups	666.1891	483	1.379		
	Total	852.161	497			
12	Between Groups	265.985	14	18.999	14.818	.000
	Within Groups	620.572	484	1.282		
	Total	886.557	498			

Note. *p<.05

Table 24

Post Hoc Analysis (LSD): Educational Vision (survey statement 18)

Dependent Variable: 18

School	School 10			School 12			School 15		
	Mean Dif.	Std. Error	Sig.	Mean Dif.	Std. Error	Sig.	Mean Dif.	Std. Error	Sig.
School 9	.576	.406	.156	-.909*	.338	.007	.281	.336	.404
School 10				-1.485*	.328	.000	-.295	.325	.364
School 12							1.190*	.236	.000

Note. *p<.05

Table 25

Post Hoc Analysis (LSD): Mean of Mean Six Domains of Planning (Mean of Means survey statements 6-11)

Dependent Variable: Mean of 6

School	School 10			School 12			School 15		
	Mean Dif.	Std. Error	Sig.	Mean Dif.	Std. Error	Sig.	Mean Dif.	Std. Error	Sig.
School 9	.56944	.33057	.086	-.651*	.2768	.019	1.475*	.2757	.000
School 10				-1.220*	.2680	.000	.9053*	.2670	.001
School 12							2.126*	.1964	.000

Note. *p<.05

Table 26

Post Hoc (LSD): Interaction of Variables Across Six Domains of Planning (survey statement 13)

Dependent Variable: 13

School	School 10			School 12			School 15		
	Mean Dif.	Std. Error	Sig.	Mean Dif.	Std. Error	Sig.	Mean Dif.	Std. Error	Sig.
School 9	.477	.404	.270	-.699*	.339	.040	1.421*	.335	.000
School 10				-1.146*	.328	.001	.947*	.324	.003
School 12							2.025*	.237	.000

Note. *p<.05

Table 27

Post Hoc Analysis (LSD): Design and Appearance of School Conveys the Educational Vision (survey statement 23)

Dependent Variable: 23

School	School 10			School 12			School 15		
	Mean Dif.	Std. Error	Sig.	Mean Dif.	Std. Error	Sig.	Mean Dif.	Std. Error	Sig.
School 9	1.106*	.490	.025	-.212	.409	.604	2.101*	406	.000
School 10				-1.132*	.396	.001	.995*	.393	.012
School 12							2.313*	.285	.000

Note. *p<.05

Table 28

Post Hoc Analysis (LSD): Facility Meets the Needs of Stakeholders (survey statement 12)

Dependent Variable: 12

School	School 10			School 12			School 15		
	Mean Dif.	Std. Error	Sig.	Mean Dif.	Std. Error	Sig.	Mean Dif.	Std. Error	Sig.
School 9	.795	.473	.093	-.788*	.394	.046	2.174*	.391	.000
School 10				1.583*	.382	.000	1.379*	.379	.000
School 12							2.962*	.275	.000

Note. *p<.05

Profile of Schools Selected for Comparative Case Analysis

The four schools selected for comparative case study show the greatest variance over two core components of the systems model and are information-rich. School 12 (twelve) is selected for having the highest mean responses of the degree to which educators believe that: “Within this school and community that it serves, there is a shared sense of purpose and a focus on what is important for students” and: “This facility contributes to a shared sense of purpose and a focus on what is important for students. School 10 (ten) is selected for having the lowest mean responses to these same two statements. School 09 (nine) is selected for having a low mean response to the statement: “Within this school and community that it serves, there is a shared sense of purpose and a focus on what is important for students” and a high mean response to the statement: “This facility contributes to a shared sense of purpose and a focus on what is important for students. Finally, school 15 (fifteen) is selected for having a high mean response to the

statement: “Within this school and community that it serves, there is a shared sense of purpose and a focus on what is important for students” and a low mean response of the statement: “This facility contributes to a shared sense of purpose and a focus on what is important for students.

Although the schools are not selected based on differences in physical, social cultural, economic, or academic characteristics, the four schools are nonetheless diverse. Twelve is in a very affluent suburb of a major city in eastern Pennsylvania. Fifteen is in a well-established, middle-class suburb of a major city in eastern Pennsylvania. Nine is in an economically-distressed school district outside a major city in western Pennsylvania and serves four large federally-funded housing projects. And finally, school ten is located in a small town in the Appalachian coal region of central Pennsylvania.

The four schools selected for case study are designed and constructed by four different architectural firms in three different counties of Pennsylvania. Three of the schools opened in 2002 and the fourth opened in 1992. The school’s sizes are 72,400, 143,400, 162,798, and 185,500 square feet respectively. At the time of their construction, the cost to the taxpayers is $9.0 million, $13.1 million, $16.2 million, and $34.4 million. Both the least and most expensive projects of the fifteen schools are represented in the sample (see table 29). The school districts, in which the schools reside, range in size, from 2.9 to 125.2 square miles. This range represents the smallest and the largest districts of the fifteen schools (see table 29). Economically, the percent of the student body’s economically disadvantaged are 3.0%, 11.40%, 17.6%, and 66.3%. Of the fifteen schools surveyed, the four schools selected for site visits include the schools with the lowest and highest percentage of economically disadvantaged students (see table 29).

The same is true academically. On the Pennsylvania State System of Assessment (PSSA), passing rates ranged from 27.7% to 58.10%; 70.20% to 84.50%. The sample of four schools of the fifteen that participate, contains the lowest and highest percentages of eighth grade students achieving grade level proficiency in reading and math (see table 29).

Table 29

Comparison of Characteristics of Schools in Sample

School	Arch. Firm Code	County Code	Classification	Grade Span	# of Students	Sq. Miles of Dist.	School Dist. Pop	Year Opened	Cost	% of Economically Disadvantaged	PSSA Passing Rate
School 01	5	1	Rural/Inside Metro Area	6, 7, 8	1,013	103.8	40,001	1/1/1995	$17,007,639.00	5.80%	74.40%
School 02	7	2	Urban/Fringe of Large City	6, 7, 8	928	21.4	12,536	9/1/1992	$12,184,541.00	1.30%	78.40%
School 03	6	3	Urban/Fringe of Large City	6, 7, 8	950	42.9	23,476	9/1/2000	$26,753,981.00	7.30%	78.00%
School 04	2	3	Urban/Fringe of Large City	6, 7, 8	913	34.9	16,152	9/1/2002	$31,739,412.00	29.20%	62.60%
School 05	2	4	Urban/Fringe of Mid Size City	6, 7, 8	1,008	90.3	20,934	8/26/1994	$16,093,406.00	13.80%	67.50%
School 06	10	5	Urban/Fringe of Mid Size City	6, 7, 8	565	95.5	34,573	9/1/1994	$12,872,678.00	12.50%	67.80%
School 07	3	1	Urban/Fringe of Mid Size City	6, 7, 8	870	16.1	24,366	1/1/2002	$23,970,927.00	12.70%	68.90%
School 08	8	6	Rural Outside Metro	6, 7, 8	766	283.3	21,531	9/1/1998	$15,847,702.00	46.70%	57.90%

Table 29 (continued).

School	Arch. Firm Code	County Code	Classification	Grade Span	# of Students	Sq. Miles of Dist.	School Dist. Pop	Year Opened	Cost	% of Economically Disadvantaged	PSSA Passing Rate
School 09	4	7	Urban/Fringe of Large City	6, 7, 8	451	2.9	15,372	9/3/2002	$8,993,485.00	66.30%	26.70%
School 10	11	8	Small Town	6, 7, 8	599	125.2	16,827	9/30/2002	$16,206,428.00	17.60%	58.10%
School 11	12	9	Small Town	6, 7, 8	611	198.9	15,338	9/1/1999	$10,135,868.00	40.10%	60.00%
School 12	1	10	Urban/Fringe of Large City	7, 8, 9	1,056	121.8	71,079	9/3/2002	$34,426,816.00	3.00%	84.50%
School 13	2	11	Urban/Fringe of Mid Size City	5, 6, 7, 8	998	292.7	19,201	9/1/1999	$12,872,678.00	31.70%	55.30%
School 14	13	12	Rural/Inside Metro Area	6, 7, 8	609	34.2	46,820	9/1/1993	$15,298,556.00	20.70%	67.70%
School 15	9	10	Urban/Fringe of Large City	6, 7, 8	1,035	42.3	64,707	9/1/1992	$13,106,571.00	11.40%	70.20%

Table 30

Summary of Characteristics of Schools and School Districts in Sample

Characteristic	Analysis
Number of Schools	15
Number of Different Architectural Firms	12
Number of Different Counties	13
Number of Different Municipal Census Classes	5 of 8
Number of Different Middle School Grade Spans	3
Total Number of Students Attending Schools	12,372
Range in Size of Student Populations	451 to 1,056
Range in Size of Districts (Square Miles)	2.9 to 292.7
Range in School District Populations	12,536 to 71,079
Total Population Served by Schools	442,913
Range Years Opened (by Research Design possible Years Include 1992 through 2002)	8 of 11 (1992–1, 1993–2, 1994-1, 1995-2, 1998-1, 1999-2, 2000-1, 2002-5)
Range in Cost	$9.0 million to $34.4 million
Total Cost	$267,510,688
Range of Percent of Student Body from Low Income Homes	1.3% to 66.3%
Range of Percent of Student Body Passing PSSA (Combined Reading and Math)	27.7% to 84.5%

Table 31

Comparison of Characteristics of Schools Selected for Comparative Case Study

School	Arch. Firm Code	County Code	Classification	Grade Span	# of Students	Sq. Miles of Dist.	School Dist. Pop	Year Opened	Cost	% Economic. Disadvantage	PSSA Passing Rate
School 09	4	7	Urban/Fringe of Large City	6, 7, 8	451	2.9	15,372	2002	$8,993,485.00	66.30%	26.70%
School 10	11	8	Small Town	6, 7, 8	599	125.2	16,827	2002	$16,206,428.00	17.60%	58.10%
School 12	1	10	Urban/Fringe of Large City	7, 8, 9	1,056	121.8	71,079	2002	$34,426,816.00	3.00%	84.50%
School 15	9	10	Urban/Fringe of Large City	6, 7, 8	1,035	42.3	64,707	1992	$13,106,571.00	11.40%	70.20%

Table 32

Summary of Characteristics of Schools and School Districts Selected for Comparative Case Study

Characteristic	Analysis
Number of Schools	4
Number of Different Architectural Firms	4
Number of Different Counties	3
Number of Different Municipal Census Classes	2
Number of Different Middle School Grade Spans	2
Total Number of Students Attending Schools	3,141
Range in Size of Student Populations	451 to 1,056
Range in Size of Districts (Square Miles)	2.9 to 125.2
Range in School District Populations	15,372 to 71,079
Total Population Served by Schools	167,445
Range Years Opened (by Research Design possible Years Include 1992 through 2002)	2 of 11 (1992–1, 2002-3)
Range in Cost	$9.0 million to $34.4 million
Total Cost	$72,733,300
Range of Percent of Student Body from Low Income Homes	3.0% to 66.3%
Range of Percent of Student Body Passing PSSA (Combined Reading and Math)	26.7% to 84.5%

Comparative Case Studies

Using qualitative research methods and the systems model as a lens, the answers to five critical questions for each of the four schools are researched. The questions directly reflect core components of the systems model and are identical to the questions sought in the quantitative phase of this study. These questions are as follows: (1) Does the school have an articulated educational vision? (2) Do the design professionals and educators manage variables within the six domains of planning when designing the facility? (3) Do the design professionals and educators manage the interaction of variables across the six domains of planning when designing the facility? (4) Is the educational facility a physical representation of the educational vision? and (5) Does the educational facility meet the needs of the stakeholders?

In order to qualitatively determine the answers to these questions and in order to establish a sound method of cross-verification, the strategy of data triangulation is utilized. Three separate data sources are collected for each site. Within each set of data sources, evidence is sought to qualitatively determine the answers to the questions listed above. These data sources include text documents, interviews, and artifacts.

The case study for each site begins with a thorough review of text documents in the form of public construction records filed at the Pennsylvania Department of Education. These records, collectively known as PlanCon, represent a set of documents required for every public school construction project that seeks reimbursement from the Commonwealth of Pennsylvania. The PlanCon documents provide in-depth information about: (1) the description of a proposed project and the justification of its need, (2) a technical review of the conceptual drawings, site plan, and educational specifications, (3)

site acquisition, (4) estimated project costs and various tests of a district's financial ability to make payments, (5) a review of the architectural aspects of a project when the design is fully developed, (6) architectural aspects of the project and documentation that other state and local agency requirements have been met or will be met before entering into construction contracts, (7) construction bids, and (8) financing and final costs (PlanCon, 2003).

Following a review of text documents, interviews are conducted at each of the four locations. The interviews follow a standardized open-ended format. The standardized open-ended format as described by Patton (2002) requires that the exact wording and sequencing of the questions be determined in advance and all interviewees are asked the same base set of questions in the same order. However, the questions are worded in a completely open-ended format. The interviews are taped, transcribed, and analyzed. The transcripts are analyzed using the strategy of thematic analysis of text and memoing.

Finally, in order to gain a more thorough understanding of the data uncovered during the document analysis and interviews, the presence or absence of artifacts is utilized to complete the third element of triangulation. Artifacts may include, but are not limited to: ways in which educators, students, parents, and the community utilize the building, building design, reflections of the culture of the school district in architecture, spaces to show case or support the history, traditions, and success of the school, minutes from meetings, informational flyers, newsletters, and any physical objects from the design and construction of the facility, and reports from local newspapers.

School Twelve

Qualitative Data

School number 12 (twelve) is the newest of five middle schools located in a school district classified as "urban on the fringe of a large city (NCES, 2004)". In total, the 122 square mile school district educates 19,089 students and serves a community of 114,410 residents (Standard & Poor's, 2005). Twelve has a student population of 1,056 children served by the full time equivalent of 46 teachers (Great Schools, 2004). Twelve is selected as one of the four purposefully selected sites for a comparative case study from the population of 15 schools surveyed as a result of having the highest mean responses to the degree at which educators feel that their school has an educational vision, and the degree to which the educators believe that the design of their facility conveys that educational vision (see table 33).

Twelve is a 186,000 square foot middle school that opened in 2002. Housing grades seven, eight and nine; the facility contains: thirty-five academic classrooms, nine science labs, four computer labs, a band, orchestra, and choral suite adjacent to a 750 seat auditorium, a full gymnasium, auxiliary gym, and fitness/adaptive physical education space, a technical educational suite, art suite, family and consumer science suite, and library. The facility also contains accommodations for the administration, counselors, and support staff, instructional planning centers for teachers, and a cafeteria with a seating capacity of 450, a student common area, and an outdoor terrace. The building is situated on a fifty-eight acre site which also includes an outdoor all weather track, four-fenced tennis courts, three all purpose fields for soccer, lacrosse, and field hockey, three softball/baseball fields, and a football field. The tract of land on which the school sits is

adjacent to property owned by the township. Together, the properties are utilized to benefit both the school district and the residents of the community.

According to the Pennsylvania Department of Education Division of School Facilities (PDE DSF) the cost of site acquisition, structure, and movable fixtures, and equipment for school twelve equals $34,426,816.00 (PDE DSF, 2002). PDE DSF calculates the per square foot cost of an educational facility by adding the cost of the structure, architects' fee, and sewage disposal, and then divides it by the architectural area in square feet. PDE DSF calculates the per square foot cost of school twelve to be $140.64 (PDE DSF, 2002).

The student demographics of school twelve reveals a student body which is homogenous, academically excelling, and coming from middle and upper middle class homes. The composition of the student body is 94.4% white; 2.7% Asian/Pacific Islander; 1.6 % African American; 1.2 % Hispanic; and less than 1.0% American Indian/Alaskan National (Standard & Poor's, 2004). In 2004, while attaining adequate yearly progress in all areas defined by the federal government's *No Child Left Behind Act of 2002,* 92% of eighth grade students test proficient in reading and 89% test proficient in math (Standard & Poor's, 2004). In that same year, the school district posts a graduation rate of 94% (Standard & Poor's, 2004). The median household income in the school district is $126,847.00 and the median home value is $212,059.00 (Standard & Poor's, 2004). According to the Pennsylvania Department of Education, only 2.8% of the student body is from low income households (PDE Stats, 2004).

As reported by Standard and Poor's in 2004, the school district in which school twelve resides has an average operating expenditure of $8,000.00 per student. The

$8,000.00 per child represents expenditures on instruction, support services, and non-instructional services, among other day-to-day purposes, from the general fund, special revenue fund, food services, child care, non-major fund and other enterprise funds. Operating expenditures include salaries and benefits, supplies and materials, and purchased services. Operating expenditures exclude capital and debt-related expenditures, adult education, community service, as well as trust and agency funds, and internal service funds. Of the $8,000.00 per child operating expenditures, $5,998.00 is spent on instruction and instructional support (Standard & Poor's, 2004). In the same year, the school district carries a debt with expenditures that equal $823.00 per student and capital expenditures of $2,712.00 per student (Standard & Poor's, 2004).

Traveling past vineyards, horse farms, veterinary clinics, specialty boutiques, and large, newly constructed residential homes, one can speculate that school twelve is situated in a fairly affluent community that experiences population growth. Beautifully landscaped, single family homes situate in excess of 3,500 square feet and are constructed on lots larger than an acre, bound by old fieldstone walls. Often, clusters of these homes include a prominent and beautifully restored farmhouse that clearly once presided over acreage on which the neighborhood now sits. Though there are still open spaces and working farms, one need not drive far on crowded two lane roads to find fields which still show signs of recent crops, but are dotted with surveyor stakes, marked by a sign which foretells the sale of "Building Lots".

Beyond the physical appearance of the community, congestion on the roads, and amount of new residential construction, a review of local newspaper articles provides empirical evidence of rapid population growth. In October of 2000, the superintendent of

the school district in which school twelve resides presents a report on enrollment statistics to the board of school directors. In this report, he indicates that in middle schools alone, 137 new students are added in one year to bring the total number of students in seventh, eighth, and ninth grades to 4,004 (Local Newspaper 12, 2000). In order to deal with the rapid increase in student population, the superintendent in his report recommends the use of portable classrooms, the relocation of kindergarten classes, and an addition of a fifteenth elementary school. By the summer of 2002, the year in which school twelve opens, the school district is involved in 56 separate capital improvement projects which are primarily brought about as a result of rapid population growth (Local Newspaper 12, 2002).

In an interview with the building principal of twelve, the principal describes how rapid changes in the size, composition, and needs of the student body (demographics) have created a "culture of change". "Our parents, teachers, and students, consider change the norm," the principal comments, and then supports the observation by saying: "I don't remember a time since I began working in the district that we haven't been involved with a major capital improvement project!" (Interview 12-1, 2006). Quantitatively, the observations made by the principal are supported by the survey results of the educators at school twelve. During the first phase of this study, 84.6% of the educators at school twelve participate in the quantitative survey (see table 33). In that survey, demographics is the domain of planning that that educators feel require the greatest level of detailed understanding by those responsible for planning schools. During the structured interviews with educators from school twelve, five out of the seven educators interviewed speak about the growing student population and how this brings about a need for

additional facilities (Interviews 12-1, 12-2, 12-5, 12-6, 12-7, 2006). Though school twelve is a very large structure, how the facility is utilized provides a very different "feel". One of the teachers interviewed states that the building "helps (maintain) the close relationship that we have with students" (Interview 12-5, 2006). As mentioned earlier, each grade level is academically housed on a separate floor, creating three schools within one. On each floor, there are three academic teams. The teachers on each team share adjacent rooms and student lockers are in the hall outside their rooms. When the students move to auxiliary spaces, they do so as a team or grade level. The auxiliary spaces are all adequate to support the size of the student body. For example, the cafeteria has a seating capacity of 450 students, while each grade level contains approximately 350 students. As a result, the cafeteria effectively, efficiently, and comfortably serves and houses the students of an entire grade. During structured interviews, one of the teachers state: "One of the fun things that I see is that because of the layout (of the building), though there are so many students, you never feel crowed. You don't feel like there are as many students as there really are. If you say to someone we have over 1,100 students, most people (when in the building) wouldn't even know that" (Interview 12-6, 2006).

At the time school twelve is being planned and constructed, the economics associated with rapid growth in the student population do not appear to be an issue in the school district or community. While the mean response of all educators (n = 496) who participate in the survey in the first phase of this study rank the economics of the school district and community as the second most important domain that educational facility planners need to understand, the educators at school twelve (n = 32) rank economics sixth out of seven domains (see table 34). A review of the economic data explains why

economics is not considered a primary factor in the planning of school twelve. Fifty-four percent of household incomes in the school district exceed $75,000, 22% have household incomes between $100,000 and $149,000, and 16% of household incomes exceed $150,000 (Standard & Poor's, 2004). During a building tour, the principal discusses the budget for the project and his ability to make decisions with regard to the construction of the facility and the purchase of furniture, fixtures, and movable objects. The principal has freedom to make changes to the facility and determine purchases that he feels are educationally sound if they are within reason and remain within the fixed budget. The Pennsylvania Department of Education Division of School Facilities (PDE DSF, 2002) reports that the budget for furniture, fixtures, and movable objects for school twelve is just over a million dollars. From the interview and as evidenced by the building tour, the principal takes this responsibility seriously. Student desks and chairs, teacher desks and chairs, filing cabinets, and audio-visual equipment are identical throughout the building. Through a standardization and bid for bulk quantities, costs are reduced. With the trust of the superintendent of schools, the mindset that the principal needs to make sound, reasonable decisions about changes and purchases, and with the school district and community turned attention towards the onset of another major capital improvement project, the principal reports that he and his core team of educators made those decisions with few questions asked. In the words of the principal, "The superintendent was pretty much hands-off". In two separate interviews, educators directly involved with the planning of the facility echo the same sentiments as the principal when they discuss decisions with regard to changes to the facility and the purchase of slightly over one million dollars of furniture, fixtures, and movable objects, (Interviews 12-2, 12-3, 2006).

One states that: “As long as we were not making any wild decisions (about spending), we were flying under the radar. The community was more concerned with the high school project” (Interview 12-3, 2006).

Though the economic and tax implications associated with the construction of a new school are often a point of contention within the community, a review of local newspaper articles do not evidence any friction in the relationships between educators, elected officials, parents, community groups, and citizens (politics) with the decision to build school twelve, or the economic impact that comes with that decision. In December 1999, the board of school directors, votes 8-0, with 1 member absent, in order to proceed with plans to build a fifth middle school in the school district (PlanCon Twelve, 2000). Though the decision to proceed with plans to build a new middle school is unanimous and a review of newspaper articles reveal no negative comments on the decision, the decision of where to build the school becomes a divisive political issue. Newspaper articles chronicle a nearly year long battle between the school district and one of the nine municipalities that the school district serves. The controversy centers around constructing the school on an “environmentally sensitive” piece of land (Local Newspaper 12, 2000). The issue becomes “such a hot topic” that school board members vow “to proceed with the plan at all costs”, regardless of the township supervisors’ wishes (Local Newspaper 12, 2000). The township officials block the school board’s efforts to proceed with the project with an argument that the school district’s initial plans will never meet zoning requirements, and also by a refusal to issue variances necessary for construction (Local Newspaper 12, 2000). Although initially the school board refuses to enter into discussions with the township, “supervisors continued to implore the district

to join them in creating a cooperative solution, advantageous to both the municipality and the district." (Local Newspaper 12, 2000). In the end, the township and school district enter into a joint agreement to cooperatively develop a different property for both school district and township use (Local Newspaper 12, 2000). The final agreement transfers property owned by the township to the school district, and property owned by the school district to the township. After these transfers, the school district owns a fifty-eight acre site on which the school would be constructed. The township retained ownership of an existing farmhouse and two acres of land adjacent to the fifty-eight acre property for use as a community center. Also, as part of the agreement, the township is given "first priority" rights, after the school district, for use of its fields by the township via its own clubs or athletic organizations. In addition, the school is designed to allow community access after school hours for use of the gym, athletic facilities, and cafeteria (Building Tour 12, Interview 12-3, 2006). Around the campus and adjacent township property, the school district and township provide walking paths for the general public. Due to the fact that township and school officials mutually agree to the size, shape, and location of the school on the tract of land, and the specifics for site development, the school district is permitted to submit their land development plan as a preliminary/final draft, which effectively accelerates the review process. In the end, the agreement saves the school district nearly $500,000, accelerates the issuance of permits necessary to begin construction, provides for community-wide use of the campus and adjoining township property, and preserves the "environmentally sensitive" tract of land which is the original point of contention (Local Newspaper 12, 2002). Once the controversy over where to build the school is resolved, articles with regard to the construction project are not found

in the archives of the local newspaper until the building is near completion. This is further evidenced through a review of public documents on file with the Pennsylvania Department of Education (PDE). The Commonwealth of Pennsylvania requires a public hearing prior to the construction of a new public building. Act 34 of 1973, also known as the Taj Mahal Act, is designed to keep the public aware of and involved with public construction projects. The format of the hearing provides citizens and governmental officials the opportunity to enter their questions, concerns, opposition, or support of the project into the public record. A review of the transcripts on file with the Pennsylvania Department of Education from this hearing show that not a single parent, educator, member of the community, or elected official expresses concerns, asks questions, or enters comments into the public record when afforded the opportunity to do so (PlanCon Twelve, 2000). The community does, however, turn their immediate attention to another large capital improvement project that is proposed by the school district. Newspaper articles of that time show how the large high school project acts as the catalyst to politically charge the community (Local Newspaper 12, 2000, 2001).

Passing through meadows and lightly wooded areas on what has every appearance of being a two lane rural road, one would never expect to round a bend and find a building such as school twelve. The academic wing, fronted by a smoked glass enclosed stair tower, rises three stories above the landscape. To provide perspective on the size of school twelve, each story of the academic wing houses all of the necessities for a full grade level of over three hundred students, and more than fifteen core and support teachers. To the left of the academic wing and central to the structure is a one to one and a half story entrance. Clearly defined and inviting, the entrance to the main lobby leads

to offices for the administration, counselors, support staff, and the auditorium. To the left of the main lobby and auditorium is the two story gymnasium and athletic facilities. Though the facility is large and basic in its design, an institutional feel is muted through the use of changes in colors, materials, and architectural details. Tan block, brown smoked glass, enameled window frames, curved-roofed porticos, and landscaping break what otherwise would be huge expanses of brown brick.

The planning of school twelve can best be characterized as a bureaucratic. Based on newspaper articles of reports given by the superintendent of schools to the board of school directors, the justification to construct a new middle school is developed through an assessment of existing facilities, student demographics, educational programs, and the development and evaluation of alternate solutions (Local Newspaper 12, 2000, 2001). However, once the decision is made to build, the planning process is top-down and relies heavily upon input from administrators and teachers (Interviews 12-1, 12-2, 12-5, 12-6, 12-7, 2006). A tour of the facility, coupled with structured interviews, support this assertion to reveal that all primary considerations during the design of the facility center around the development, arrangement, and utilization of educational spaces and areas within the facility (Building Tour 12, 2006; Interviews 12-1, 12-2, 12-5, 12-6, 12-7, 2006). A review of Plan Con documents on file at PDE further support this observation, as the school district reports, "preparation of the educational specifications was developed through a series of discussions with students, parents, community members, teachers, administrators, and members of the board of education, as well as a review of the educational research and literature available from other districts with similar building programs, the National Middle School Association, the National Education Association,

research databases and visitations to recently constructed middle schools throughout Pennsylvania" (PlanCon, 2002). In this statement, no specific mention is made of any formal mechanism to utilize input of individuals outside the formal structure of the school district to directly impact the design of the facility. This point is also supported by the fact that newspaper articles (Local Newspaper 12, 2000, 2001) and interviews (Interview 12-1, 2006) can support the supposition that the superintendent of schools and the principal understand the dynamics of the community, needs of the students, educational philosophy and practice, and history of the school district, there is little evidence that participants outside the formal structure of the school district are included in the formal planning process. During structured interviews, three of the teachers involved with the planning process indicate that they have no interaction with the general public during planning of the facility (Interviews 12-2, 12-5, 12-7, 2006). This indication is in contrast to what is reported in PlanCon. The remaining educators that are interviewed make no mention at all of participants from outside the formal structure of the school district. Given the facts that the planning for school twelve rely heavily on input from teachers and administrators, and that when educators at this school are asked about the degree to which their facility "contributes to a shared sense of purpose and a focus on what is important for students", their mean response is higher than that of the other fourteen schools in the sample (see table 13). One might expect to find a school building that is highly customized and geared specifically to meet the needs of the teachers and students of school twelve; however, this is not the case. A tour of school twelve (2006) reveals that the instructional spaces are generic and flexible.

One of the reasons that the instructional spaces in school twelve are generic and

flexible is due to the fact that its initial design began with the blueprint from another school that the architectural firm has already constructed (Interviews 12-1, 12-2, 12-5, 12-6, 12-7, 2006). As the superintendent of the school's primary designee for the design, construction, and opening of the facility, the principal reports that, although he and the lead architect have some freedom to alter spaces within the facility, the footprint of the building can not be changed, and that any changes made to the blueprint have to stay within the established budget. In addition, the principal and architect are also charged with the responsibility of making sure that the facility does not contain any design features which would prohibit it from being converted into an elementary or high school in the future, should the needs of the school district change. The principal estimates that that 60% to 70% of the final design remain unchanged from the original blueprints (Interview 12-1, 2006).

Though the instructional spaces are designed to be both generic and flexible this does not indicate that principles and methods of instruction, and how students learn (pedagogy) is not an important domain during the planning process. The school district has had a long-standing tradition in middle level education. Over forty years ago, in recognition of the unique needs for young adolescents, the school district demonstrates their commitment to this age group and opens a new junior high school; the third in the district (School District Web Site 12, 2006). Since this time, the school district, consistent with changes in national educational movements, evolves from a junior high school model into a middle school model. By the time that school twelve is being planned, the school district is operating four middle school programs. As the number of students in middle level grades increase and tax the capacity of existing facilities, there is

no evidence that the school district has seriously considered moving away from their current grade alignment, structure, or educational philosophy. In development of educational specifications for school twelve, the district indicates in its PlanCon (2002) documents that it has reviewed educational research and literature available from the National Middle School Association. In addition, at the opening ceremonies for twelve, in a speech the principal cites the support of an assistant superintendent who "challenged us to make sure that the academic program would be commensurate with the existing middle schools." To this end, all teachers on the core planning team are middle school teachers. Although the core planning team has little impact on the overall design of the facility, their primary responsibility is to refine and fashion goals, programs, policies, and procedures to govern the educational program within the new facility. In other words, their goal is development, communication, and implementation of the school districts, and the building of the principal's vision for what the middle school program could be within that facility. As the building principal notes in his dedication speech: "These individuals (core planning team) met throughout last year to plan and prepare and develop a vision for the future of our new middle school" (Dedication Speech 12, 2002).

Within the school district and community, the concept of an "educational mission and vision" is not just a means of guiding the planning process for a new facility. The concept and process of developing, maintaining, and communicating an educational mission and vision is central to the culture of the school district. Over the last decade, the three strategic plans for the school district greatly emphasize the concepts of educational mission and vision. The 1992-2000 strategic plan titled "Charting the Course", the 2000-2006 strategic plan titled "Staying the Course", and the 2006-2112 strategic plan,

currently being written and titled “Expanding the Course”, all place an emphasis on the development, maintenance, and communication of an educational mission and vision (District 12 Website, 2006). In the school district’s most recent strategic planning documents, two of the stated goals for the district are; (1) expand the communication network using existing community and cultural groups to share information, and showcase the work and achievements of our students, and (2) structure permanent ways to engage all community stakeholders in a meaningful dialogue with the school district to foster a better sense of involvement (Strategic Planning Document 12, 2006). The school district’s public relations department provides up-to-date information, in both traditional and electronic forms, to the general public with regard to district goals, initiatives, programs, successes, and concerns (School Twelve’s Website, 2006). During structured interviews, all seven participants are able to clearly articulate vision statements of the school and/or school district (Interviews 1, 2, 3, 4, 5, 6, 7, 2006).

A second theme central to the culture of the school district is concept of “change”. In a discussion of rapid population growth, the principal of school twelve describes the school district as a “culture of change” (Interview 1, 2006). However, rather than feeling overwhelmed by change, the school district embraces it. In literature for perspective teachers the school district describes itself as “one of the largest and fastest growing districts in Pennsylvania accommodating over 600 new students each year without ever losing its focus” (Perspective Teacher Information 12, 2006). The strategic planning themes of “Charting the Course”, “Staying the Course”, and “Expanding the Course”, all focus on the change that the district has experienced over the last fifteen years and expects to continue experiencing throughout the term of the new strategic plan.

A final theme central to the culture of the school district is that of "excellence". The packet for realtors and new residents promotes the school district with the phrase: "Excellent Results, Outstanding Recognition, A Reputation of Value to Our Community" (New Resident Packet 12, 2005). In this packet, the school district proceeds to substantiate these claims by providing objective evidence as to why they are an acknowledged leader in curriculum, instruction, assessment, and staff development. They provide lists of students and staff that have local, state, national awards, and recognitions to their credit, and provide data on students who are meeting rigorous academic standards. The district builds the case that the success of the school system has created a reputation that, "crosses state boundaries and draws people to the area" (New Resident Packet 12, 2005).

The concepts of "an educational mission and vision", "change", and "academic excellence" may seem like unusual concepts to reflect the values, attitudes, beliefs, standards, traditions, and customs of the school district and community (culture). However, these are the repeated hallmarks of the school district that guide the actions of individuals and the institution as a whole; they draw the community into the educational process and provide a sense of institutional identity for the district. When considering this notion, it is important to remember the size of this school district, because it is one of the largest in the Commonwealth of Pennsylvania. It encompasses nine municipalities and contains fifteen elementary schools, five middle schools, and three high schools which serve nearly 20,000 students and over 100,000 residents. What binds the citizenry of this school district together and creates an institutional identity, is very different than that of a small, single municipality school district.

In order to design a building that reflects the culture, mission, and vision of the school district, and successfully meet the needs of faculty, staff, students, and the community, the architect and design professionals must understand the needs of the school district and community and have the ability to utilize available resources, and convert their educational vision into a physical structure (architectural acuity). The educators at school twelve that participate in the survey during phase one of this study, rank architectural acuity as the second highest domain in terms of the degree of detailed understanding of those responsible for planning their school. During the building tour (2006) and the structured interviews, and during times when the researcher is free to move about the building and interact with faculty and students, everyone readily speaks about how pleased they are with the facility. During the building tour, the principal expresses that when asked to help design school twelve, his experience of working with a middle school program housed in a facility originally constructed as a junior high school is invaluable. (Building Tour 12, 2006). In addition to his experience, the architectural firm has previously constructed a facility that uses the blueprints from which school twelve is designed from. The lead architect comes to the project with a working knowledge of the finished product. The combination of practical experience and working knowledge of existing facilities gives the principal and lead architect a tremendous advantage. Their efforts, along with those of the core planning team, result in a school building that the faculty rates higher in being a physical representation of the educational vision, and higher in meeting the needs of the faculty, staff, students, and community than the other fourteen faculties did for each of their schools in the sample.

Planning an educational facility that meets the needs of the faculty, staff, students,

and community in a pluralistic democratic society is a complicated social, cultural, political, and economic process. The mechanisms at work are dynamic and those responsible for planning and constructing educational facilities need to understand the interaction of economic, political, and social forces at work as well as the needs of teachers and students. In short, the relationships between the six domains of planning are as important as the variables within any single domain. Those responsible for planning school twelve demonstrate that they have an understanding of these relationships. When the educators at school twelve are asked to respond to the statement: "Those responsible for designing this facility understood the interaction of economic, political, and social forces as well as the needs of teachers and students" their mean response is higher than that of any of the other fourteen faculties which participated in the survey.

Consistent with the quantitative data, an analysis of the qualitative data yields three themes in this area. These themes can best be termed as: (1) understanding, (2) modification, and (3) focus. When educators at school twelve, who are directly involved with the planning of the facility are asked: "Can you please talk about how the final design of this school may have been impacted by the interaction between economic, political, and social forces at work in the school district and the needs of teachers and students", all those interviewed return precise and thoughtful answers. Their responses indicate that they understand the very nature of the question (Interviews 12-1, 12-2, 12-3, 12-4, 2006). The educators demonstrate an understanding of the relationships between the economics of the project and the politics that would have arisen had they not remained on budget (Interview 12-1, 12-2, 12-3, 2006). They discuss the ideal design of the building verses footprint and blueprint mandated as a starting point (Building Tour

12, Interviews 12-1, 12-2, 2006). They understand the nature and intent of the agreement between the school district and how that impacts the location of the building on the fifty-eight acre site, and the location and construction of playing fields (Interviews 12-1, 12-3, 2006). All educators interviewed understand the mission and vision of middle level education in the school district and how the facility is best utilized to fulfill that mission (Interviews 12-1, 12-2, 12-3, 12-4, 12-5, 12-6, 12-7, 2006).

To understand the economic, political, and social forces at work, as well as to understand the needs of teachers and students, those responsible for planning strive to balance these forces by making the appropriate modifications. For example, the principal is restricted by the budget and the footprint of the building; however, he is instrumental in arranging the spaces within the building around a middle school model, thereby ultimately reflecting the educational mission and vision of the school district. The teachers on the core planning team have little impact on the overall design of the facility or the arrangement of spaces within the facility. However, these teachers are successful at fashioning goals, programs, policies, and procedures to govern the educational program within the new facility that reflects the culture of academic excellence expected within the school district and community.

Finally, to make modifications does not mean to compromise their mission and vision. As those responsible for planning school twelve make adaptations to deal with economic, political, and social forces, they do so by remaining focused on the needs of teachers, students, and the community. First and foremost, they remain focused on their beliefs, philosophy, and on the instructional practices they feel are in the best interest of middle school students. In his dedication speech, the principal of school twelve thanks

the superintendent of schools for his trust and support, and for always reminding the core planning team that their "first order of business was the students".

Findings of School Twelve

Does School Twelve have an Articulated Educational Vision?

Quantitatively, the survey reveals that when educators at school twelve are asked to respond to the statement: "This school has an educational vision", their mean response is 6.818 out of a possible 7 (see table 35, statement 18), higher than any of the other fourteen schools in the sample. Qualitatively, as evidenced in structured interviews, a review of local newspaper articles, public documents filed with the Pennsylvania Department of Education, and a review of artifacts from the school district, the concepts of an educational mission and vision are part of the culture in the school district in which school twelve resides. The process associated with developing, maintaining, and communicating an educational mission and vision is central to the culture of the school district. These ideas have been the emphasis of fifteen years of strategic planning, are highlighted in the principal's dedication speech during the opening ceremonies, and can readily be expressed by educators during structured interviews.

Is School Twelve a Physical Representation of the School District's Educational Vision?

Quantitatively, the survey reveals that when educators at school twelve are asked to respond to the statement: "The design and appearance of this facility conveys the educational vision of the school", their mean response is 6.485 out of a possible 7 (see table 35, statement 23)— higher than any of the other fourteen schools in the sample. Qualitatively, as evidenced in structured interviews, a review of local newspaper articles and public documents filed with the Pennsylvania Department of Education, a tour of the

facility, and a review of artifacts from the school district, school twelve is a physical representation of the school district's educational vision.

The combination of practical experience and working knowledge of existing facilities gives the principal and lead architect a tremendous advantage in designing and arranging the spaces in a manner that facilitates a middle school model consistent with the educational mission and vision of the school district. The teachers on the core planning team are equally successful at fashioning goals, programs, policies, and procedures to govern the educational program within the new facility to reflect an expectation of academic excellence commensurate with the four existing middle schools.

In the end, even with the educational spaces designed to be generic, flexible, and built for change, it is understood by those involved with the planning, that these design traits are necessary and represent the stress of rapid population growth being experienced by educators, school district and township officials, and citizens within the community.

Do the Design Professionals and Educators who Plan School Twelve Manage Variables within and Across the Six Domains of Planning when Designing the Facility?

Quantitatively, an analysis of the survey reveals that when educators at school twelve are asked to respond to the statement: "Those responsible for planning and constructing this facility understood the interaction of economic, political, and social forces at work as well as the needs of teachers and students", their mean response is the highest of all fifteen schools participating in the survey. Their mean response is 5.813 out of 7.0 (see table 35, statement 49). In addition, every educator is asked six questions, one for each of the domains of planning, with regard to the degree at which "those responsible for planning the facility understood" each domain. Again, of the fifteen

schools, the educators at school twelve have the highest mean response when the responses of all six questions are averaged. The average of the mean responses to the six questions is 5.313 out of 7 (see table 13).

As evidenced in structured interviews, a review of local newspaper articles and public documents filed with the Pennsylvania Department of Education, a tour of the facility, and a review of artifacts from the school district, those responsible for planning school twelve understand and manage each of the domains of planning as well as the interaction of those domains. Evidence of these observations, arranged by domains, are as follows:

Demographics. When considering demographics, planners design a facility that not only addresses the current size, composition, and needs of the student body, but if future changes in demographics deem necessary, the building can contain design traits that prohibit it from being converted into an elementary or high school facility. Though school twelve is a very large structure, the arrangement of academic spaces within the facility helps foster a close relationship between teachers and students. The auxiliary spaces are all adequate to support the size of the student body. As stated by one of the teachers during the structured interview (2006) and evidenced during the building tour, the facility never feels crowded or impersonal.

Pedagogy. Though the building design is generic and flexible, this does not indicate that the domain of pedagogy is not important to the planners. The school district has a long- standing philosophy of treating young adolescences as an age group with unique educational needs. The principal of school twelve and the core planning team which consists primarily of middle school teachers, make decisions about the arrangement and

assignment of instructional spaces, the purchase of furniture and fixtures, and fashions goals, programs, policies, and procedures to govern the educational program within the new facility. Their stated goal is to make sure that the academic program commensurate with the existing middle schools.

Culture. The educators at school twelve rank culture as the domain of planning that requires the second highest level of detailed understanding in being the domain their planners understand better than any of the others, and the second highest domain of planning in terms of its impact on the final design of the facility. The concepts of "an educational mission and vision", "change", and "academic excellence", are the hallmarks of the school district that guide the actions of individuals and the institution as a whole. They draw the community together and into the educational process. School twelve is designed to be flexible and built for change. The arrangement of spaces within school twelve reflects the educational mission and vision of the school district. The goals, programs, policies, and procedures developed to govern the educational program within the new facility reflect a culture of academic excellence. In these ways, the culture of the school district is reflected in the architecture of school twelve and through the way educators interact with this architecture.

Architectural acuity. The combination of practical experience and working knowledge of existing facilities gives the principal and lead architect a tremendous advantage in converting the school district's educational vision into a facility that meets the needs of faculty, staff, students, and the community. During the building tour (2006) and times when the researcher was free to move about the building to interact with

faculty and students, everyone readily speaks about how pleased they are with the facility.

Economics. The economics associated with rapid shifts in student demographics is not an issue in the school district or community. This is likely the result of two factors. First, the school district is large, affluent, and has a substantial resource base. Second, the principal, lead architect, and core planning team work to assure that all changes to the facility stay in the fixed budget, and that the million dollar expenditures for furniture, fixtures, and movable objects are justifiable and educationally sound.

Politics. Though the decision to proceed with plans to build a new middle school is unanimous and a review of newspaper articles reveals no negative comments on the action, the decision of where to build the school becomes a divisive political issue. Newspaper articles chronicle a near year long battle between the school district and one of the nine municipalities that the school district serves. In the end, the school district and municipality reach a joint agreement that is of mutual benefit. The agreement provides an alternative site, saves the school district nearly $500,000, provides for community-wide use of the campus and adjoining township property during the school day, and results in the selection of a facility design that allows community use of athletic and common areas within the school after hours.

Interaction of domains. An analysis of the qualitative data yields three themes with regard to the interaction of the six domains of planning. These themes are: (1) understanding, (2) modification, and (3) focus. Those responsible for planning school twelve understand the interaction between economic, political, and social forces at work in the school district and in the needs of teachers and students. With an understanding of

the economic, political, and social forces at work, planners strive to create a balance in these forces and make the appropriate adaptations. However, these planners demonstrate that to make adaptations does not mean to compromise their mission and vision. They remained focused on the needs of teachers, students, and the community—especially the students.

Does School Twelve Meet the Needs of the Stakeholders?

Quantitatively, the survey reveals that when educators at school twelve are asked to respond to the statement: "This facility meets the needs of faculty, staff, students, and the community", their mean response is 5.813 out of a possible 6.0 (see table 13)—higher than any of the other fourteen schools in the sample. The qualitative results are consistent with the quantitative results.

From the onset, based on a forty year tradition of treating the middle grades as a unique group within the educational program, the educators involved with planning school twelve are charged with the responsibility of making sure that the academic program is commensurate with the existing middle schools. To this end, the core planning team's primary goal is the development, communication, and implementation of the school district's and principal's vision of what the middle school program could be within the new facility. During the building tour (2006) and structured interviews with educators, and during times when the researcher is free to move about the building and interact with faculty and students, everyone readily speaks about how pleased they are with the facility. Formally and informally educators speak of how the building meets their needs and the needs of their students.

Even though initially concerns are raised with regard to the school district's proposal to build it on an environmentally sensitive property, an agreement with township supervisors provides an alternative site, saves the school district nearly $500,000, provides for community-wide use of the campus and adjoining township property during the school day, and results in the selection of a facility design that allows community use of athletic and common areas within the school after hours. As a result, both the facility and the campus better meet the needs of the community.

Table 33

Tier One and Two Selection Data for School Twelve

School 12			
Mean of Vision (4)	5.667		
Mean of Physical Representation (5)	5.697		
Year of Opening	9/3/2002		
		Count	Percent
Possible Participants		39	
Total Participants		33	84.62%
Involved in Planning (1)	Yes	10	30.30%
	No	23	69.70%
	Total	33	100.00%
Years Spent in Facility (2)	0 to 2	4	12.12%
	3 to 4	29	87.88%
	5 to 6	0	0.00%
	7 to 8	0	0.00%
	9 to 10	0	0.00%
	10+	0	0.00%
	Total	33	100.00%
Facility Utilized As Designed (3)	Yes	33.00	100.00%
	No	0.00	0.00%
	Total	33.00	100.00%

Table 34

Ranked Responses Mean Responses for School Twelve

School 12					
Rank Order of Degree to Which Planning of Facility Requires Knowledge of Domains	Mean of Responses	Rank Order of Degree to Which Facility Planners Understood Domain	Mean of Responses	Rank Order of Degree of Impact on Design of Facility	Mean of Responses
Demographics	6.091	Culture	5.844	Economics	6.063
Culture	5.969	Architectural Acruity	5.839	Culture	5.906
Pedagogy	5.909	Economics	5.813	Interaction	5.813
Interaction	5.906	Interaction	5.813	Architectural Acruity	5.806
Architectural Acruity	5.774	Demographics	5.788	Pedagogy	5.719
Economics	5.750	Pedagogy	5.742	Demographics	5.531
Politics	5.500	Politics	5.581	Politics	5.375

Table 35

Summary of Survey Responses for School 12

Survey Statement	n	Mean	SD	SE
4	33	5.667	0.4787	0.0833
5	33	5.697	0.4667	0.0812
6	33	5.242	0.7513	0.1308
7	32	5.406	0.7121	0.1259
8	32	5.500	0.6720	0.1188
9	33	5.485	0.7550	0.1314
10	33	5.182	0.7687	0.1338
11	33	5.061	0.7044	0.1226
12	33	5.333	0.6455	0.1124
13	32	5.063	0.7594	0.1342
14	32	6.813	0.4709	0.0832
15	33	6.061	0.9663	0.1682
16	33	5.818	0.9505	0.1655
17	33	5.939	0.8993	0.1565
18	33	6.818	0.3917	0.0682
19	33	6.667	0.4787	0.0833
20	33	6.485	0.6185	0.1077
21	33	6.242	0.8671	0.1509
22	33	6.333	0.8165	0.1421
23	33	6.485	0.6185	0.1077
24	33	6.091	0.9799	0.1706
25	33	5.788	1.1390	0.1983
26	32	5.531	1.2177	0.2153
27	33	5.909	1.0113	0.1760
28	31	5.742	1.0945	0.1966
29	32	5.719	0.9583	0.1694
30	32	5.969	0.8224	0.1454
31	32	5.844	0.9197	0.1626
32	32	5.906	0.9284	0.1641
33	32	6.375	0.8707	0.1539
34	32	6.781	0.4908	0.0868
35	32	5.750	1.1914	0.2106
36	32	5.813	1.0906	0.1928
37	32	6.063	1.1053	0.1954
38	30	5.500	1.2526	0.2287
39	31	5.581	1.1188	0.2009
40	32	5.375	1.2115	0.2142
41	31	5.774	1.0555	0.1896
42	31	5.839	0.8204	0.1474
43	31	5.806	0.9458	0.1699
44	32	6.063	0.9483	0.1676
45	31	6.290	0.6925	0.1244
46	32	6.375	0.7071	0.1250
47	32	6.281	0.8126	0.1436
48	32	5.906	0.9284	0.1641
49	32	5.813	0.9651	0.1706
50	32	5.813	1.0298	0.1820

School Fifteen

Qualitative Data

School number fifteen (15) is a sixth, seventh, and eighth grade middle school located in a district classified as "urban on the fringe of a large city" (NCES, 2004). In total, the forty-two square mile school district educates just over 11,000 students and serves a community of 74,000 residents (Standard & Poor's, 2005). Fifteen currently have a student population of 1,056 children served by the full time equivalent of forty-six teachers (Great Schools, 2004). However, when the facility is first opened it is designed to serve only 800 students. A substantial addition added four years after the building is completed increases its total capacity to over a 1,000 students. School fifteen is chosen as one of the four purposefully selected sites for a comparative case study because when evaluated against the other fourteen schools in the sample, the educators at school fifteen have a high mean response at the degree to which they feel that their school has an educational vision, and the low mean response at the degree to which they believe that the design of their facility conveys this educational vision (see table 36). Based on these criteria and on an analysis of variance (ANOVA) of the mean survey responses of the educators at school fifteen, as a single case it was significantly different from the other fourteen schools in the population. It is notable that school fifteen is the oldest school which participates in the study. During the quantitative phase of this study, 53.85% of the educators participate in the survey. Of these participants, 40% have been in the facility for more than ten years, and six of the approximate ten-member team that assists with the planning of the facility still works in the school. Four of these six educators participate in the structured interviews.

In 1992, when the facility opened, the 110,000 square foot middle school houses grades six, seven, and eight (PlanCon 15, 1990). At this time, the facility contains: twenty-five core academic classrooms, six science labs, one computer lab, band and chorus rooms; a gymnasium, auxiliary gym, a technical educational room and industrial arts shop; an art room, family and consumer science suite, and a library. The facility also contains accommodations for the administration, counselors, and support staff, instructional planning centers for teachers, and a cafeteria with a stage. The cafeteria seats 600 students during lunches and 800 students during assemblies (PlanCon 15, 2006, Building Tour 15, 2006, Interviews 15-2, 15-8, 2006). The building is situated on a campus adjacent to the district's other two middle schools. Together, the three middle schools share playing fields and athletic facilities. In 1996, the school district constructs a large addition to school fifteen, thereby increasing the number of core academic classrooms by a full one third (Building Tour 15, 2006, Interview 15-2). Though the enlarged facility still houses grades six, seven, and eight, the school district is reconfigured so that school fifteen receives students from four, rather than three elementary schools (Interview 1-15, 2-15, 2006). While the addition increases the number of academic classrooms, and in turn, the rated capacity of the facility by 200 students, it is impossible to increase the size of halls in the original portion of the building; the district chose not to enlarge the common areas that include the lobby, library, cafeteria, gymnasium and athletic facilities, and the main entrance and exit into the campus (Building Tour 15, 2006, Interview 1-15, 2-15, 3-15, 4-15, 5-15, 2006).

The student demographics of school fifteen reveal a student body which is

somewhat homogenous, achieves a fair level of academic success, and contains a majority of children that come from middle class homes. The composition of the student body is 88% Caucasian, 4.8% African American 2.1% Hispanic, 4.8% Asian/Pacific Islander, and 0.3% American Indian/Alaskan National (Standard & Poor's, 2004). In the 2004/2005 school year, 54% of the eighth grade students at school fifteen test proficient in reading and 45% test proficient in math on the standardized Pennsylvania State System of Assessment (PDE, 2005). While overall, these percentages meet adequate yearly progress as defined by the federal government's *No Child Left Behind Act of 2002*, due to the fact that students identified with special education needs, as a sub-group within the student population, they do not meet mandated goals, and the school and school district are cited by the Pennsylvania Department of Education. In 2004, the school district posts a graduation rate of 97% (Standard & Poor's, 2004). As stated, the majority of students in school fifteen come from middle class homes. The median household income in the school district is $114,238.00 and the median home value is $158.154.00 (Standard & Poor's, 2004). According to the Pennsylvania Department of Education, 11.0% of the student body is from low income households (PDE Stats, 2004).

As reported by Standard and Poor's in 2004, the school district in which school fifteen resides has an average operating expenditure of $9,783.00 per student (Standard & Poor's, 2004). The $9,783.00 per child represents money spent on instruction, support services, and non-instructional services, among other day-to-day purposes, from the general fund, special revenue fund, food services, child care, non-major fund and other enterprise funds. Operating expenditures include salaries and benefits, supplies and materials, and purchased services. Operating expenditures exclude capital and debt-

related expenditures, adult education, community service, as well as trust and agency funds, and internal service funds. Of the $9,783.00 per child operating expenditures, $7,407.00 is spent on instruction and instructional support (Standard & Poor's, 2004). In the same year, the school district carries no debt service or capital project expenditures (Standard & Poor's, 2004).

Driving past strip malls, professional buildings, dry cleaners, and neighborhoods that are clearly built in the 1950s and 1960s, the school district in which school fifteen resides appears to have been at the heart of a suburban landscape for decades. A review of the history of supports these observations. After World War II, the U.S. Steel Corporation announces that it plans to construct a major steel mill in the county where school fifteen now resides. The communities which grow around the new steel mill eventually become the schools district.

U.S. Steel's announcement and subsequent construction of the mill leads to a historic sequence of events in a county that, for the first forty years of the twentieth century, average a 1% population growth (CensusScope, 2006). These events change the face of the urban landscape in the United States. Over the next quarter century, veterans who grew up during the depression and came of age on battlefields in Europe and the Pacific return home from World War II to build one of the major industrial centers in the northeastern United States. Along with U.S. Steel, other mid-century manufacturing and industrial giants are drawn to the area due to its geographic relationship to major metropolitan areas, the availability of road, rail and river ports, and by a skilled and motivated work force.

Within six months of the steel mill breaking ground, a well known post-war

construction company begins building one of the first planned communities. By the time it is completed in 1958, the planned community occupies over 5,500 acres which includes churches, schools, swimming pools, shopping centers, and 17,311 single-family homes (The State Museum of PA, 2003). The community was billed as "the most perfectly planned community in America" (The State Museum of PA, 2003). With the promise of good jobs and home ownership, families flock to the community that represents the post-war American Dream. Over the next twenty years, the community grows and prospers. In 1974, the steel mill reaches its peak employment of just over 8,000 workers (U.S. Steel, Press Release, 2002).

Through the 1950s and into the 1960s, the four municipalities that eventually combine to form the current school district race to keep their school facilities ahead of the population growth. Then, in 1966, the four municipalities enter into an agreement to create the current school district. The primary goal of the agreement enables the newly formed school district to provide more varied programs in better facilities with better equipment than any township or borough could provide by itself (District Information Packet 15, 1990). In order to deal with the pressures of a growing population, the newly-formed school district, governed by a single board of education, organizes and reorganizes its grade alignment, internal boundaries for elementary school assignment, and the way it utilizes facilities. Eventually, the school district settles into a K-6, 7-8, 9-10, 11-12 grade structure which it maintains through the 1970s (District Literature 15, 1990).

Beginning in the mid-to-late 1970s and over the decade that followed, the school district sees a loss of its industrial pre-eminence, suffers economic decline, and is subject

to dramatic population swings. From the mid-1970s to the mid-1980s, 10,000 jobs are lost at U.S. Steel and other major manufacturers due to downsizing and plant closures. This leaves the county with an unemployment rate that it has not experienced since the Great Depression, especially among skilled workers (County Redevelopment Report 15, 2004). In the spring of 1979, with the decline of enrollments (District Literature 15, 1990) and the nation going through a series of economic recessions (National Bureau of Economic Research, 2006), the board of school directors form a "Steering Committee" to study grade reorganization (District Literature 15, 1990). The committee utilizes enrollment projections that are completed by an outside agency to develop a plan that "best served the educational needs of the district and made the best use of existing facilities" (District Literature 15, 1990). From this study, the school district comes to believe that a 9-12 structure at the high school level is "philosophically and educationally ideal". However, the district determines that though it is an educationally appropriate grade alignment, it is not "economically feasible at that time" (District Literature 15, 1990). The school district does conclude that a 6-8 grade structure best meets the "emotional, intellectual and social needs of the emerging adolescent." (District Literature 15, 1990). At the same time, the district reports that a 6-7-8 grade alignment affords the opportunity to "utilize staff more effectively and facilities more efficiently during a period of enrollment change (decline)" (District Literature 15, 1990). As a result, the district reorganizes into a K-5, 6-8, 9-10, 11-12 grade structure. With declining enrollments, economic instability in the community, and a reluctance to change to a preferred high school grade alignment due to the associated cost, it is assumed that the middle school philosophy is ushered into the school district more as a cost effective use

of facilities and faculty than on the merits of the associated pedagogical practices. However, once in the district, the middle school philosophy remains in use for more than twenty-five years. At the time school fifteen is built, the school district has functioning middle school programs for more than a decade and is operating two middle school facilities.

Beginning in the mid 1980s, the county in which school fifteen resides begins revitalization. With a surplus in housing, low mortgage rates, and a reawakening of geographic value of the region, the population of the county begins a sudden and sustained increase (PlanCon 15, 1990). Once again, the area offers an appeal to young families. As a result, children of the "baby boomers" begin an "in-migration" from cities. Though industry has experienced a ten year decline, the county never totally loses its industrial base. As a result of this in-migration, service industries begin to infuse with the existing industrial base, fueling not only an expansion, but also a diversification of the county's economy (U.S. Senate Agricultural Hearings, 1999). In addition to a charged economy, land in the county is still readily available. Though in the 1950s and 1960s, a tremendous investment is made in the development of the industrial centers and surrounding communities, and though in the mid-1980s, these communities contain nearly one third of the county's population, they only comprise ten percent of the county's land (County Redevelopment Report 15, 2004). The availability of land provides opportunities for the expansion of an economic base and room for new residential housing. From 1990 to 2000, the county population grows by 10.43% (CensusScope, 2006), which makes it one of the fastest growing counties in Pennsylvania (U.S. Senate Agricultural Hearings, 1999).

By the end of the 1980s, the district again faces pressures as a result of student enrollment. In response to these pressures, the board of school directors form the "Feasibility Task Force" to study student enrollment and facilities. The Feasibility Task Force determines that the sudden student population growth which begins in the mid-1980s is going to be sustained. As a result, they make recommendations to deal with the size, composition, and needs of the student population through a combination of construction and redistricting. However, even with a rapid decline in debt service and reasonable interest rates, when the cost of the plan is determined, the board of school directors determines that the plan as a whole is not economically feasible.

With many of the recommendations of the Feasibility Task Force discarded and with "serious elementary enrollment problems" (PlanCon 15, 1990), the district continues to move ahead with plans to construct a new elementary school. The school district administration is then charged with the responsibility of taking the recommendations made by the Feasibility Task Force and the data that the committee gathered in order to develop a facilities usage plan that is "cost effective" and to "bring stability and accommodate future growth in the school district" (PlanCon 15, 1990).

In February of 1989, the administration brings forth plans which include twelve to fifteen million dollars of new construction. The fifteen million dollars was on top of the cost for the new elementary school. The board of education and response of the community to the administrations' recommendations is the same as it is with the Feasibility Task Force. The sentiments of the board toward the administrative recommendations are entered into the public record as follows: "The administration's Reorganization Committee report will not provide for alternatives that are viable to our

school system. One of the plans requires the construction of a 12 to 15 million dollar middle school and has met with organized community resistance. It is fair to conclude that everyone in the district agrees on the destination but cannot agree on the course to get us there." Even though the administration reaches many of the same conclusions as the Feasibility Task Force does, debts on existing buildings approach retirement, and debt service and interest rates are low; the board of school directors, based on economic concerns, refuse to make the necessary resources available to proceed with any construction project beyond the new elementary school.

The superintendent of schools is then directed to develop cost options based on five scenarios: (1) Reorganization and No Construction, (2) Reorganization and Additions, (3) Reorganization, Additions, and Redistricting, (4) Reorganization and Construction of a New Middle School, (5) Designation of the Elementary School Project as a Middle School Project, Use of Modular Classrooms at the Elementary Schools, and Reorganization. The administration is directed to present the board with five options and the cost of each of these options by the fall of the 1989/90 school year (PlanCon 15, 1990). In May of 1989, the administrative team reviews the five options with the board of school directors. The option that the administration recommends is designed to reorganize the district over a two to three year period through construction of a third middle school. The old middle school along with the eleventh and twelfth grade building would be utilized to create a 9-12 campus high school, and relieve over crowding at the elementary schools through the strategic placement of modular classrooms rather than the construction of a new elementary school (PlanCon 15, 1990). With this recommendation, those responsible for the educational facilities of the school district try to make the

project more palatable by designating the new elementary school project as a new middle school project. This saves the school district millions of dollars from the initial recommendations made by the administration. In addition, it redirects some of the focus away from the construction proposal and onto the community's ten year desire to have a 9-12 grade high school program.

When reviewing school district information with regard to deliberations over solutions to deal with increased student enrollment, it is possible to draw the general conclusion that there is a great deal of apprehension, frustration, and dissatisfaction within the school district and community (District Publication 15, 2006, PlanCon, 1990, Educational Specifications Document 15, 1990, Interview 15-2, 15-6, 15-7, 2006). This is demonstrated in school board documents placed on file with the Pennsylvania Department of Education in preparation for the districts Act 34 hearing. The level of apprehension, frustration, and dissatisfaction is best expressed in a presentation by an unidentified school director to the board of school directors as a whole. In this presentation he/she implores the board to follow the administration's recommendations and "avoid a crisis management situation" (PlanCon 15, 1990). In frustration with the board's unwillingness to act he/she states: "Preparation to anticipated changes must be based on projected and existing enrollments. Let us be mindful that projections at best are only estimates of what might occur; however, they should never be used as an excuse of undue deliberations, failure to develop a plan to address the problem, or make definitive decisions to move projects forward when validated by live body counts (PlanCon 15, 1990).

In June of 1990, in a split decision, the board of school directors votes, 6 to 2 with

one member absent, in favor of moving forward with the administration's recommendation to designate the elementary school project as a middle school project, reorganize the grade structure within the district to create a 9-12 grade high school campus, and deal with over crowding at the elementary school buildings through the use of modular classrooms (PlanCon 15, 1990).

Given the fact that from this point forward, the actual planning and construction of school fifteen takes less than twenty-four months, it may seem odd to begin this discussion with forty years worth of local history. However, when examining this case it becomes clear that the history of the school district and community is of critical importance to understand the apprehension, frustration, and dissatisfaction that manifests itself in a reluctance to provide additional classroom space. In short, what the educators and design professionals face as they begin the planning process for school fifteen is a reflection of the culture, history, and unfolding of events in the community as a whole. The fact that the school district is located in a planned community that is centered on America's industrial strength, built by a generation that survives the Great Depression and wins World War II, thereby embodying the post-war American Dream was at the very heart of the matter. Now, less than thirty years later, having had their values questioned by the cultural and political events of the 1960s, their economic security lost in the 1970s, and facing change spurred on by a massive in-migration of outsiders in the 1980s, the community that represents security and hope for the parents, now in their sixties, represents turmoil and transition for their children who are now in their forties. Based on this history, it is not a surprising revelation that on the quantitative survey in phase one of this study, when the educators at school fifteen are asked which of the

domains of planning have the greatest impact on the final design of the facility, their top three responses are the domains of: (1) economics, (2) politics, and (3) culture (see table 37).

Unfortunately, even with the majority of the Board of School Directors votes to proceed with the construction of a new middle school, the quantitative and qualitative variables within the six domains of planning and the interaction of those variables across the domains of planning create a daunting task for those responsible for planning, designing, and constructing school fifteen. The interaction of economic, political, and social forces at work in the school district and community are contending with the needs of teachers and students and limiting the resources available to the educators and design professionals responsible for designing and constructing a facility which is a physical representation of the school district's educational visions.

The most severe limitation placed on educators and design professionals occurs when the Board of School Directors votes to designate their elementary school construction project as a replacement middle school. With blueprints already drawn for a new elementary school, rather than lose the investment in architectural fees, those responsible for planning school fifteen are directed to utilize the same the blueprints and specify the facility as a middle school. Though the designation of educational spaces can change and to a minor extent be redesigned, they are to remain virtually unchanged from the blueprints for the elementary school (Interview 15-1, 15-2, 15-3, 15-7, 15-8, 2006). One of the teachers interviewed who was on a small committee of approximately ten teachers "hand selected by the principal at the time" to help plan school fifteen (Interview 15-2) considers himself to be "lucky" to help with the arrangement of work areas and

equipment in the two elementary classrooms that are designated to become the industrial arts area (Interview 15-3, 2006). As another teacher on the core planning team laments, "We were not allowed to do a lot with design. The design was set. We were limited to little more than color choices" (Interview 15-1, 2006). The aforementioned teacher supports the concerns with regard to the shortfall of the building design to explain: "The initial design was to be an elementary school with a cafetorium (a cafeteria with a stage), rather than an auditorium. When the building was changed to a middle school, I had to make recommendations on how to best equip a stage in a cafeteria. What we needed was an auditorium" (Interview 15-1, 2006). To add to the design problems, community members, and especially residents with properties adjacent to the construction site, raises concerns with the project. In an attempt to slow, stop, or redirect the project, issues are raised with regard to the design of the facility and the layout of the campus, the cost of the project, and the wisdom of the school board and administration in choosing to construct a middle school. Property owners adjacent to the site on which school fifteen is to be built raises concerns with regard to the proposed entrance to the property, an access road for deliveries which runs between the school building and their properties, and signage (Interviews 15-1, 15-2, 2006). Many of the issues raised by the community and reported during structured interviews by educators are confirmed during a review of the transcripts from the Act 34 Hearing. A review of the transcripts on file with the Pennsylvania Department of Education record community members that ask questions of the nature: (1) Can the Board of Education still change its mind about the project? (2) What happens if the Board of Education wants to stop the project later? (3) How adaptable is this building? (4) If the Board of Education chooses, can this building still be

an elementary school? (5) Can this building ever become a high school? (6) What other costs are associated with this project? and (7) How much are we spending on furniture and fixtures? (PlanCon 15, 1990).

With community resistance mounting, as a means to "appease" (Interview 15-2, 15-7, 15-8, 2006) the residents with properties that adjoin the site on which the school is to be constructed, the blueprints for the school are reversed so that the building is a mirror image of the original design. With this change, what is on the north side of the building becomes the south side of the building. As a result, the access road for deliveries is changed to the side of the campus opposite the concerned neighbors. Though this change "somewhat appeased" adjacent property owners, it places the gym and the locker rooms on a different side of the campus than the athletic and playing fields (Interview 15-2, 15-4, 15-5). This problem is compounded by the fact that the layout of the campus is not redesigned, therefore the safest and most convenient way to move students from the locker rooms to the fields is ultimately through the main academic area of the building (Interview 15-5, 2006, Building Tour 15, 2006).

When driving to school fifteen, flat-faced strip malls with porticos that protect the shoppers entering and exiting the stores from the rain are common place. The only thing that makes any twenty-five foot stretch of the face of one of these malls appear differently than any other twenty five foot stretch are the signs in the windows. Other than signs, the buildings are symmetrical and unadorned. The sides and backs of these malls have long windowless stretches of brick or block broken by the employee entrances which repeat themselves in equal increments. From the road, school fifteen looks amazingly like one of these malls. Marked only by a low brick sign, the main entrance to

the campus and driveway positions arriving drivers at a forty-five degree angle to two sides of the building. The face of the building that draws your immediate attention has a one story high brick facade with a portico that protects students from the rain as they enter and exit the busses. The buses pull-up, nose first and at an angle to the building. A sign every fifteen feet identifies the number of the bus loading or unloading in that spot. The other side of the building which faces a driver upon approach is one and a half stories high and contains the gymnasium. Other than a few windows just below the roof line, the long stretch of brick on this side of the building is only broken by the occasional entrance. Overall, there are few architectural details or changes in the type or texture of the building materials. The building is fairly symmetrical and unadorned. With that stated, the building is not unpleasant. With minimal architectural detailing, its clean distinct lines accent the well maintained building and spotless campus. The clean facade, sidewalks, and well maintained grounds easily demonstrate pride in upkeep. From the exterior, the building looks efficient and purposeful. However, other than the low sign at the entrance, that purpose is not immediately evident. This is compounded by the fact that the main access into the building is created by cutting-off the corner of the building furthest from the entrance. As a result, the main doors are a forty-five degree angle from the two adjoining sides. Unfortunately, it is on the side opposite the main entrance to the campus. The main doors to the facility face directly toward the main exit from campus. The immediate purpose of the building is most easily recognized in the rearview mirror of a car driving off of the campus. Had the building been positioned as it is originally intended by the designers, rather than as a mirrored image to appease the neighbors, the main doors to the building would face directly toward the main entrance to campus.

Upon arrival, this provides a clear focal point that along with the signage and flagpole, can offer an immediate announcement of the facility's purpose.

Like the exterior, the interior has a very functional look. The clean lines and basic design of the well maintained facility convey functionality and pride in upkeep. Though the majority of the educators are quick to list the faults of the building, they also demonstrate pride in their school, their programs, and their students through an emphasis on the positive things that occur at their school (Interviews 15-1, 15-2, 15-4, 15-8, 2006). Educators are as equally enthusiastic point out ways that the faculty has adapted to the shortcomings of the facility. For example, one educator who is quick to outline the problems associated with practicing and performing in the cafetorium, is as equally quick to explain ways the teachers have "gotten around those issues". The teachers evidence their success by noting the "enthusiasm" of the students and "the large turn outs" when any performances are staged (Interview 15-1, 2006). In another example, after discussing how the size of the gymnasium, locker rooms, and athletic storage areas are too small for the size of the student body, another educator, with pride in their accomplishment, points out how the physical education teachers use the gymnasium, auxiliary gymnasium, hallways, and parking lot to their advantage, and how they govern the movements of the children in the crowded space through a PA system and wireless microphone (Interview 15-2, 2006). The physical education teachers, librarian, and a member of the administrative team all provide examples of the same nature (Interviews 15-4, 15-6, 15-7, 2006).

The contrast between educational concerns that arise from problems with the design of the facility, a sense of shared purpose, and a focus on what is important for

students that is conveyed by educators during structured interviews, is also evident in the results of the survey conducted during phase one of this study. This contrast demonstrated quantitatively and qualitatively, is the reason school fifteen is unique from the other fourteen schools that participate in the research. When the educators at school fifteen are asked to respond to the statement: “This school has an educational vision”, their mean response is greater than that of six of the other fourteen schools and above the mean response of all fifteen schools that participate in the study (see figure 5). At the same time, out of fifteen schools in the sample, the educators at school fifteen have the lowest mean responses to the statements: “The design and appearance of this facility conveys the educational vision of the school” and “This school meets the needs of faculty, staff, students, and the community” (see table 29). During this investigation no single domain more than demographics attributed to the contrast between the degree to which educators at school fifteen believe their school has an educational vision and the degree to which they believe their building is a not physical representation of that vision.

During structured interviews, 100% of the educators convey dissatisfaction with the way that the building addresses the size, needs, and composition of the student body (Interviews 15-1, 15-2, 15-3, 15-4, 15-5, 15-6, 15-7, 15-8, 2006). In the decade that leads to the formation of the school district, and during the twenty-four years leading up to the planning and design of school fifteen, the school district constantly struggles with the size, needs, and composition of the student body. As stated earlier, the primary reason that the school district is formed is to effectively and efficiently deal with student demographics. In documentation on file with the Pennsylvania Department of Education, the school district reports that in the years prior to the planning of school fifteen, they

exercise, “extreme caution not to add classroom space unnecessarily or at a prohibitive cost” (PlanCon 15, 1990). At the same time, a review of district materials and PlanCon documents indicate that from the mid-1980s to the opening of school fifteen in 1992, the stance of “extreme caution” leaves the school district continually short of classroom space. Unfortunately, even with more than twenty-five years worth of lessons learned, the school district continues to fail to adequately predict and adjust to changes in demographics. Since the opening of school fifteen in 1992, the school district has made alterations and additions to five school buildings and has constructed a new elementary school (PDE Construction Summary, 2003). One building which receives a major addition is school fifteen. In 1995, just three years after school fifteen opens, a major addition increases the number of core academic classrooms by a full one third (Building Tour 15, 2006, Interview 15-2) and raises the total rated capacity of the facility by 200 students. Though it might be assumed that a substantial addition alleviates the concerns of educators, due to the fact that it is impossible to increase the size of the hallways in the original portion of the building, and due to the fact that the school district chooses not to enlarge the common areas which include the lobby, library, cafeteria, and gymnasium, athletic facilities, and the entrance and exit to the campus, the original design flaws of the building are exacerbated (Building Tour 15, 2006, Interview 1-15, 2-15, 3-15, 4-15, 5-15, 2006). This set of events is cited by educators during the structured interviews as the primary reason for overall dissatisfaction with the facility (Interviews 15-1, 15-2, 15-3, 15-4, 15-5, 15-6, 15-7, 15-8, 2006).

In the case of school fifteen, culture economics, politics, and demographics are four domains of planning that together represent a uniquely dynamic and complicated

collection of quantitative and qualitative variables. Emphasis on these domains of planning does not indicate that the quantitative and qualitative variables within the domains of architectural acuity and pedagogy are not important in the school district during the time that school fifteen is designed. The fact that the school district has a decade worth of experiences in middle level education is reflected in how the educational spaces are designated within the facility, how teachers are assigned to those spaces in relationship to educational programs and to one another, and how those programs are scheduled within the facility (Building Tour 15, 2006). Likewise, architectural acuity is also evident given the constraints placed on educators and design professionals by the Board of School Directors. Working with the limited resources allotted to them, it is apparent that the architect and design professionals work with the principal and teachers to provide a functional middle school that is as close to a physical representation of the educational vision as possible (Building Tour 15, Interview 1, 2, 2006). In support of this observation, interviews with three of educators who work in this school the year that it opens indicates that the facility functions well as a middle school during its first year of operations (Interviews 15-1, 15-2, 15-3, 2006). Unfortunately, within a year of the facility's opening, accommodations are already being made to deal with changing demographics. In less than three years from the time it opens, educators and design professionals find themselves back at school fifteen to plan a major addition.

Findings of School Fifteen

Does School Fifteen have an Articulated Educational Vision?

The school district in which school fifteen resides currently operates three middle schools. When school fifteen is constructed, the school district has more than a decade

worth of experience with middle level education. During structured interviews, the educators at school fifteen collectively establish that they maintain a shared sense of purpose and a focus on what is important for students. They evidence their beliefs through a demonstration of pride in their school, their programs, and their students. Even when they readily list obstacles to their educational programs due to the design of the facility, they still emphasize the positive things that occur and the ways that the faculty has adapted to them.

Quantitatively, the educators at school fifteen mean response to the statement: "Within this school and community that it serves, there is a shared sense of purpose and a focus on what is important for students", is 5.086 out of a possible 6.0 (see table 38, Statement 4). In addition, when asked to respond to the statement: "This school has an educational vision", the mean response is 5.629 on a scale of 7.00 (see table 38, statement 18). These results are consistent with the findings during the qualitative study.

Is School Fifteen a Physical Representation of the School District's Educational Vision?

From the onset, it proves to be a challenge to plan school fifteen as a facility that is designed to be a physical representation of an educational vision. With plans already drawn for a new elementary school, rather than lose the investment in architectural fees, those responsible for planning school fifteen are directed to utilize the same blue prints and simply designate the facility as a middle school. Though the designation of educational spaces change and to a minor extent be redesigned, they are to remain virtually unchanged from the elementary school blueprint (Interview 15-1, 15-2, 15-3, 15-7, 15-8, 2006). As a result of this action, it is not unexpected when, out of fifteen schools in the sample, the educators at school fifteen have the lowest mean responses to

the statements: “The design and appearance of this facility conveys the educational vision of the school” and “This school meets the needs of faculty, staff, students, and the community (see table 38, statement 12). This sentiment is also echoed during structured interviews, when 100% of the educators convey dissatisfaction with the way that the building addresses the size, needs, and composition of the student body (Interviews 15-1, 15-2, 15-3, 15-4, 15-5, 15-6, 15-7, 15-8, 2006).

Given the fact that school fifteen is the oldest school to participate in the study, it stands to argue that after thirteen years of operation, the educators respond to the survey questions based on current conditions of the facility, and that the lowest degree to which they indicate the facility meets the needs of faculty, staff, parents and the community are the result of events that could not have been anticipated even by the most astute facility planners. To this end then, it is necessary to point out the fact that the design issues which cause the greatest concerns today, begin almost immediately after the facility is opened. Three of educators who participate in structured interviews indicate that within two years of the facility’s opening, teacher planning centers are being converted to additional classroom spaces, and that the common areas, especially the halls, show they are not designed to manage the increasing number of students (Building Tour 15, 2006, Interviews 15-2, 15-3, 15-4, 15-6, 2006). As the elementary schools continue to be pressed for space, the school district is forced to begin planning a major addition to school fifteen. The problems that arise and lead up to the construction of the addition, and the concerns raised with the inadequacy of the addition have been consistent over the thirteen years since school fifteen opens.

Do the Design Professionals and Educators who Plan School Fifteen Manage Variables within and Across the Six Domains of Planning when they Design the Facility?

Quantitatively, an analysis of the survey reveals that when educators at school fifteen are asked to respond to the statement: "Those responsible for planning and constructing this facility understood the interaction of economic, political, and social forces at work as well as the needs of teachers and students" their mean response is the lowest of all fifteen schools that participate in the survey. Their mean response is 3.486 out of 7.0 (see table 38, statement 49). In addition, every educator is asked six questions, one for each of the domains of planning, with regard to the degree at which "those responsible for planning the facility understood" each domain. Again, of the fifteen schools, the educators at school fifteen have the lowest mean response when the responses of all six questions are averaged. The average of the mean responses to the six questions is 3.233 out of 7 (see table 13).

As evidenced in structured interviews, public documents filed with the Pennsylvania Department of Education, a tour of the facility, a review of artifacts from the school district, and a historical examination of the county, those responsible for planning school fifteen have difficulty managing the six domains of planning as well as the interaction of those domains. Of particular difficulty for planners are the quantitative and qualitative variables within the domains of economics, politics, and culture. This is not to indicate that the domains of pedagogy and architectural acuity are not important. However, they are over shadowed by the complexity of the qualitative and quantitative variables in the other four domains. Evidence of these findings, as arranged by domains,

is as follows:

Culture. When examining this case, it becomes clear that the history and culture of the school district and community is of critical importance to understand the apprehension, frustration, and dissatisfaction that manifests itself in a reluctance to provide additional classroom space. The history of the county reveals that the school district is located in a planned community built by the families of men that return home from World War II. Over the forty years that follow, the community prospers, suffers economic and population swings, and then prospers once again. Based on this history, it is not a surprising revelation that, on the quantitative survey in phase one of this study, when the educators at school fifteen are asked which of the domains of planning have the greatest impact on the final design of the facility, their top three responses are the domains of: (1) Economics, (2) Politics, and (3) Culture (see table 37). Although these responses represent forty years of time that leads up to the planning of school fifteen, the dynamics of their impact is none the less important to the twenty-four month period that school fifteen is planned.

Demographics. Leading up to the formation of the school district in 1966 when enrollments are growing rapidly, and on through the 1970s when student enrollment declines, and finally, on into the 1980s when a sudden growth in student enrollment catches the district off-guard, the school district in which school fifteen resides has difficulty coping with the size, composition, and needs of the student body. Over the two decades which lead up to the construction of school fifteen, the school district forms task forces and committees, collects data, and commissions studies to examine issues associated with changes in student demographics. Although recommendations from

these efforts make it clear that additional classroom space is needed, the school district exercises “extreme caution not to add classroom space unnecessarily or at a prohibitive cost” (PlanCon 15, 1990). A review of district materials and PlanCon documents indicate that from the mid 1980s to the opening of school fifteen in 1992, the stance of “extreme caution” leaves the school district continually short of classroom space. Unfortunately, even with the opening of school fifteen, the district continues to be short of classroom space. In the decade that follows the opening of school fifteen, the school district completes alterations and additions to five school buildings and constructs a new elementary school (PDE Construction Summary, 2003). One of the buildings that received a major addition is school fifteen. In 1995, just three years after school fifteen opens, a major addition increases the number of core academic classrooms by a full one third (Building Tour 15, 2006, Interview 15-2) and raises the total rated capacity of the facility by two hundred students. On the quantitative survey in phase one of this study, the educators at school fifteen indicate that the domain of demographics is least understood by those responsible for planning their school, and that demographics is the domain that is least reflected in the final design of the facility.

Economics. Quantitatively and qualitatively, the economics of the school district and community are a domain of major consideration. From a review of the survey results, school district documents, PlanCon documents, transcripts from the Act 34 hearing, structured interviews, and history of the county, the economic turmoil and uncertainty of the late 1970s and 1980s play a critical role in the decision making process. Even though the debt service on several of the school buildings is nearly retired, the interest rates are low, and the educational facilities are not adequate for the current

student population, let alone the projected student population, the Board of Education resists in releasing the resources necessary to make permanent, long-term improvements. As it is known that the capacity of the middle schools cannot handle its student population enrolled in the elementary schools, elementary students continue to attend classes in overcrowded classrooms, thereby forcing the school district to enter into a prolonged decision making process. When the Board of Education does act, the type and amount of facilities constructed barely meet the needs of the student population enrolled.

Politics. The relationships between educators, elected officials, parents, community groups, and citizens are clearly strained during the time which leads up to the planning of school fifteen. A review of school district literature and records, structured interviews, and documents on file with the Pennsylvania Department of Education indicates high levels of apprehension, frustration, and dissatisfaction among the stakeholders of the school district in which school fifteen resides. Transcripts of meetings and school district documents indicate that school board members, the administration, parents, and community members are at times combative. The nature of the relationships within and between these groups, aggravated by the economic situation of the community, result in a school district which is slow to respond to the problems of inadequate classroom space.

Pedagogy. Although overshadowed by economics, politics, culture, and demographics pedagogy is nonetheless important to the school district and its educators. The fact that the school district has a decade worth of experiences in middle level education is reflected in how the educational spaces are designated within the facility, how teachers are assigned to these spaces in relationship to educational programs and to

one another, and how these programs are scheduled within the facility (Building Tour 15, 2006).

Architectural acuity. Architectural acuity is evident given the constraints placed on educators and design professionals by the Board of School Directors. Working with the limited resources allotted to them, it is apparent that the architect and design professionals work with the principal and teachers to provide a functional middle school that is as close to a physical representation of the educational vision as possible (Building Tour 15, Interview 1, 2, 2006). In support of this observation, three of the educators that are interviewed and work in that facility the year that it opens indicate that the facility functions well as a middle school during the first year of operation (Interviews 15-1, 15-2, 15-3, 2006).

Interaction of domains. This investigation identified and described complicated social, cultural, political, and economic mechanisms at work when, in a democratic society, this public school is planned. The interaction of economic, political, and social forces at work in the school district and community contend with the needs of teachers and students, and they also limit the resources available to the educators and design professionals responsible for designing and constructing a facility which is a physical representation of the school district's educational visions. The environment in which this school is planned is complicated and dynamic.

Does School Fifteen meet the Needs of the Stakeholders?

On the quantitative survey in phase one of this study when the educators at school fifteen are asked to respond to the statement: "This school meets the needs of faculty, staff, students, and the community", their mean response is 2.371 out of 6 (see table 38).

Qualitatively, as a result of a building tour (2006) and structured interviews with educators (2006), although Fifteen is a well maintained, functional building it is limited in the degree to which it meets the needs of faculty, staff, students, and the community.

Table 36

Tier One and Two Selection Data for Fifteen

School 15			
Mean of Vision (4)	5.086		
Mean of Physical Representation (5)	4.543		
Year of Opening	9/1/1992		
		Count	Percent
Possible Participants		65	
Total Participants		35	53.85%
Involved in Planning (1)	Yes	6	17.14%
	No	29	82.86%
	Total	35	100.00%
Years Spent in Facility (2)	0 to 2	2	5.71%
	3 to 4	5	14.29%
	5 to 6	5	14.29%
	7 to 8	5	14.29%
	9 to 10	4	11.43%
	10+	14	40.00%
	Total	35	100.00%
Facility Utilized As Designed (3)	Yes	13.00	37.14%
	No	22.00	62.86%
	Total	35.00	100.00%

Table 37

Ranked Responses Mean Responses for Fifteen

School 15					
Rank Order of Degree to Which Planning of Facility Required Knowledge of Domains	Mean of Responses	Rank Order of Degree to Which Facility Planners Understood Domain	Mean of Responses	Rank Order of Degree of Impact on Design of Facility	Mean of Responses
Architectural Acuity	5.471	Economics	4.286	Economics	5.200
Demographics	5.457	Politics	3.657	Politics	3.657
Pedagogy	5.429	Interaction	3.486	Culture	3.486
Economics	5.371	Culture	3.314	Interaction	3.400
Interaction	5.229	Pedagogy	3.114	Architectural Acuity.	3.324
Culture	5.176	Architectural Acuity	3.086	Pedagogy	3.257
Politics	5.029	Demographics	2.286	Demographics	2.657

Table 38

Summary of Survey Responses from Fifteen

Survey Statement	n	Mean	SD	SE
4	35	5.086	0.9194	0.1554
5	35	4.543	1.1966	0.2023
6	34	2.147	1.0483	0.1798
7	35	3.057	1.5328	0.2591
8	35	3.486	1.3799	0.2333
9	35	4.114	1.2549	0.2121
10	35	3.857	1.3093	0.2213
11	34	2.735	1.2627	0.2166
12	35	2.371	1.2853	0.2173
13	35	2.943	1.2113	0.2047
14	35	6.057	0.9983	0.1687
15	35	5.486	1.1973	0.2024
16	34	5.471	0.9609	0.1648
17	35	5.371	0.9420	0.1592
18	35	5.629	1.4770	0.2497
19	35	4.400	1.6306	0.2756
20	35	4.486	1.5024	0.2539
21	35	4.514	1.4219	0.2403
22	35	4.514	1.5787	0.2669
23	35	4.171	1.5046	0.2543
24	35	5.457	2.0771	0.3511
25	35	2.286	1.5257	0.2579
26	35	2.657	1.5135	0.2558
27	35	5.429	1.5394	0.2602
28	35	3.114	1.7619	0.2978
29	35	3.257	1.9755	0.3339
30	34	5.176	1.6044	0.2751
31	35	3.314	1.7451	0.2950
32	35	3.486	1.5787	0.2669
33	35	4.086	1.6156	0.2731
34	35	5.086	1.4627	0.2472
35	35	5.371	1.3303	0.2249
36	35	4.286	1.8562	0.3138
37	35	5.200	1.5301	0.2586
38	35	5.029	1.5809	0.2672
39	35	3.657	1.6439	0.2779
40	35	3.657	1.6259	0.2748
41	34	5.471	1.7621	0.3022
42	35	3.086	1.6693	0.2822
43	34	3.324	1.8541	0.3180
44	35	2.829	1.5809	0.2672
45	35	3.429	1.8034	0.3048
46	35	3.086	1.6337	0.2761
47	34	3.735	1.6933	0.2904
48	35	5.229	1.8001	0.3043
49	35	3.486	1.6337	0.2761
50	35	3.400	1.6485	0.2787

School Nine

Qualitative Data

School number 9 (nine) is the only middle school located in a school district classified as "urban on the fringe of a large city" (NCES, 2004). School nine has a student population of 451 children served by the full time equivalent of 28 teachers (Great Schools, 2004). In total, the 2.9 square mile school district educates 1,564 students and serves a community of 15,362 residents (Standard & Poor's, 2005). School nine is chosen as one of the four purposefully selected sites for comparative case study because when evaluated against the other fourteen schools in the sample, the educators at school nine have a low mean response to the statement: "Within this school and community that it serves, there is a shared sense of purpose and a focus on what is important for students", and a high mean response of the statement: "This facility contributes to a shared sense of purpose and a focus on what is important for students (see table 39). Based on these criteria and on an analysis of variance (ANOVA) of the mean survey responses of the educators at school nine, as a single case, it is significantly different from the other fourteen schools in the population.

School nine is a 72,000 square foot middle school that opens in 2002. Housing grades six, seven, and eight, the facility contains 24 academic classrooms, 3 science labs, 1 computer lab, a full gymnasium with two locker rooms, an art room, technology, family, and consumer science module computer labs, and a library. The facility also contains accommodations for the administration, counselors, and support staff, work areas for teachers, and a cafeteria with a seating capacity of 450. Notably missing from the facility are an auditorium, band, and chorus rooms. In addition, the facility does not

have any athletic or playing fields. The building is situated on a 24 acre parcel of land previously owned by the school district. The tract of land on which the school sits is outside the boundaries of the school district. The school district purchased the land in anticipation of a high school construction project that never comes to fruition (PlanCon 9, 2000). In 1997, the school district opens a new elementary school on the northern edge of the 24 acres. The middle school sits on the southern edge of the same site.

According to PlanCon documents on file with the Pennsylvania Department of Education, the need for the construction of a new middle school is justified based on four criteria (PlanCon 9, 2000). First, the district sites the success of the new elementary school as "attributing to an overcrowding at the kindergarten through sixth grade facility" (PlanCon 9, 2000). The school district plans, with the construction of a new middle school, to remove sixth grade from the elementary school to create room for growth. Second, like the elementary school, the school district's junior/senior high school is at capacity. As a result, there is no space for computer or science labs. In addition, the district projects that increased enrollment at the elementary level will eventually reach the high school to create an even greater need for additional space. The school district plans, with the construction of a new middle school, to remove seventh and eighth grades from the junior/senior school to create space to expand programs for growth. Third, when the district constructed the new elementary school outside of economically distressed neighborhoods, educators and district officials recognize that they are better able to address the health and safety issues of their elementary school students, and better educate the children. They believe that many of the health and safety issues addressed by building a new elementary school need to be extended to a middle school. Finally, the

district subscribes to a middle school philosophy and attempts to operate middle school programs in a junior/senior high school setting. The district feels that the needs of young adolescents can be best met in a separate middle school.

Though the school district provides demographic, pedagogical, and cultural rationale for the construction of a new middle school, economic justification for a new middle school is more difficult. A review of local newspaper articles discloses that school nine is located in a school district with a history of poor fiscal management (Local Newspaper 9, 2005). In 1988, the school district has a $760,000 deficit and an unfavorable report from the state Auditor General's office. The shortage is reported as being the result of "poor fiscal management" (Local Newspaper 9, 2005). By 1992, the district asks the state to take over its operation because of continuing economic troubles (Local Newspaper 9, 2005). By the end of the 1990s, the school district is recognized for reversing its trend of poor fiscal management. In 1997, the school district opens a new K-6 elementary building. This is the first new school in the school district in seventy-five years (District Literature 9, 2006). In addition, that same year, the school district receives a $1.2 million grant to renovate the school district's early childhood center (Local Newspaper 9, 1997). During this time period, the school district receives regular audit reports that indicate full compliance with applicable state laws and regulations, and that the school district receives the funds from the state to which it is entitled (State Auditor General Reports, 1997, 1998, 1999, 2000). It was during this time that the school district gains enough financial solvency to issue general obligation bonds (PlanCon 9, 2000) for the purpose of building a new middle school.

The economic problems of the school district are a reflection of the larger community in which school nine resides. The school district includes four federally funded housing projects which provide housing for low income families (Interview 9-1, 9-2, 9-4, 9-5, 2006). According to Standard and Poor's (2005), 26% of the households in the school district have incomes less than $15,000.00, and an additional 26% have incomes less then $30,000 (Standard & Poor's. 2005). The median household income is $44,913.00 and the median home value is only $46,267.00 (Standard & Poor's. 2005). However, this is not always the situation in the school district. During the first half of the twentieth century, the communities around the school district are known for their extensive iron and steel interests. Also, there are large railroad machine shops and manufactories of enamel ware, lumber, wall plaster, locomotive and car springs, nuts and bolts, malleable castings, chains and forgings, freight and passenger cars, tin ware, concrete, and cigars (Wikipedia, 2006). During the second half of the twentith century, the communities around school nine witness rapid economic decline. The municipality at the heart of the small school district peaks in population, with just under 20,000 residents in the mid-twentith century (Wikipedia, 2006). Less than fifty years later, the 2000 census indicates that the population of the municipality has dropped to 6,622 residents (U.S. Census Bureau, 2006). Over the last decade, the school district and the county in which it resides witnesses a 4.10% decrease in its population; only two of Pennsylvania's sixty-seven counties see a greater out-migration between the 1990 and 2000 census (CensusScope, 2006).

The combination of a decrease in population, a decline in property values, and fixed operating costs drive the per pupil expenditures of the school district well above the

state average. As reported by Standard and Poor's (2004), the school district in which school nine resides has an average operating expenditure of $11,624.00 per student; $3,267.00 more than the state average. The $11,624.00 per child represents money spent on instruction, support services, and non-instructional services, among other day-to-day purposes, from the general fund, special revenue fund, food services, child care, non-major fund and other enterprise funds. Operating expenditures include salaries and benefits, supplies and materials, and purchased services. Operating expenditures exclude capital and debt-related expenditures, adult education, community service, as well as trust and agency funds, and internal service funds. Of the $11,624.00 per child operating expenditures, $8,064.00 is spent on instruction and instructional support (Standard & Poor's, 2004). In the same year, the school district carries capital expenditures of $6,389.00 per student, 480% above the state average (Standard & Poor's, 2004). According to the Pennsylvania Department of Education Division of School Facilities (PDE DSF), the cost of site acquisition, structure, and movable fixtures and equipment for school nine equals $8,993,485.00 (PDE DSF, 2002). PDE DSF calculates the per square foot cost of an educational facility by adding the cost of the structure, architects fee, and sewage disposal, and then divides it by the architectural area in square feet. PDE DSF calculates the per square foot cost of Nine to be $118.81 (PDE DSF, 2002). The per square foot cost is well within the average range of middle schools built in 2001 PDE, DSF, 2001).

Given the economic condition of the school district and community in which school nine resides, it is not surprising that on the survey in the first phase of this study, economics is the domain of planning that educators report to have the greatest impact on

the final design of the facility (see table 40). Beyond the survey results, structured interviews reveal that the educators at school nine discuss the economics of the school district and community in an entirely different manner than the educators in the other three school districts that participate in the comparative case study. During structured interviews in the other three school districts, economics is discussed by educators in terms of the resources that the school district and community provide to teachers and students (Structured Interviews 15-1, 15-2, 15-6, 15, 7, 12-2, 12-3, 12 5, 2006). At school nine, economics is always described in terms of the distress of the community and the problems that poverty causes for families, students, and the school district (Structured Interviews 9-2, 9-3, 9-4, 2006) Given the fact that the small community in which school nine resides is economically distressed and has limited resources to commit to educational facilities, the decision to build an $8 million facility would strain the relationship between educators, elected officials, parents, community groups, and citizens. However, there is no indication that the Board of School Directors has any problems moving the project forward. A review of the transcripts from the Act 34 hearings reveal that during the hearings, only six of nine school board members are present and there are no members of the community at the hearing (PlanCon documents 9, 2000). On March 9, 2000, the board of school directors, with one member absent, vote unanimously to proceed with the construction of a new middle school.

Driving on a road along the Ohio River there are points on the way to school nine that enables one to easily forget where its at. With the river to the immediate left and mountains rising to the immediate right, one gets a glimpse of what this valley must have looked like two hundred years ago. However, as one rounds a corner, skeletons of rusted

river barges stretch along the shore. Pipes, tanks, and pilings, along with mounds of twisted metal beams, rusting and wasting, provide a vivid image of the economic distress that has befallen this community. As bleak as the once thriving river docks now seem, it is still only a small reflection of the difficulties associated with living in the municipality in the heart of this very poor school district. Poverty has given rise to four federally funded low income housing projects that only serve to center the plight of the community on the front doorsteps of the children. Though the community has been involved with renovating and revitalizing efforts (Community Literature, 2006), the principal of school nine reports that during the first semester of the 2005/06 school year, three students are directly or indirectly involved with gun violence, and that a fourth is alleged to have committed a murder (Interview 9-2, 2006). On any given day, gangs, violence, alcoholism, drug addiction, teen pregnancy, and hopelessness can keep students from attending school.

Given the economic, social, and cultural problems in the school district and community, it is not surprising that the student demographics of school nine reveal a student body which is academically struggling and economically disadvantaged. The student body at school nine is primarily Caucasian, Non-Hispanic, and African American. The composition of the student body is 61.7% Caucasian, 36.8% African American, 1.0 % Hispanic, and 0.5% Asian/Pacific (Standard & Poor's, 2004). Although scores have generally been on the increase, in 2005, the eighth grade students at school nine fail to attain adequate yearly progress in reading and math as defined by the federal government's *No Child Left Behind Act of 2002*. During the 2004/05 school year, 67.2% fail to reach grade level proficiency in reading as measured by the standardized

Pennsylvania System of Assessment proficiency in reading, and 70.4% of the eighth grade students fail to make grade level proficiency in math (PDE Report Card 9, 2005). As a result, the school district is cited by the Pennsylvania Department of Education. That same year, the school district posts a graduation rate of 87% (PDE Report Card 9, 2005). According to the Pennsylvania Department of Education, 71% of the student body is from low income households (PDE Stats, 2004).

Perched on a terrace nestled on the side of a hill, school nine makes an immediate and welcoming impression. Using different textures and colors of block and brick, enameled trim, varied pitched roofs and architectural details, school nine is a facility that is easily recognized as a school. In addition, the overall appearance and style of the building gives the impression that the facility is a school for older children. However, the scale, colors, and architectural details do not convey that the building is a high school. Even absent the signage, one would likely guess that school nine is a middle school.

The interior and exterior colors of school nine are muted, earthy, and soothing. Arriving before sunrise, the interior and exterior lighting give the building an amber glow. From the main entrance to campus, simple jade-colored geometric ornamentation can be seen just below the roof line on the exterior of the building as well as on a smaller scale down the halls inside the building. Carrying colors, patterns, and architectural details from the exterior to the interior of the building give the facility a warm, friendly, and inviting look.

As the buses arrive, students in uniforms begin to line up single file in the vestibule. Watching the students arrive through a large plate glass window that separates the office from the vestibule and lobby, one never anticipates seeing five to eight teachers

and security guards enter the lobby, line-up up folding tables, and begin searching every back pack, gym bag, and purse as students enter the building. As students wait for their belongings to be searched, security guards use metal detectors to check every student that enters the building. Exiting the office from behind the plate glass window, one can hear conversations which occur in the vestibule and lobby. The conversations, bag search, and use of metal detectors quickly ground any visitor in the reality of the environment.

Once in the lobby, students are greeted with signs that announce the school is a "Hands-Off Environment," that "Respect, Tolerance, and High Expectations" are important values for the school, and that students are held to a "No Excuses" policy. These terms, phrases, and associated expectations are explained to parents and guardians in a letter prior to the opening of school (Summer Mailing 9, 1005), and also to the students during an assembly on the first day of school (Interview 9-2). These messages are consistently reinforced by educators (District Literature 9-1, 2005, Interviews 9-2, 9 4, 2006). The stated goal of the educators at school nine is to let the students know they are welcome, safe, and encouraged to choose a lifestyle free from crime, drugs, gangs, and violence (District Literature 9-2, 2005). The appearance and layout of the facility, and the manner in which the facility is utilized, greatly assists the educators to provide these messages to students. In short, the facility and the way it is utilized greatly enhances feelings of safety and belongingness for the students (Building Tour 9, 2006).

Once students complete the bag search and pass through metal detectors, they quickly disperse to the three academic wings. Each academic wing houses a separate grade level and is easily accessible from the central lobby. The fourth wing of the building houses the creative arts classrooms, cafeteria, and gymnasium. A tour of the

facility and an interview with the principal reveals that building is designed as a series of wings to better manage the unique needs of different grade levels and the student body as a whole (Building Tour 9, 2006, Interview 2, 2006). In addition to separating the children by grade level, the students are also divided into teams, and the teams are divided into groups. The rooms in each of the wings are arranged so that teachers on a team are assigned to adjacent rooms, and their students' lockers are in the halls just outside those rooms (Building Tour 9, 2006).

Once the academic day begins, students rotate through a very traditional middle school schedule. However, the educators stagger every grade level's eight-period schedule so only one grade level changes classes at a time. This not only reduces noise and disruptions, it allows the administrators and security guards to focus their attention in the hall where students are moving. The head security guard believes that those responsible for planning school nine understand that time between classes is unstructured and prone to disruptions (Interview 9-1, 2006). The security guard points out the fact that the corridors at school nine are designed to have long, unobstructed views (Building Tour 9, 2006, Interview 9-1, 2006). Even when students exit a wing, their movements are easily monitored by the teachers in the wing that they enter. In Nine, it is difficult to find lines of sight with obstructed views from carefully placed teachers and security. Again, it is important to recognize how the design of the facility, coupled with how educators are utilizing that design, combined to manage a difficult student body and help promote feelings of safety and belongingness.

The building is designed to support traditional pedagogical practices of a middle school. Beyond academic subjects, children have an opportunity to participate in

exploratory and physical education classes. Students rotate through periods of art, technology education, family and consumer science, physical education, health, and the library. These spaces, like the academic classrooms, are designed to meet the needs of the students and educators. The physical education teacher, librarian, and art teacher all acknowledge satisfaction with their instructional spaces (Structured Interviews 9-5, 9-6, 9-7, 2006)

In the cafeteria, students eat lunch by grade level. The cafeteria is designed to double as a large group area for the entire school. As a result, the cafeteria is sized to seat 450 students during assemblies. However, for lunch periods, the total number of students does not exceed 160. As a result during lunches, the cafeteria is spacious and flexible. Furniture and fixtures in the cafeteria are kept to only what is needed by students during lunch. The round cafeteria tables only allow seating for six to eight students. The small seating size per table combined with the large floor space provides ease in monitoring a whole grade level of students during lunch. Single fixture bathrooms adjoin directly to the cafeteria. Lunch monitors and security guards only allow one student in each restroom at a time. The students entering and exiting the lavatories are always in plain view of an adult. Again, with forethought in the design, a cafeteria which is often one of the most difficult to spaces to manage in any school, can effectively and efficiently be policed by educators, teachers aides, and security personnel.

Given the degree to which school nine assists and complements the social and academic mission of educators, it is not surprising that during phase one of this study, when educators are asked to respond to the statement: “The design and appearance of this facility conveys the educational mission of the school”, their mean response is 6.237 on a

scale of out of 7.0 (see table 41, statement 23). This is the fourth highest mean response of all fifteen schools that participate in the survey and is separated by only five one-hundredths of a point from the schools ranked second and third (see table 13). Likewise, when asked to respond to the statement: "This facility meets the needs of faculty, staff students and the community", the mean response of educators at school nine is 4.545 on a scale of six (see table 41, statement 12). Their ranked mean response places school nine fifth out of the fifteen schools surveyed (see table 41). With responses of this caliber and observations of this nature, one can speculate that educators play a crucial role in the planning of school nine. However, this is not the case.

School nine is primarily planned by the lead architect, superintendent of schools, and a board member (PlanCon 9, 2000, Interview 2-9, 2006). The principal reports that "Other than being allowed to make some decisions regarding furniture, the school was built with no input from teachers" (Interview 9-2, 2006). The principal goes on to state that the planning of this facility is done primarily by "a board member and the architect." (Interview 9-2, 2006). The principal states that she does not see the design of the school until after the educational specifications for the building are determined. The principal indicates during structured interviews that other than colors, the rest rooms that adjoin the cafeteria, and her insistence on a particular flooring material, she and her teachers have nothing to do with the planning or design of the facility (Interview 9-2, 2006). A review of the PlanCon documents supports the principal's assertion that very little input is collected from the building principal and none is collected from teachers (PlanCon 9, 2000). PlanCon documents indicate that the initial program for the building is developed during meetings attended by central office administration and architects. Using

information from that meeting, the architects present a design proposal. Though the PlanCon documents indicate that at a series of meetings conducted with the middle school principal, district personnel, and interested board members, the principals contends that what occurs is very superficial (Interview 9-2, 2006). To support this assertion, the principal states that she had to "fight for even the littlest change" (Interview 9-2, 2006). The PlanCon documents also record that "all interested district personnel" tour a school project in a neighboring state that is completed by the architectural firm, and is of a similar scope and size as the proposal for school nine. Again, the principal and educators at the building level indicate that they did not participate in the site visit. As a matter of fact, 100% of the educators who participate in structured interviews indicate that they have no input on the design of the building (Interviews 9-2, 9-4, 9-5, 9-6, 9-7, 2006). Finally, PlanCon documents report that the architects tour the school district's three year old elementary facility to collect information on that facility. As part of the tour, they interview the principal and maintenance director to collect feedback on the positive and negative attributes of the new elementary school.

The question then arises without input from educators: "How did the planning of Nine result in a facility that is successful at meeting the needs of faculty, staff, students, and the community?" The answer to this question is likely to be found in the strength of the architectural firm that is hired to complete the project. The firm has been in continuous partnership for over eighty-years. With six offices in three states, the firm has a wealth of experience in the design of public schools. The firm has noted expertise in facility master planning, space programming, and educational planning (Architectural Firm Documentation 9, 2006). The firm's success is supported by the number of award

winning educational facilities throughout Pennsylvania, Ohio, and Virginia (Business Profile 9, 2005). The firm is noted for designing and constructing public and private schools, hospitals, universities, museums and cultural facilities, as well as significant projects for local and state governmental institutions (Business Profile 9, 2005, Architectural Firm Documentation 9, 2006). As a result of a building tour and structured interviews, it is apparent that the facility is specifically designed to be a middle school for urban children. Middle school principles and methods of instruction supported by the National Middle School Association (NMSA, 2006) are embedded in the overall design of the building and arrangement of spaces within the facility. Being aligned with those same beliefs, the principal's assignment of educators within the facility, the policies, programs, and procedures developed to manage teachers and students during the school day, and the curriculum, all emphasize a strong belief in the same principles and methods of instruction supported by the National Middle School Association. Evidence for consistency in the beliefs of the architect and school district administration can be found in the fact that on the survey in phase one of this study, 100% of the educators at school nine indicate that the facility is utilized as it is intended to be by the designers, and they rate architectural acuity as the domain of planning which has the second greatest impact on the final design of the facility. The only domain rated higher in terms of its impact on the final design of the facility is economics. In addition, during structured interviews, all of the educators that state they have no input on the design of the facility also indicate satisfaction with their instructional spaces (Interviews 9-2, 9-4, 9-5, 9-6, 9-7, 2006).

At the same time that educators report a high degree to which their school building contributes to a shared sense of purpose and a focus on what is important for

students, they report that within the school and community there is a low degree of shared sense of purpose and a focus on what is important for students. Out of the fifteen schools that participate in the study, only three schools report a lower mean on this measure (see table 13). During structured interviews, it is revealed that this low score is likely due to events which occur after the facility opens, rather than during the design phase. During structured interviews, all of the educators who are present in 2002 when the building opens mark it as a positive year. The principal opens a new school, with a new curriculum, and with sixteen new teachers that the principal is personally responsible for hiring. In over half of the structured interviews and in discussions with the head custodian and cook, the principal is described as the reason for the success of the school, especially during their first year in operation (Interview s 9-1, 9-3, 9-5, 9-7, 2006). The mission, vision, and success of the school during its first year in operation wins the principal and the staff recognition and an award from a well recognized organization of school administrators (Local Newspaper 9, 2002). The school is touted nationally as an urban success story. After one year in operation, attendance goes up, test scores are up, and morale is high. The principal is quoted in the local newspaper to say: "In just a short period of time with a brand new teaching staff we have had a phenomenal amount of achievement. Everyone looked at us and said the students couldn't do it, but they can and we've proven it" (Locale Newspaper 9, 2003).

Unfortunately, only two years after the building opens, fiscal problems resurface in the school district. In August 2004, the State Auditor General reports that the district has experienced a $556,000 shortfall three years earlier, and that by June of 2003, it mushrooms to a $1.9 million deficit (Local Newspaper 9, 2005, State Auditor General

Report 9, 2004). The Auditor General reports that the school district starts the 2003/04 school year, with a $1.5 million deficit (Local Newspaper 9, 2004, State Auditor General Report 9, 2004). The report also states that the school district fails to stay within state budgetary limitations "in nearly all expenditure categories" (State Auditor General Report 9, 2004). In particular, the district is cited for budgeted monies that are exceeded for furniture and fixture. The district also has some state funding partially rescinded for the placement of four employees on the payroll at professional salaries that are not properly certified. Finally, the school district is cited due to the fact that the records for the high school and middle school student accounts are "completely disorganized".

Compounding the financial problems is a decline in enrollment, a decrease in property values, and high fixed operating costs. And even though in 2000, the school district does, in part, justify the need for a new middle school based on enrollment, by 2004, the school district begins to lose students. During the four year period from the time planning school nine begins until the time fiscal problems surface in 2004, the small district loses 93 students. This is a 6% decline in enrollment (PDE Projections, 2006). Two years later, the district loses a total of 167 studnets, which is more than a 10% decrease in enrollment. By the 2014/2015 school year, PDE (2006) estimates that the total district enrollment will be down to 940 students K-12, a 58% decrease from current enrollments (PDE Projections, 2006). During the aforementioned same year, there is only expected to be 194 students enrolled in the middle school. That is a 40% decrease from current enrollment and 43% under the rated capacity of the facility (PDE Projections, 2006).

As a result of poor fiscal management and decreased enrollment, both staff and

programs have been cut at school nine. In August of 2005, less than a month before school opens, the school district directs the middle school principal to release two creative arts teachers and close the writing lab. The result which ensues follows that class sizes in art, technology education, family and consuner science, physical education, and the library increase to over 32 students per class, and, along with the writing lab, the foreign language program is also cut from the curriculum. In addition, teaching positions on the core academic teams vacant by retirements are not being filled. To fill in these gaps, teachers are assigned to teach across the grade levels. This move creates a substancial disruption in the middle school's team approach to which the school district prescribes and that two years earlier helps the school achieve national recognition (Interview 9-2, 2006).

In both structured interviews and in local newspaper articles, it is evident that after the operation of the first school year, feelings of success are high. Educators and the community are proud that an economically distressed school district finds the means to build their students a brand new middle school that not only increases attendance and standardized test scores, but also provides a safe and secure place where students can be encouraged to choose a lifestyle free from crime, drugs, gangs and violence (Structured Interview 9-2, 2006, Building Tour, 2006, Local Newspaper Article, 2006). Less than two years later, structured interviews and local newspaper articles evidence frustration and anger. Poor fiscal management, a decline in enrollment, a decrease in property values, and high fixed operating costs proceed to quickly erode human resources, academic programs, teaching matreials, and the morale (Structured Interview 9-1, 9-2, 9-3 9-5, 9-6, 2006, Building Tour, 2006, Local Newspaper Article, 2006). When the

quantitative results are examined in light of the qualitative results, it is surprising that teachers responses to questions with regard to the educational vision are not lower.

Findings of School Nine

Does School Nine have an Articulated Educational Vision?

On the quantitative survey, educators at school nine indicate a low degree to which there is a shared sense of purpose and a focus on what is important for students in the school and community. There are only three schools out of the fifteen that participate in the study which were lower (see table 13). However, the case study indicates that a far more complicated set of dynamics are work in the school district where school nine resides. The low quantitative scores simply cannot be explained by the presence or absence of an educational vision. Although the planning of school nine involves very few individuals, with limited input from building level administrators, and no input from students, parents, or the community, it is designed and constructed in well recognized middle school philosophy. That same philosophy and a set of instructional practices are consistent with the vision of the middle school principal and faculty. Once in the facility, educators quickly learn that the design of their school can be utilized to assist them in the pursuit of their mission. This is evidenced in structured interviews, the building tour, and by national recognition that the educators receive for their success. Given the level of recognition that the school receives after its first year in operation, it is not likely that an absence of an educational vision is the reason for the low mean scores on the survey. Stuctured interviews reveal that it is an inability to sustain a well articulated vision that causes these scores. The survey results from school nine may have been very different if the survey was conducted in June of 2003, at the end of the first school year in operation.

By all indications, school nine has a sound educational vision. Unfortunately, the school district does not have the financial stability to sustain their vision and it has not yet reformulated their vision to address the current reality of the environment.

Is School Nine a Physical Representation of the School District's Educational Vision?

When educators at school nine are asked to respond to the statement: "The design and appearance of this facility conveys the educational vision of the school", their mean response was the fourth highest of the fifteen schools (see table 41, statement 23). At the same time, when asked to respond to the statement: "Within this school and community there is a shared sense of purpose and a focus on what is important for students", they have the fourth lowest (see table 39). As established earlier, it is not that the school district does not have an educational vision or that they lack the expertise, experience, or the facilities to achieve that vision. By all indications, school nine is a physical representation of a sound educational vision, and by all indications this educational vision is shared by the architect and central office administrators when the building is designed, and also by the principal and teachers when the building opens. Unfortunately, the school district does not have the financial stability to sustain the vision for which school nine is constructed. In addition, they have not reformulated a new vision to address the current reality of the environment.

Do the Design Professionals and Educators who Planned School Nine Manage Variables within and Across the Six Domains of Planning when They Design the Facility?

Quantitatively, an analysis of the survey reveals that when educators at school nine are asked to respond to the statement: "Those responsible for planning and constructing this facility understood the interaction of economic, political, and social

forces at work as well as the needs of teachers and students", their mean response is the third highest of all fifteen schools that participate in the survey (see table 40).

As evidenced in structured interviews, public documents filed with the Pennsylvania Department of Education, a tour of the facility, and a review of artifacts from the school district, those responsible for planning school nine have no challenges to their handling of the design and construction of the new middle school. With the recognition that the school district receives after the first year the building is in operation, those responsible for planning school nine does an exceptional job in the management of architectural acuity, culture, and pedagogy domains. In addition, it appears that the district does a satisfactory job dealing with the domain of politics and in dealing with the interaction of the qualitative and quantitative variables across the six domains of planning. On the other hand, although there were no questions raised at the time of planning, design, and construction with regard to the domains of demographics and economics, shortsighted planning results in the school district's inability to sustain their educational vision. Evidence of these findings, as arranged by domains, is as follows:

Culture. In a community that is in economic distress where on any given day, gangs, violence, alcoholism, drug addiction, teen pregnancy, and hopelessness can keep students from attending school, consideration of culture is critical. By building the new elementary and middle schools outside of the economically distressed neighborhoods, educators and district officials are better able to address the health and safety issues of the children, and as a result, better educate their students. Both the location and design of school nine promote feelings of safety and belongingness. The educators at school nine

develop programs and procedures that, in conjunction with the facility, address the social and cultural needs of their students while at the same time address academics.

Demographics. The size, composition, and needs of the student body are taken into consideration during the design of school nine. Beyond the fact that the facility adequately handles the size of the population, it is designed to assist with the safe and efficient management of a student population where the threat of violence is a daily reality. Unfortunately, the district certainly takes a gamble when they project that the success of the new elementary school will continue to increase in enrollment if they construct a new middle school. With just the opposite occurring, the school district is not prepared to deal with the problems associated with a decrease in enrollment. Although the justification to build school nine is based, in part, on an expected increase in enrollment, a review of the enrollment figures in the school district indicates to those responsible for planning school nine that, at best, student enrollment only experiences a minimal increase. Also as important, there are clear indications that enrollment can decline.

Economics. Nine is located in a school district with a history of poor fiscal management (Local Newspaper 9, 2005). In the early 1990s, the district asks the state to take over its operation because of continued economic troubles (Local Newspaper 9, 2005). By the end of the 1990s, the school district is recognized for reversing its trend of poor fiscal management. Unfortunately, economic trouble resurfaces in August 2004, when the State Auditor General reports that the district has a $1.9 million deficit. As a result of poor fiscal management, a decline in enrollment, a decrease in property values, and high fixed operating costs, the district finds itself financially incapable of sustaining

the school district's educational vision and mission at the middle school. Given the fact that the junior/senior high school is crowded and over seventy-five years old makes modernization and renovations inevitable. However, in hindsight, the decision to construct a new $8.9 million middle school may not have been the best way to invest the district's very limited resources

Politics. The relationships between educators, elected officials, parents, community groups, and private citizens which lead up to the planning of school nine, do not present any challenges to those responsible for planning the facility. The architect and superintendent develop the educational specifications, and along with a board member, develops the design for school nine. Whether by design or due to the fact that the community contains a high number of people who are disenfranchised, parents, students, community groups, and private citizens are not involved in the planning process. At the hearing of Act 34, only six of the nine members of the board of school directors are present, and no one from the teaching staff, administration, or community (outside of those responsible for running the hearing) enter comments into the public record.

Pedagogy. The facility is specifically designed to be a middle school for urban children. Middle school principles and methods of instruction supported by the National Middle School Association (NMSA, 2006) are embedded into the overall design of the building, the arrangement of spaces within the facility, and reflect in the assignment of educators within those spaces, the curriculum, and by the policies, programs, and procedures that are developed to manage teachers and students throughout the school day. Academically and socially, after the first year in operation, the school is recognized

as having met the needs of students. This is evidenced by a rise in student scores on standardized assessments and by the recognition of the school's success by a national organization of school administrators. At the time of the survey, middle school principles and methods of instruction around which so much is designed are severely limited by a reduction in staff and a lack of funding for programs.

Architectural acuity. The educator's mean response to the degree at which school nine meets the needs of faculty, staff, students and the community is the fifth highest of the fifteen schools which respond to the question. In addition, the educators at school nine rate architectural acuity as the second highest domain of planning to impact the final design of the facility. The reason for these high means is likely to be found in the strength of the architectural firm that is hired to complete the project. The firm has noted expertise in school construction, facility master planning, space programming, and educational planning (Architectural Firm Documentation 9, 2006). Both the architectural firm and school district administration evidence consistent beliefs in the core principles and instructional practices that are recommended by the National Middle School Association. In conjunction with these beliefs, the architectural firm has the experience and expertise to construct a facility that is a physical representation of these beliefs. As a result, 100% of the educators indicate on the survey that the facility is being utilized as it is intended to be by the designers, and also, 100% of the teachers who participate in structured interviews express satisfaction with the layout of the building and their specific instructional space. This all includes classroom teachers, a physical education teacher, the librarian, and teachers working in a lab setting (Interviews 9-1, 9-3, 9-5, 9-7, 2006).

Interaction of domains. Quantitatively, an analysis of the survey reveals that when educators at school nine are asked to respond to the statement: "Those responsible for planning and constructing this facility understood the interaction of economic, political, and social forces at work as well as the needs of teachers and students", their mean response is the third highest of all fifteen schools that participate in the survey. By the recognition received after the first year in operation, those responsible for planning school nine do an exceptional job in the management of architectural acuity, culture, and pedagogy domains. In addition, it appears that the district does a satisfactory job in dealing with the domain of politics and with the interaction of the qualitative and quantitative variables across domains. However, as stated several times earlier, the district's shortsighted planning in the domains of economics and demographics leave the district with a large debt service, a decline in enrollment, a dwindling tax base, and high fixed operating expenditures.

Does School Nine Meet the Needs of the Stakeholders?

The educators at school nine demonstrate the expertise, experience, and the facility necessary to achieve their vision. This is evidenced by the national recognition that is received by the faculty and staff for an increase in attendance and standardized test scores after only one year in operation. During a tour of the facility and structured interviews, it was evident that the facility is specifically designed to be a middle school for urban children. Middle school principles and methods of instruction supported by the National Middle School Association (NMSA, 2006) are held common by the central office administration, architectural firm, and the faculty and staff of the facility. These beliefs are embedded into the overall design of the building and the arrangement of

spaces within the facility, and how these spaces are used to academically, socially, and culturally address the needs of middle school-aged children in the school district. Beyond the design, the location of the new middle school outside of economically distressed neighborhoods results in educators being better able to address the health and safety needs of their students.

On the quantitative survey in phase one of this study, when the educators at school nine are asked to respond to the statement: “This school meets the needs of faculty, staff, students, and the community”, their mean response is the fourth highest of the fifteen schools that participate in the study (see table 13).

Table 39

Tier One and Two Selection Data for Nine

School 9			
Mean of Vision (4)	4.636		
Mean of Physical Representation (5)	5.091		
Year of Opening	9/3/2002		
		Count	Percent
Possible Participants		28	
Total Participants		11	39.29%
Involved in Planning (1)	Yes	3	30.00%
	No	7	70.00%
	Total	10	100.00%
Years Spent in Facility (2)	0 to 2	2	3.64%
	3 to 4	8	14.55%
	5 to 6	1	1.82%
	7 to 8	0	0.00%
	9 to 10	0	0.00%
	10+	0	0.00%
	Total	11	20.00%
Facility Utilized As Designed (3)	Yes	11.00	100.00%
	No	0.00	0.00%
	Total	11.00	100.00%

Table 40

Mean Ranked Responses of School Nine

Rank Order of Degree to Which Planning of Facility Required Knowledge of Domains	Mean of Responses	Rank Order of Degree to Which Facility Planners Understood Domain	Mean of Responses	Rank Order of Degree of Impact on Design of Facility	Mean of Responses
Economics	5.636	Economics	5.091	Demographics	5.364
Politics	5.818	Culture	5.182	Culture	5.455
Pedagogy	5.818	Architectural Acuity	5.364	Politics	5.545
Interaction	5.818	Politics	5.455	Pedagogy	5.545
Culture	5.818	Pedagogy	5.455	Interaction	5.636
Demographics	5.909	Interaction	5.545	Architectural Acuity	5.636
Architectural Acuity	5.909	Demographics	5.545	Economics	5.818

Table 41

Summary of Mean Responses from Nine

Survey Statement	n	Mean	SD	SE
4	11	4.636	1.6293	0.4912
5	11	5.091	1.5136	0.4564
6	11	4.636	0.9244	0.2787
7	11	4.636	1.5015	0.4527
8	11	4.818	1.3280	0.4004
9	11	4.727	1.4206	0.4283
10	11	4.636	1.5015	0.4527
11	11	4.545	1.3685	0.4126
12	11	4.545	0.9342	0.2817
13	11	4.364	1.4334	0.4322
14	11	6.636	0.6742	0.2033
15	11	4.545	2.0181	0.6085
16	11	4.636	1.8586	0.5604
17	11	4.182	1.6624	0.5012
18	11	5.909	1.7003	0.5126
19	11	6.000	1.0954	0.3303
20	11	5.182	1.0787	0.3252
21	11	5.182	0.9816	0.2960
22	11	5.636	1.0269	0.3096
23	11	6.273	0.7862	0.2371
24	11	5.909	0.9439	0.2846
25	11	5.545	1.6348	0.4929
26	11	5.364	1.5015	0.4527
27	11	5.818	0.8739	0.2635
28	11	5.455	1.6348	0.4929
29	11	5.545	1.5076	0.4545
30	11	5.818	0.8739	0.2635
31	11	5.182	1.5374	0.4635
32	11	5.455	1.5076	0.4545
33	11	5.364	1.5015	0.4527
34	11	6.182	0.6030	0.1818
35	11	5.636	0.8090	0.2439
36	11	5.091	1.7581	0.5301
37	11	5.818	0.9816	0.2960
38	11	5.818	0.9816	0.2960
39	11	5.455	1.5076	0.4545
40	11	5.545	1.2933	0.3900
41	11	5.909	0.8312	0.2506
42	11	5.364	1.3618	0.4106
43	11	5.636	0.8090	0.2439
44	11	5.818	1.4709	0.4435
45	11	6.000	1.1832	0.3568
46	11	6.182	0.7508	0.2264
47	11	5.364	1.6293	0.4912
48	11	5.818	0.8739	0.2635
49	11	5.545	1.2933	0.3900
50	11	5.636	1.1201	0.3377

School Ten

Qualitative Data

School number 10 (ten) is the only middle school in a school district classified as "small town" (NCES, 2004). In total, the 123 square mile school district educates 2,218 students and serves a community of 16,540 residents (Standard & Poor's, 2005). School ten has a student population of 558 children served by the full time equivalent of 32 teachers (Great Schools, 2004). School ten is chosen as one of the four purposefully selected sites for a comparative case study from the population of fifteen schools surveyed as a result for having the lowest mean responses at the degree to which educators feel that within in school and community there is a shared sense of purpose and a focus on what is important for students, and also the degree to which the educators believed that the design of their facility contributes to a shared sense of purpose and a focus on what is important for students (see table 42).

School ten is a 143,000 square foot middle school that opens in 2002 (PDE Construction Report, 2002). The facility is constructed on a 101 acre campus adjacent and connected to the school district's high school. The 96,000 square foot high school is constructed in 1968 (PlanCon, 1999). Housing grades six, seven, and eight, the facility is designed with three sections. The first section contains the following: 20 academic classrooms, 4 science labs, 3 computer labs, the library, accommodations for the administration, counselors, and support staff, instructional planning centers for teachers, and a cafeteria with a seating capacity of 200. The second section of the facility contains the art, family and consumer science, and general music rooms, an industrial arts area, and the school's band and choral rooms. In addition, this section also contains a 1,300

seat auditorium. The third section that adjoins to the high school contains the athletic center which houses a full size competitive gymnasium with seating for 957 spectators, a wrestling room, weight room, locker room facilities, and offices. Both the athletic center and performing arts areas are shared by students in both the high school and middle school.

According to the Pennsylvania Department of Education Division of School Facilities (PDE DSF), the cost of site acquisition, structure, movable fixtures and equipment for school ten equals $16,206,428 (PDE DSF, 2002). PDE DSF calculates the per square foot cost of an educational facility by adding the cost of the structure, architects fee, and sewage disposal, and then divides this by the architectural area in square feet. PDE DSF calculates the per square foot cost of school ten to be $94.16 (PDE DSF, 2002). In the year that this facility is bid upon, $94.16 per square foot is deemed a highly competitive price. Of the twenty-seven school districts which seek reimbursement from the Pennsylvania Department of Education in 1999 for the construction or renovation of educational facilities, only seven have a per square foot cost of less than $100.00 (PDE Construction Report, 1999).

The student demographics of school ten reveal a student body which is homogenous, academically borderline, and comes from middle and lower middle class homes. Slightly over 98.0% of the student body is Caucasian, 1.0 % is African American and less than 1.0% is Asian/Pacific Islander, Hispanic, and American Indian/Alaskan National (Standard & Poor's, 2004). In 2005, while barely attaining adequate yearly progress in all areas defined by the federal government's *No Child Left Behind Act of 2002,* 58.8% of the eighth grade students test proficient in reading and 60% of the eighth

grade students test proficient in math (Standard & Poor's, 2005). In both reading and math, the school's standardized test scores are below the state average. That same year, the school district posts a graduation rate of 89.8% (Standard & Poor's, 2004). The median household income in the school district is $57,711.00 and the median home value is $75,811.00 (Standard & Poor's, 2004). However, this mean is somewhat misleading. Seventeen and a half percent of the school district's population have an annual household income of less than $15,000 and an additional 22.7% have annual incomes of less than $30,000 (Standard & Poor's, 2004). The mean household income in the school district is increased by 35% of the population making more than $50,000.00 (Standard & Poor's, 2004). According to the Pennsylvania Department of Education, 27.8% of the student body is from low income households (PDE Stats, 2004).

As reported by Standard and Poor's (2004), the school district in which school ten resides has an average operating expenditure of $7,864.00 per student. The $7,864.00 per child represents money spent on instruction, support services, and non-instructional services, among other day-to-day purposes, from the general fund, special revenue fund, food services, child care, non-major fund, and other enterprise funds. Operating expenditures include salaries and benefits, supplies and materials, and purchased services. Operating expenditures exclude capital and debt-related expenditures, adult education, community service, as well as trust and agency funds, and internal service funds. Of the $7,864.00 per child operating expenditures, $5,357.00 is spent on instruction and instructional support (Standard & Poor's, 2004). In this same year, the school district carries a debt with expenditures that equal $18.00 per student and capital expenditures of $194.00 per student (Standard & Poor's, 2004).

The school district in which school ten resides is part of the coal region in the Appalachian Mountains. The town is located in a narrow valley whose slopes are made to appear steeper by huge culm banks which spill down from the top of the ridges. Along Main Street, turn of the century Victorian houses with stain glass windows and old brick banks with marble steps are reminiscent of the wealth that comes from the anthracite coal mines. Since the mid 1960s, the mines and mills have been downsizing and closing. The days of a booming industrial based economy are in the past. The Victorian train station that once welcomed business men and industrialists to the town has not seen train service in twenty-five years, and the homes and buildings along Main Street are in various levels of disrepair. Neighborhood streets which run back and forth against the slope of the Appalachian ridges begin their ascent one block off of Main Street. As they wind up the ridges, each block is nearly a full roof top hire than the block before. To gain perspective on the slope, one need not look further than the school campus. The school sits on a 74.1 acre terrace. The north/south change in slope over the very long and narrow terrace is 25 feet. However, the east/west change in slope over the whole 101 acre campus is 1,100 feet (PlanCon 10, 1999). Standing on top of campus one can see rows of houses which step down the ridges to Main Street below.

At the time planning for new facilities begin, elementary students attend one of three K-6 schools. The elementary schools open in 1951, 1959, and 1979. The high school students attend classes at the school district's only high school, which is constructed in 1968 (PlanCon 10, 1999). The seventh and eighth grade students are housed in a 66,000 square foot junior high school. Originally built as a high school facility, the building is just short of its seventieth birthday when discussions with regard

to a new middle school begin. Though renovations and additions are made to the facility in 1957 and 1968, it is well understood that the junior high school is short on space and in need of extensive repair and renovations. Programmatically, the building is over crowded. Several classrooms, the computer lab, and the library are of insufficient size. The gym does not meet proper height requirements and two temporary classrooms that are placed adjacent to the school, have been in use for over twenty-five years. Special education students are bused out of the school district for classes. Structurally, the existing roof needs a replacement or to receive an upgrade. The steel framed, non-insulated windows need replacements. All of the exterior doors need replacements and due to the fact that the interior doors do not meet the appropriate fire rating, they also need to be changed. The fire alarm system needs to receive an upgrade. The building does not meet any of the requirements in the *American with Disabilities Act of 1990* for handicapped accessibility. And all amenities, from the lockers to the kitchen equipment, need to be repaired, refurbished, or replaced altogether. Mechanically, the HVAC systems need full replacements. The electric system is wholly inadequate for the needs of the teachers and students. Aesthetically, the exterior masonry is deteriorating and is in need of cleaning, repair, and waterproofing. On the interior of the building, walls need repair and paint; throughout the building, all of the window treatments also need replacements (PlanCon 10, 1999). Even though the facility is in need of extensive repairs and renovations, it is important to understand that a deep connection exists between long-time residents of the community and this school building. This is evidenced during structured interviews when teachers who worked in the old school discuss building with an air reverence. One teacher, who has had three generations of her family attend the

school, comments that “as old and broken down as it was, it was still part of the family” (Interview 10-1, 2006). This familial connection is also evident in 2002 when the building closes it doors for the last time. A last day assembly reported in the local newspaper (2002) draws generations of townspeople and educators together to reminisce over all that the nearly seventy-five year old structure has witnessed.

In addition to concerns with the condition of the junior high school, school district officials also have concerns that at the elementary schools and the high school does not have adequate facilities to deal with class enrollments and expanding programs. The district identifies expanding programs in the areas of special education, advanced science and math classes, computer and technology classes, and for gifted honors classes (PlanCon 10, 1999). In order to address the condition of the junior high school, district-wide enrollments, and the need to expand programs, the school district contracted with an architectural firm to complete a feasibility study. In the spring of 1997, a “project launch” is held during which representatives of the school district and architectural firm meet to discuss the school district’s needs (PlanCon 10, 1999). According to PlanCon documents (1999) on file with the Pennsylvania Department of Education, this meeting focuses on needs, expectations, and concerns with relation to the school district’s educational facilities. The group prioritizes needs and establishes a time to meet with representatives of the faculty for the purpose of collecting direct input from teachers. In addition, the entire staff (K-12) is given a survey that focuses on the educational program and facility needs for the district. Concurrent to the staff survey, the administration collects information from the community with regard to their concerns and beliefs about educational program and facilities (PlanCon 10, 1999). Using the information gathered,

educational specifications are developed and presented to the school board for review. Based upon these specifications, the school board is presented with four facility options to consider. The four options include: (1) renovations and additions to the junior high school along with renovations and additions to the high school, (2) building a new seventh and eighth grade junior high school on the senior high school site, and to complete renovations and additions to the high school itself, (3) build a new senior high school on a different site and move grades six, seven, and eight into the high school to create a middle school, and (4) realign the elementary schools into K-5 buildings, build a new sixth, seventh, and eighth grade middle school adjacent to the senior high school, and complete renovations and additions to the high school.

In December of 1997, the board voted 8-0, with one member absent, to proceed with plans to build a new sixth, seventh, and eighth grade middle school adjacent to the senior high school, to realign the elementary schools as K-5, and complete renovations to the high school. In anticipation of the project and due to a favorable economic climate, the school district issues two sets of general obligation bonds. The first bonds are issued at the end of 1997 in the amount of $5 million and the second set of bonds is issued in 1998 for $10 million dollars. This money is deposited into interest-bearing accounts to await construction of the new facility (Local Newspaper 10, 1999). In February of 1998, the board votes to move ahead with a design for a new middle school based on the educational specifications that are developed by school district administrators and the architect (PlanCon 10, 1999). The educational specifications requires the construction of a 143,000 square foot building.

During the time the school district considers its options, steady resentment and

opposition against the project grows in the community (Structured Interview 9-1, 2006). When the board begins to consider its options it is reported in the local newspaper that renovations to the old junior high school will cost up to $8.6 million, while building a brand new building for grades seven and eight will cost taxpayers up to $9.5 million (Local Newspaper 10, 1997). However, by the time of the Act 34 hearing in April of 1998, it is well known in the community that the new facility, as designed, may cost up to $18 million (Local Newspaper, 1998). All of this results in a tremendous amount of controversy surrounding the project. Although the Board of School Directors votes 8-0 to proceed with the exploration of plans to build a new middle school, the Board of School Directors and the community are now deeply divided over the project. The increased cost of the project is described to the public as being the result of the fact that the facility would house three grades, not two, and also due to the fact that the facility includes "many amenities" (Local Newspaper 10, 1997). In addition, the project is upgraded to include more classrooms, a gym bigger than the high school one, and an auditorium. The building is planned to contain the following: new team and locker rooms that connect to the high school, four science labs, two art classrooms, large group instruction rooms, a computer room, science and industrial arts rooms, a three-level elevator, and a technology education center.

Nearly 250 people attend an Act 34 hearing held in the senior high school cafeteria to solicit public input on the project. Board members, the administration, and the architect are questioned on a range of issues which include: reasons for building a new middle school rather than renovating the junior high school, the impact of taxes on small businesses and farmers, whether the project will use union workers, what the

accrued bill to date for the architectural firm totals, problems with having sixth through twelfth grade students in the same building, and their rationale for wanting to hire a construction management company over a clerk of the works. The testimony is heated and emotional. One woman exclaims to thunderous applause, “How can a town afford an 18 million dollar middle school when we can’t even afford to give our graduates a decent job!” (Local Newspaper 10, 1997, PlanCon 10, 1999). Another citizen with equal support from the audience advises the Board of School Directors by saying, “I suggest you stay away from the frills and look for another architect!'” (Local Newspaper 10, 1997).

Two of the most influential citizens to enter comments into the public record are the president and CEO of the largest employer in the school district and the local State Representative. In a letter to the board read into the record from the president and CEO of the largest employer in the school district, the CEO lashes out against the price tag of the project and expresses his concern over the tax consequences. The local State Representative issues a five-page statement that is presented by one of his staff members which challenges the Board of School Directors to make the “fiscally responsible decision” by turning away from the project (PlanCon 10, 1999). The Representative who could not be present due to the fact that he was in the state capital “fighting for tax reform” wants to let the citizenry know that: “The age of a school building did not play any role whatsoever in adequately preparing a child for college” (PlanCon 10, 1999). In addition, the Representative’s aide announces that the Representative will be “drafting legislation to encourage school districts to renovate existing buildings rather than replace them” (PlanCon 10, 1999).

In all, thirty five people speak out against the Board's plans for over two hours. Speakers include bankers, lawyers, elected officials, small business men and individual citizens. Not one person rises to speak in favor of the project. In the PlanCon file (1999), the original reviewer for the Pennsylvania Department of Education attaches a handwritten note to the school district's initial application for reimbursement which states: "It seems everybody is against the project."

A review of the transcripts from the Act 34 hearing make it clear that the major point of contention within the community and among the school directors is the cost of the project. As a result, it is not surprising that when educators are asked with regard to the degree at which each of the six domains of planning impact the final design of the school, economics is the ranked as highest (see table 43). A further review of the PlanCon documents indicate that the cost of the facility is not the result of the need for expensive site work, environmental issues, unique design features, special building materials, or the economy. The cost is due to the size of the project (PlanCon, 1999). The 143,000 square foot facility is 2.16 times larger than the old junior high school and 1.48 times larger than the school district's 96,000 square foot high school building.

Two of the major areas which contribute to the size of the project are the athletic center and performing arts areas. Both of these spaces are sandwiched between the high school and middle school, and are joined to both facilities. According to district literature, the athletic center is a "state-of-the art facility" that includes an 11,200 square foot, 957-seat gymnasium. Adjacent to the gym is an athletic trainer's office, wrestling room, weight room, boys and girls locker rooms, and team rooms (District Literature 10, 2006). District literature boasts that: "Spectators entering the gymnasium entrance will

be impressed with the patterned terrazzo foyer, built-in trophy case, the two digital scoreboards, and the two team logos painted on the hardwood gym floor" (District Literature 10, 2006). The nearly 15,000 square feet performing arts center includes a 1,300 seat auditorium with a 2,710 square foot stage. Adjacent to the auditorium are band and chorus rooms, each in excess of 1,800 square feet, a general music classroom, offices, practice rooms, and instrument storage. Based on the values reported in PlanCon (1999) and confirmed during a building tour (2006), the halls, vestibules, lobbies, mechanical areas, and the athletic center and performing arts areas conservatively contain over 32,000 square feet. This represents forty-two percent of the difference between the size of the old junior high school and the new middle school. PDE reports that the cost of per square foot of school ten is $94.16 (PDE Construction Costs 10, 2002). Using these numbers, the athletic center and performing arts areas are constructed at a cost of over $3 million dollars.

Over the six months that follow the Act 34 hearing, the board and community remain deeply divided over the project. During this time period, the Board of School directors, knowing that they are still not obligated to proceed, place the project out on bid. In the spring of 1999, when the bids open, the project comes in under budget (Local Newspaper 10, 1999). Regardless of this fact, the final decision to proceed with the project does not come until the fall of 1999. In June of this same year, the school district's budget narrowly passes on a 5-4 vote, with much of the controversy swinging around the financing of the project (Local Newspaper 10, 1999). Finally, with the threat of having to re-bid the project looming, the Board of School Directors call a special meeting in September of 1999 for the sole purpose of making a final decision. After two

years and much debate, the board votes 6-3 in favor of proceeding with construction (Local Newspaper 10, 1999, PlanCon 10, 1999).

Although it is a “rough battle”, everyone in the district hopes that “things would start to get back to normal” (Interview 4-10, 2006). However, these hopes are dashed when the Superintendent of Schools, who has been with the district for thirty-six years, shocks the Board of School Directors and community by announcing that he plans to retire, even though he still has four years left on his five year contract. The school board president is quoted in the local paper to say the following: “He dropped a bomb on us. I fully expected him to stay through the building project then we would gear up to replace him” (Local Newspaper 10, 1999). By September of this aforementioned school year, the assistant superintendent is made superintendent, and the newly hired high school principal becomes the acting assistant superintendent, appointed as the central office administrator in charge of the project. In addition to central office changes, over the course of the next five years, the middle school houses three different principals.

Entering onto the campus, the flow of traffic for the middle school goes around the back and down the length of the complex. Driving behind the facility, tucked between the back of the building and the slope rising immediately on the opposite side of the road, one gets a sense of just how big a 234,000 square foot complex really is. The facility sits on a 74.5 acre terrace. With the football stadium and main drive in front of the complex and a ridge immediately behind the school, the building at its widest point is the width of seven classrooms and three hallways. This is less than 250 feet wide. Conservatively, even with sections of the high school having two floors, the complex is 600 to 750 feet long. Although the roof lines vary due to libraries, athletic facilities, and

classroom wings, the best way to imagine the complex is like two shoe boxes end to end. This is not to indicate that the exterior of the building is esthetically unpleasing. Those responsible for planning school ten make an attempt to match the style of the 1968 high school with the 2000 middle school. The brick, block, trim, changes in roof lines, and matching enameled roofed porticos at major entrances give the appearance that the two sections of building are closer in age than thirty-two years.

The main entrance of the middle school is on the far end of the building. With bright colors, a curved portico, and the name of the building prominently displayed, when one faces the main entrance to the facility one would never realize the length of the complex behind the brick facade. In interviews with two of the educators, they indicate that is important to convey the feeling to the students that this was "their middle school" and "not just an addition to the high school" (Interviews 10-5, 10-6, 2006). Upon entering the school, distinct architectural features draw the eye across a funnel shaped lobby and down a hall to the glass face of the 5,000 square foot library. To the right and with a diagonal face to create one side of this funnel shaped lobby, the school office is easily recognizable. Halls in the facility are offset so that the line of sight is never more than six classrooms in length. The use of different materials, colors, and the painting of stripes above the lockers give the interior of the building a custom appearance. The interior of the facility is esthetically pleasing, so much so that the facility is showcased in a national architectural digest (Architectural Firm Literature 10, 2006).

With the pleasing physical attributes of the facility, the question arises as to why educators' responses rank their school as the lowest of all fifteen participating schools when it comes to the degree at which the facility contributes to a shared sense of purpose

and focus on what is important for students (see table 43). It may be postulated that the battle which divides the community over the building of the school contributes to the low score. However, when the educators are asked to respond to the degree at which the design and appearance of the facility conveys the educational vision of the school, only three schools in the sample have a lower mean response (see table 13). In addition, when educators are asked the degree at which their school meets the needs of faculty, staff, students, and the community, again, only three schools in the sample have a lower mean response (see table 13).

In understanding these responses it is important to begin with the second criteria that results in school ten's selection for a comparative case study. Of the fifteen schools, school ten has the lowest mean response when the educators are asked to respond to the statement: "Within this school and community that it serves, there is a shared sense of purpose and a focus on what is important for students (see table 13). Again, it is easily postulated that the divisive nature of the project results in a low sense of shared purpose and a focus on what is important for students. However, when the educators at school ten are asked to respond to the statement: "This school has an educational vision", with no reference being made to the community, their mean response is the lowest of all fifteen schools that participate in the study (see table 13).

As a result of structured interviews and the building tour, four themes arise that likely contribute to the low mean scores outlined above. These four themes include: (1) a lack of administrative consistency, (2) the facility is called a middle school and demonstrates the design attributes of a middle school, yet practices outlined by the National Middle School Association are not being followed, (3) the sixth grade staff

from the elementary schools and the seventh and eighth grade staff from the junior high school do not bond into a single middle school faculty, (4) resentment exists among the teachers who come from the old junior high school. These educators believe that their school is treated like more of a wing of the high school rather than as having its own separate identity.

During four of the six structured interviews, educators reflect on the fact that since they have been in the old junior high building, they have had a succession of administrators (Interviews 10-1, 10-2, 10-3, 10-4, 10-5, 2006). In total, from the time discussions begin with regard to the construction of a new school through its second year in operation, the faculty has been led by four different building level administrators and three different central office administrators. The first principal left for a position in a different district (Local Newspaper 1998). The second principal, who holds the position during the critical first year of operation, is moved to an assistant elementary position created by the Board of School Directors (Local Newspaper 10, 2002). The third principal openly admits that he/she considers the position as a short term assignment before retirement and then does so (Interview 10-5). And finally, the fourth, though educators report positive professional growth under most recent principal's guidance, the current principal has only been in the position for less than two years. Educators, especially classroom teachers, perceive the lack of continuity contributing to a lack of focus and direction (Interviews 10-1, 10-2, 10-3, 10-4, 10-5, 2006).

The educational program at school ten cannot be classified as an elementary, middle school, or as a junior high school program. School ten is the only school of the four selected for case study that has had academic classrooms arranged by discipline

rather than interdisciplinary teams (Interview 10-1, 2006, Building Tour 6, 20060). In the other three schools, other than science, teaching equipment and supplies unique to a discipline, can easily be relocated to other spaces, and teachers are assigned to rooms based on an interdisciplinary team. In the case of school ten, items such as maps and graphing boards are more permanently integrated into the classroom design (Building Tour 10, 2006). The seventh and eighth grade teachers who are interviewed consider this as a positive attribute, but complain that the all of the subject areas can be grouped except science. During one interview, a teacher states that one of the things that she likes about the building is the fact that she is "in an area where the teachers all taught the same subject" (Interview 10-1, 2006). This teacher's concern with the building design resides with the fact that the science rooms are spread throughout the building. A tour of the building shows that the science rooms are not grouped by discipline, but distributed throughout the building. A review of a building map makes it clear that the science rooms are meant to be clustered in a set with four other classrooms. This design feature is consistent with middle school instructional practices and is standard in the design of the other four middle schools involved in the comparative case study. The rooms are grouped this way for the purpose of teaming. If true departmentalization is the goal of the architect and school district, clustering the science rooms together due to their unique needs for water, disposal of waste, water, electric, gas, and storage is far easier and less expensive. On the other hand, while the seventh and eighth grade teachers have a very subject oriented approach based on their old junior high model, the sixth grade teachers remain dedicated to an elementary model with an emphasis on teaching reading and math skills (Structured Interview 10-1, 10-3, 2006, Building Tour, 2006). Beyond the

academic classes, all students in grades six, seven, and eight rotate through a collection of exploratory classes. These classes, as well as the collection of rooms in which they are taught, separate from the academic classrooms, and closely resemble a traditional middle school model. Although the school district states the desire in PlanCon to move towards a middle school philosophy, their efforts have been piecemeal. The fact that the seventh and eighth grade teachers' emphasis remains subject-centered, and that the sixth grade teachers' emphasis remains elementary-centered, demonstrates a lack of movement towards a middle school model that is centered on the unique academic needs of young adolescents.

The difference in philosophies between the teachers that come from the elementary schools and the teachers that came from the junior high school creates a distinct rift among the faculty. Though everyone is congenial, the seventh and eighth grade teachers indicate that they have concerns that the sixth grade teachers are doing things differently than they are (Interviews 10-1, 10-3, 2006). According to one of the teachers who is interviewed, this is the first year that, "the sixth grade was made to follow the same schedule as the seventh and eighth grade teachers "(Interviews 10-3, 2006). Although the differences are never expressed in an antagonistic fashion, a real "us/them" mentality is exhibited within the faculty.

Finally, there remains resentment among some of the teachers who come from the old junior high school. These instructors express frustration due to the fact that they feel their facility is treated more like a wing of the high school rather than as its own school. Although everyone acknowledges that the junior high school was in desperate need of remodeling, renovations, and additions, it is still their school. One teacher states:

“Sometimes we are like the poor step children to the high school” (Interview 10-3, 2006). Another teacher makes the point that the athletic center is “named after the school district” and not “named Ten’s Athletic Center” with which it was built. This teacher continues to note that “the same goes for the auditorium” (Interview 10-3, 2006).

While the teachers indicate that there is a lack of a shared sense of purpose and a focus on what is important for students within the school district and community, this does not necessarily explain why the facility is rated by its educators as the lowest of all fifteen schools that participate in the study when they respond to the statement: The degree to which the facility contributes to a shared sense of purpose and focus on what is important for students. Given the fact that the facility is designed with input from the faculty and staff, teachers are allowed to select furnishings and fixtures for their rooms, that there are distinctive academic, exploratory, and athletic sections, and the aesthetics of the building are showcased in an architectural digest, a mean score this low may not be expected when educators are asked to respond to this statement.

Structured interviews and a building tour indicate that the reason for dissatisfaction with the building focuses on one central issue, the layout of the facility. On the very first day that the new facility opens, students who are interviewed by a local reporter state that they find the building to be “confusing” (Local Newspaper 10, 2002). Although the students are excited and nervous about being in the new school, the initial observations that the researcher made when first entering the building are almost identical to the comments made by students when interviewed by the local newspaper reporter (Local Newspaper, 2002).

In order to make an extremely long and narrow building more interesting and visually appealing, the facility is designed with three distinct offsets. On the interior of the building these offsets are set alongside the positioning of the 5,000 square foot library in the middle of the facility, and it creates twelve different halls which are separated from each other by eleven right angle corners. The ninety degree turns in the halls create pockets of three to seven rooms. Due to the fact that the seventh and eighth grade rooms are departmentalized rather than teamed, students are constantly traveling in and out of these pockets. In the longest stretch of hallway, the line of sight is only the equivalent of the length of five classrooms. In most cases, the line of sight is only the equivalent to the length of three or four classrooms. To add to this disjointed feeling, in order to deal with the change in elevation over the length of the building, stairs and ramps separate the academic, creative arts, athletic and performing areas. In several cases, middle school teachers are actually in closer proximity to high school staff than they are their own faculty or office. This design only serves to further the philosophical rift between the sixth, seventh, and eighth grades, and also the creative arts teachers. Small pockets of rooms which are set around corners and out of the line of sight of other rooms, physically prohibit regular informal interaction between professional staff. During structured interviews, two teachers indicate that they often feel isolated from their peers (Interviews 10-4, 10-5, 2006). One teacher indicates that if on some days you "get busy in your own little area, you might not see anyone (outside that area) unless you go to the office or faculty room" (Interview 10-4, 2006). If the hallways are not offset, the line of sight in the academic section of the school doubles in all cases. In addition, an absence of off-

sets also reduces the number of interior hallways from twelve to six, and the number of right angle turns from eleven to seven.

In the end, the educators at school ten rank the domain of architectural acuity fifth out of the seven sets of variables to impact the final design of their facility. This fact by itself may not support the level of dissatisfaction that educators have with their facility. However, the only two categories that the educators at school ten rank lower in are pedagogy and demographics. The fact that the architect's and design professional's ability to understand the needs of the school district and community, principles and methods of instruction, and how students learn, along with the size, composition and needs of the student body are ranked as the three sets of variables having the least impact on the over all design of the facility, may be more revealing about the level of dissatisfaction with the design of the building than any other measure.

Findings of School Ten

Does School Ten have an Articulated Educational Vision?

School ten is chosen as one of the four purposefully selected sites for a comparative case study from the population of fifteen schools surveyed as a result having the lowest mean responses to the degree at which educators feel their school has an educational vision. During structured interviews and a building tour, the teachers at school ten are divided in their pedagogical approaches for teaching young adolescents. Educators attribute this lack of lack of focus and direction to the fact that from the time discussions begin with regard to the construction of a new school through its second year in operation, the faculty has been led by four different building level administrators and three different central office administrators.

Is School Ten a Physical Representation of the School District's Educational Vision?

School ten is chosen as one of the four purposefully selected sites for a comparative case study from the population of fifteen schools surveyed as a result having the lowest mean response of the degree at which educators believe that the design of their facility contributes to a shared sense of purpose and a focus on what is important for students. Even though the facility has many traditional design attributes of a middle school, the educational program at school ten cannot be classified as a elementary, middle school, or a junior high school. The sixth, seventh, and eighth grades, along with the creative arts teachers are all assigned to instructional spaces and are scheduled with characteristics of different educational philosophies. At the same time, the overall layout of the building is disjointed. Students report that the building is confusing while the faculty report that the building is isolating. The physical separation of faculty contributes to the pedagogical differences between different groups of teachers.

Do the Design Professionals and Educators who Plan School Ten Manage Variables within and Across the Six Domains of Planning when They Design the Facility?

Quantitatively, an analysis of the survey reveals that when educators are asked six questions, one for each of the domains of planning, with regard to the degree at which those responsible for planning understand each domain, of the fifteen schools, the educators at school ten mean response rank their school eleventh out of fifteen.

As evidenced in structured interviews, a review of local newspaper articles and public documents filed with the Pennsylvania Department of Education, a tour of the facility, and a review of artifacts from the school district, it is demonstrated that those responsible for planning school ten find it difficult to manage all of the domains of

planning. Evidence of this conclusion, as arranged by domains, is as follows:

Demographics. Educators rank the size, composition, and needs of the student body as the domain which has the least impact on the final design of the facility. Although the facility easily accommodates the size of student body, the layout and room assignments cause confusion for the students.

Pedagogy – Even though the facility has many traditional design attributes of a middle school, the educational program at school ten can not be classified as a elementary, middle school or a junior high school. The sixth, seventh, and eighth grades, along with the creative arts teachers are all assigned to instructional spaces and approach the teaching of young adolescents with different philosophies. Educators attribute a lack of focus and direction to the fact that, from the time discussions begin with regard to the construction of a new school in its second year of operation, the faculty has been led by four different building level administrators and three different central office administrators.

Culture. Based on the transcripts of the Act 34 hearing, those responsible for planning school ten do not manage the culture of the school district. With very long-standing traditions, a strong sense of attachment to the old junior high school, and the underestimation of the willingness of the community to invest in a new public school facility that expands the performing arts and athletic facilities, the Board of School Directors is lambasted over their decisions. Although the district has the resources to construct the facility, the facility that the Board proposes is not in keeping with the beliefs of the community. The decision to build a new school deeply divides the community.

Architectural acuity. The overall concern with the facility for teachers and students resides with the layout and design. Although aesthetically pleasing and showcased in an architectural journal, the facility is disjointed by the large number of hallways which are separated from one another by ninety degree turns. The building is considered to be confusing by the students and isolating by the faculty. When the mean responses to the degree at which educators report each of the six domains of planning as having an impact on the final design of their school, the educators at school ten rank the architect's and design professional's ability to understand the needs of the school district and community, the principles and methods of instruction and how students learn, and the size, composition, and needs of the student body as the three domains that have the least impact on the overall design of the facility (see table 43). For reasons across several domains which relate back to design, educators are dissatisfied with the facility.

Economics. Although the school district does not have any difficulty in the appropriation of finances for the school, and even though the bids come in under budget, the size and scope of the project causes a great deal of controversy within the community; the construction of the project causes divisions on the Board of School Directors and within the community. The controversy squarely centers on the cost of the project.

Politics. The Board of School Directors are attacked by bankers, lawyers, elected officials, small business men, and individual citizens. The local State Representative in a five page statement, along with the CEO of the district's largest employer, question the board's ability to make sound financial decisions. In the end, however, even with a split board, supporters of the project have the necessary votes to proceed.

Interaction of domains. Educators' mean response ranks school ten eleventh out of the fifteen schools to the degree at which educators feel that those responsible for planning their facility understand the interaction of economic, political, and social forces, as well as the needs of teachers and students. The interaction of variables within the domains of politics, culture, economics, architectural acuity, and pedagogy are dynamic. In the end, the Board of School Directors have the financial solvency and votes necessary to proceed with project. However, the design and cost of the final product creates divisiveness. In the end, this division may have been worthwhile or necessary if the facility is ranked as strongly meeting the needs of faculty, staff, students, and the community. However, on a six point scale, educators mean response to this statement is 3.75 (see table 13). The descriptors on the survey show educators at school ten only "Somewhat Agree" that the facility meets the needs of faculty, staff, students, and the community.

Does School Ten Meet the Needs of the Stakeholders?

The response of educators to the statement: "This school meets the needs of faculty, staff, students, and the community", ranks school Ten eleventh out of the fifteen schools. It is clear that the design and layout of the facility, along with the mixed pedagogical approaches, impact the level of dissatisfaction that educators have with the facility. Design features which can never be changed will continue to create confusion for students and create isolation for teachers. Although the facility contains many of the traditional design features of a middle school, it is utilized, depending on the group of teachers, with an elementary, junior high, or middle school philosophy. At best, given the way that school ten is currently utilized, a statement can be made that it marginally

meets the needs of teachers and students.

Table 42

Tier One and Two Selection Data for School Ten

School 10			
Mean of Vision (4)	4.083		
Mean of Physical Representation (5)	4.333		
Year of Opening	9/30/2002		
		Count	Percent
Possible Participants		32	
Total Participants		12	37.50%
Involved in Planning (1)	Yes	9	81.82%
	No	2	18.18%
	Total	11	100.00%
Years Spent in Facility (2)	0 to 2	0	0.00%
	3 to 4	0	0.00%
	5 to 6	12	100.00%
	7 to 8	0	0.00%
	9 to 10	0	0.00%
	10+	0	0.00%
	Total	12	100.00%
Facility Utilized As Designed (3)	Yes	11.00	91.67%
	No	1.00	8.33%
	Total	12.00	100.00%

Table 43

Ranked Mean Responses of School Ten

School 10					
Rank Order of Degree to Which Planning of Facility Required Knowledge of Domains	Mean of Responses	Rank Order of Degree to Which Facility Planners Understood Domain	Mean of Responses	Rank Order of Degree of Impact on Design of Facility	Mean of Responses
Demographics	5.917	Economics	5.167	Economics	5.583
Economics	5.583	Pedagogy	4.917	Culture	4.750
Pedagogy	5.500	Culture	4.833	Interaction	4.750
Politics	5.250	Politics	4.833	Politics	4.667
Culture	5.167	Architectural Acuity	4.583	Architectural Acuity	4.583
Architectural Acuity	5.083	Interaction	4.583	Pedagogy	4.417
Interaction	5.000	Demographics	4.333	Demographics	4.250

Table 44

Summary of Mean Survey responses of School Ten

Survey Statement	n	Mean	SD	SE
4	12	4.083	1.3114	0.3786
5	12	4.333	1.2309	0.3553
6	12	3.750	1.2881	0.3718
7	12	4.167	1.2673	0.3658
8	12	4.417	1.0836	0.3128
9	12	4.333	1.3707	0.3957
10	12	4.000	1.4142	0.4082
11	12	3.917	1.5050	0.4345
12	12	3.750	1.3568	0.3917
13	12	3.917	1.2401	0.3580
14	12	6.083	0.7930	0.2289
15	12	4.583	0.9962	0.2876
16	12	4.417	1.3114	0.3786
17	12	5.083	0.6686	0.1930
18	12	5.333	1.4355	0.4144
19	12	5.417	1.3114	0.3786
20	12	5.167	1.2673	0.3658
21	12	4.917	1.1645	0.3362
22	12	5.250	0.9653	0.2787
23	12	5.167	1.3371	0.3860
24	12	5.917	1.0836	0.3128
25	12	4.333	1.6143	0.4660
26	12	4.250	1.8647	0.5383
27	12	5.500	1.3143	0.3794
28	12	4.917	1.3114	0.3786
29	12	4.417	1.5643	0.4516
30	12	5.167	1.0299	0.2973
31	12	4.833	1.2673	0.3658
32	12	4.750	1.0553	0.3046
33	12	4.750	1.4222	0.4106
34	12	5.333	1.3707	0.3957
35	12	5.583	0.7930	0.2289
36	12	5.167	0.9374	0.2706
37	12	5.583	0.9962	0.2876
38	12	5.250	0.9653	0.2787
39	12	4.833	1.2673	0.3658
40	12	4.667	1.2309	0.3553
41	12	5.083	0.9003	0.2599
42	12	4.583	1.1645	0.3362
43	12	4.583	1.0836	0.3128
44	12	4.000	1.5374	0.4438
45	12	4.417	1.4434	0.4167
46	12	4.417	1.4434	0.4167
47	12	4.500	1.2432	0.3589
48	12	5.000	1.0445	0.3015
49	12	4.583	1.3114	0.3786
50	12	4.750	1.2881	0.3718

CHAPTER V

DISCUSSION AND RECOMENDATIONS

Significance of Problem

Collectively, the cost of the fifteen schools participating in the study to the taxpayers of Pennsylvania is $267,510,688.00 to construct. When 501 educators who teach in these facilities are asked to respond to the statement: “This facility meets the needs of faculty, staff, students, and the community”, their mean response is 4.20 on a scale of 6.0 (see table 12, survey statement 12). Based on the descriptors given to the educators on the survey, a mean of 4.20 is best described as slightly above “Somewhat Agree.” When asked to respond to the statement: “This facility meets the needs of teachers”, their mean response is best described as slightly below “Somewhat Agree.” Similarly, when they respond to the statement: “This facility meets the needs of students”, the response of the 501 educators is the same— slightly below “Somewhat Agree.” With the cost of financing, the investment in these fifteen facilities alone cost the taxpayers of Pennsylvania well over a third of a billion dollars. This fact brings this study full circle to the central research question of the work: If educators and design professionals have demonstrated the ability to design and construct educational facilities that meet the needs of children and the communities they serve, what are the variables that intervene when they fail to do so?

Purpose and Goal of the Study

In pursuit of the answer to aforementioned question, the utilization of a primarily experiential literature base, a thematic analysis of text and a synthesis of literature from

education, educational administration, architecture, and an organizational sociology, a systems model of public educational facilities is developed. This model represents an attempt to develop a unifying theoretical construct from which design professionals and educators can better organize, understand, analyze, communicate, and research complex cause and effect relationships that occur when educational facilities are designed and constructed. The Systems Model for Planning of Educational Facilities attempts to: (1) identify and describe complicated social, cultural, political, and economic mechanisms at work when public schools are designed and constructed in a pluralistic democratic society, (2) make understandable the relationships between those mechanisms and educational facility planning, and (3) formalize causal inferences between social, cultural, political, and economic mechanisms, educational facility planning, and educational facilities. The goal of this study is to determine the validity of the Systems Model for Planning of Educational Facilities.

Research Tradition and Design Parameters

In the pragmatic tradition of research, the truth of a proposition is measured by its correspondence with experimental results and by its practical outcome (Columbia, 2001). In this light, pragmatic research is problem-centered and is always conducted in a social, historical, political context, as well as many others. Central to pragmatic inquiry is the research problem, not the research methodology. Pragmatic inquiry frees the researcher to select from methods, techniques, and procedures that maximize the quality of experimental results and the practical benefits of the study (Creswell, 2003).

A pragmatic view of educational facilities planning, such as the systems model, assumes that educational facilities which are planned in a democratic society arise out of

actions, situations, and consequences, rather than antecedent conditions. For these reasons, this study and the selection of the research methodology was grounded in pragmatic tradition.

Based on a pragmatic approach, the research design of this study places the practical examination of the Systems Model for Educational Facilities Planning at the heart of the research methodology. In doing so, four important criteria are taken into account in the selection of a methodology. First, the complex patterns, interactions, and relationships between the physical, social, pedagogical, cultural, and economic components described in the Systems Model for Educational Facilities Planning require an examination of variables that are both quantitative and qualitative. Second, a research method that requires the exclusive use of quantitative methods will necessitate the use of latent variables as indicators of underlying qualitative constructs. This is especially true in the domains of politics, culture, and pedagogy. Quantitative examination of variables of this nature can raise questions with regard to validity and reliability. Third, a research method that requires the exclusive use of qualitative methods will allow the synthesis of ideas for the purpose of delimiting complex underlying qualitative constructs. However, it excludes numerical descriptors and explanations of causal relationships through statistical probabilities. In addition, for the domains of demographics and economics, pure qualitative measures can raise questions with regard to validity and reliability. Finally, given the fact that the examination of the model as a whole requires concurrent analysis of variables which are both quantitative and qualitative in nature, a research design that utilizes a mixed methodological approach is a necessity.

Research Method

Based on the four criteria listed above, this study employs a sequential transformative research design. As defined by Creswell (2003), sequential transformative research is a mixed methodological approach that utilizes a theoretical lens (in this case, the systems model) to ground a study. A sequential transformative research design maximizes leverage over the complexity of the systems model and provides the greatest opportunity to make generalizations to other contexts and settings.

Maximizing Leverage over the Complexity of the Model

It is recognized that the complexity of the phenomenon being studied, the difficulty in establishing valid causal inferences in the social research of this nature, and the need for high generalizability creates a challenge for any research design. Utilizing the systems model as a lens, research is conducted in two sequential stages. The first phase of the investigation utilizes quantitative methods to describe the sample and examine, through multiple regression and univariate analysis, the validity of the core components of the systems model and the systems model as a whole. The second phase of the investigation utilizes qualitative methods to complete a comparative analysis of four purposefully selected case studies. Identical to the first phase, it is done for the purpose of examining the validity of the core components of the systems model and the systems model as a whole.

Leverage over the complexity of the systems model is gained through a comparison and contrast of the results of two distinct methodologies. The research design provides the greatest opportunity to: (1) describe complicated social, cultural, political,

and economic mechanisms at work when public schools are designed and constructed in a pluralistic democratic society, (2) elaborate on the relationships between those mechanisms and educational facility planning, and (3) cross-validate through quantitative and qualitative methods, a systems model which formalizes causal inferences between social, cultural, political, and economic mechanisms, educational facility planning, and educational facilities.

Primary Suppositions of the Systems Model for Educational Facilities Planning

The Systems Model for Educational Facilities Planning is built on two primary suppositions. The first supposition states that if a school has an educational vision, and if those responsible for the design and construction of the facility manage the interaction of economic, political, and social forces, as well as the needs of teachers and students, then using the resources available, design professionals and educators can design and construct an educational facility that is a physical representation of an educational vision. The second supposition states that if an educational facility is a physical representation of an educational vision it meets the needs of its stakeholders.

In order to examine these two suppositions, five critical research questions are examined for each individual school and across the data as a whole. These questions, identical in both quantitative and qualitative phases of the research, directly reflect the core components of the Systems Model for Educational Facilities Planning and the systems model as a whole. The five critical research questions are as follows: (1) Do the schools have an articulated educational vision? (2) Do the design professionals and educators manage variables within the six domains of planning when they design the

facilities? (3) Do the design professionals and educators manage the interaction of variables across the six domains of planning when they design the facilities? (4) Are the educational facilities physical representations of their educational visions? and (5) Do the educational facilities meet the needs of the stakeholders?

Summary of Findings: Supposition I

The data analyzed represents the responses from 501 educators from fifteen middle schools that are constructed and opened in the Commonwealth of Pennsylvania between the years of 1992 and 2002. The fifteen schools are built by twelve different architectural firms in thirteen different counties. Furthermore, the schools reside in five of the eight different census classifications for municipalities. These five classifications represent rural, suburban, and urban settings. The schools are built in eight different years between 1992 and 2002 and range in costs starting from $9.0 million on up to $34.4 million. Collectively, the schools serve 442,913 students. The individual student bodies, from a wide range of social and economic backgrounds, represent three different types of middle school grade alignments, and range in size from 451 to 1,056 students. With an equally wide range, the academic performance on standardized tests of the fifteen student bodies range from very poor to outstanding.

The Systems Model for Educational Facilities Planning is built on two primary suppositions. The first supposition states that if a school has an educational vision, and if those responsible for the design and construction of the facility manage the interaction of economic, political, and social forces, as well as the needs of teachers and students, then using the resources available, design professionals and educators can design and construct an educational facility that is a physical representation of an educational vision.

A univariate analysis of the data yields an immediate pattern consistent with this premise.

When the responses of the educators in each school are ranked from high to low based on the degree to which they believe: (1) their school has an educational vision, (2) planners understand the variables within the six domains of planning, (3) planners understand the interaction of the variables across the domains, and (4) the facility is a physical representation of the educational vision, the data shows that the schools with the highest rankings on the first three variables also have the highest rankings of the fourth. Likewise, the schools with the lowest rankings on the first three variables have the lowest rankings in the fourth. The relevance of these patterns is even greater considering that amongst the fifteen schools, the difference between the minimum and maximum mean response for the educational vision sorts the ranking of these schools over a range of 1.485 (see table 18). The difference of the minimum and maximum means for the average degree to which facility planners understand the six domains of planning rank the schools over a range of 2.080 (see table 18). The difference in the mean responses for the degree to which educational facility planners understand the interaction of the domains of planning is 2.120 (see table 18). Finally, the minimum and maximum mean responses of the degree to which the educational facility is a physical representation of the educational vision is rank the fifteen schools over a range of 2.313 (see table 18). Given the fact that a pattern in the data emerges across four variables amongst the fifteen schools provides justification for further analysis.

Multiple regression analysis is used to ascertain if: (1) the degree to which the school has an educational vision, (2) the degree to which facility planners understand the six domains of planning, and (3) the degree to which facility planners understand the

interaction of the variables across the six domains of planning and can explain the degree to which the educational facility is a physical representation of the educational vision. A multiple regression analysis is conducted to the degree at which educators report that their facility is a physical representation of the schools educational vision as the dependent variable (survey statement 23). The degree to which a school has an educational vision (survey statement 18), the degree to which facility planners understand the six domains of planning (the mean of the means of survey statements 6 to 11), and the degree to which facility planners understand the interaction of the variables across the six domains (survey statement 13) are entered as the independent variables. These variables account for a significant percentage of the variance in the model. The coefficient of determination (R^2) is 0.513, which indicates that these variables explain 51% of the variance to the degree at which an educational facility is a physical representation of the educational vision. The multiple regression analysis is significant with a confidence interval of 95%.

Summary of the Findings: Supposition II

The second primary supposition on which the Systems Model for Educational Facilities Planning is built states that if an educational facility is a physical representation of the educational vision, it will meet the needs of its stakeholders. As with the first supposition, a clear pattern in the data emerges when the schools are ranked from highest to lowest, based on educators mean responses of the degree to which they believe their school has a physical representation of an educational vision, and the degree to which the facility meets the needs of faculty, staff, students, and the community. Most notably, when the ranking is broken into a top, middle, and bottom third, eleven of the fifteen

schools remain exclusively in one of the thirds for both variables. Of the four schools not exclusively in one of the thirds, three of the four are ranked on the cut point between two of the thirds (see table 20). An examination of the data shows that at no time does a school with one of the two variables in the top third have a ranking of the other variable in the bottom third. Likewise, at no time does a school with one of the two variables in the bottom third have a ranking of the other variable in the top third. The significance of these observations is even greater considering that amongst the fifteen schools, the range of the mean responses to the degree at which the educational facility is a physical representation of educational vision is 2.313, while the range to the degree at which the facility meets the needs of faculty, staff, students, and the community is 2.962 (see table 18). The fact that a pattern in the data emerges, based on a high to low ranking of the mean responses of educators at each of the fifteen schools, provides justification for further analysis.

Multiple regression analysis is used to ascertain if the degree to which an educational facility is a physical representation of the educational vision, and can explain the degree to which the educational facility meets the needs of faculty, staff, students, and the community. A multiple regression analysis is conducted to the degree at which educators report that their facility meets the needs of faculty, staff, students, and the community as the dependent variable (survey statement 12). The degree to which educators report their facility is a physical representation of the educational vision (survey statement 23) is entered as the independent variable. This single variable accounts for a significant percentage of the variance in the model. The coefficient of determination (R^2) is 0.392, which indicates that these variables explain 39% of the

variance to the degree at which an educational vision meets the needs of faculty, staff, students, and the community. The multiple regression analysis is significant with a confidence interval of 95%.

Interpretation of Quantitative Results

In examination of the quantitative results it is important to consider that the Systems Model for Educational Facilities Planning is developed utilizing a primarily experiential literature base, a thematic analysis of text, and a synthesis of literature from education, educational administration, architecture, and organizational sociology. The model represents a theoretical construct which describes a highly complicated and dynamic process. The systems model assumes that educational facilities planned in a democratic society arise out of actions, situations, and consequences, rather than antecedent conditions. During the development of the model, the literature base has few references from which to start. After a decade of effort, educators and design professionals have greatly expanded the body of knowledge that pertains to educational facilities. This expanded body of knowledge, however, remains largely experiential or perceptual, and not experimental. There are little comprehensive, research-based resources and materials which describe the planning process for educational facilities.

It is found that literature on educational facility planning from the past decade, whether experiential or experimental, addresses one or more of four elements. These elements are: (1) the structure and nature of the organization for which planning occurs, (2) the environment in which planning takes place, (3) the purpose and method for planning, and (4) the architectural product which results from the planning. In order to define a framework for the Systems Model for Educational Facilities Planning, it is

necessary to develop well grounded and defendable assumptions with regard to critical components of the systems model and the model as a whole. To accomplish this goal, it is necessary to synthesize literature from educational facilities planning, education, educational administration, architectural practice, and organizational sociology. Based on this synthesis, four assumptions are made which are central to the Systems Model for Educational Facility Planning, and both guided and delimited this study. These suppositions are the binding that holds the Systems Model for Educational Facilities Planning together. They are as follows: (1) School districts are open-systems. In other words, schools as organizations are conceptualized as part of a larger environment; anything that happens in the larger environment may affect the school and vice versa, (2) As open-systems, schools are resource dependent. In other words, they are not self-sufficient; therefore they must engage the outside environment for needed resources. The flow or exchange of resources creates dependencies and power differentials. These power differentials have restraining effects on an organizations' actions (Johnson, 1995), (3) If school districts are considered open-systems and resource dependant, then one of the primary purposes of planning is to reduce the restraining effects of resource dependency. The process of planning involves the management of a multiplicity and hundreds of variables. These variables can be classified into six domains of planning which have been termed: pedagogy, demographics, politics, culture, economics, and architectural acuity. Regardless of the planning process utilized, all facility planners manage variables within and across the six domains of planning to reduce the restraining effects of resource dependency, (4) Design professionals, regardless of their school of thought on pedagogy or architecture, predicate the planning and design of educational

facilities on one of the basic premises for twentieth century modern architectural design: form follows function. In other words, the goal of educators and design professionals is to construct schools (architectural product) which are a clear, physical representation (form) of a well-articulated educational vision (function).

In summary, when interpreting the quantitative results, it is imperative to bear in mind that: (1) little comprehensive, research-based resources and materials exist which describe the planning process for educational facilities, (2) no previous theoretical construct for facilities planning of this nature exists, and (3) the theoretical construct on which the model is built and grounded requires a synthesize of the literature from educational facilities planning, education, educational administration, architectural practice, and organizational sociology.

If given these facts alone when entering into the study, it is entirely possible that as logical or as well grounded as the model seems, it is simply not valid. Further, as dynamic as the process is that the model represents, measurements of validity may not possible. Yet, across both the aggregated data of 501 individual participants and disaggregated of fifteen schools, built by thirteen different architectural firms, diverse in their physical, social, cultural, and academic characteristics, the critical components of the Systems Models for Educational Facilities Planning and the model as a whole is cohesive and demonstrates significance and validity.

Quantitative Conclusion

Quantitatively the critical components of the Systems Models for Educational Facilities Planning and the model as a whole were cohesive demonstrating significance and validity.

Qualitative Analysis

Qualitative Research Strategies Utilized to Gain Leverage Over the Complexity of the Model

As stated before, it is recognized that the complexity of the phenomenon being studied, the difficulty in establishing valid causal inferences in social research of this nature, and the need for high generalizability creates a daunting challenge for any research design. Of the challenges for this study, generalizability presents a particularly difficult obstacle for the qualitative portion of the research. In order to gain leverage over the model three strategies are employed.

First, replication logic is a premise in qualitative research which states that the more times qualitative research findings are shown to be true with different sets of people and/or in different contexts, the more confidence one can place in the findings and in the conclusion that the finding can be generalized beyond the original study (Jones, 2003; Smaling, 2003; Tillis, 1997). To this end, four separate sites are selected and a separate analysis is completed at each site. Each of the four cases are treated as unique and separate entities, but by holding the methodology constant, leverage over generalizability is gained through replication logic.

Second, maximum variation sampling is used as a method to select the sites for case study analysis. For small samples, a great deal of heterogeneity can be problematic because individual cases are unique. The maximum variation strategy turns that weakness into a strength through application of the following logic: Any common patterns that emerge from great variation are of particular interest and value to capture the

core experiences, and central, shared dimensions of a setting or phenomenon (Patton, 2002). The four sites selected for case study demonstrate the greatest variation in two core components of the systems model. The two core components are the degree to which each school has an educational vision (the educational form) and the degree to which each school is a physical representation of that vision (the architectural function). Maximum variation sampling reduces researcher bias, increases internal validity, and provides a means of replication. Once selected, methods of cross-verification at each site are utilized to compare what the system model predicts, what the quantitative data yields about the site, and the analysis of the qualitative data collected.

Finally, Johnson and Christensen believe that the more similar the people and circumstances in a particular case are to the people and circumstances in another case, the more defendable a generalization is and the more readily generalizations can be made (2000). Therefore, while the sites selected for case study demonstrate the greatest variation to the degree at which each school has an educational vision and the degree to which each school is a physical representation of this vision, they are all middle schools built and opened in the Commonwealth of Pennsylvania between the years of 1992 and 2003. At first, this may seem in opposition to the maximum variation sampling strategy. However, it is the Systems Model for Educational Facilities Planning that is evaluated, not the participants. Selection of middle schools built and open in the Commonwealth of Pennsylvania between 1992 and 2003 creates commonalities in the: (1) geographic region, (2) age of the facilities, (3) statues and regulations under which the facilities are built, (4) teaching certifications required of the faculty, (5) age range of students, and (6) fact that curriculum, instructional practices, and programs at the sites are designed to

meet the needs of early adolescents. This establishes manageable and consistent parameters for the data collection and analysis. Consistency in both data collection and analysis across schools with the widest variance in two critical components of the systems model reduces researcher bias, increases internal validity, and provides a means of replication.

Selection of Schools for Comparative Case Study

The four schools selected for comparative analysis are selected based on a two-tiered process. The two-tiered process ensures that the sites selected demonstrate the greatest possible variation and are information-rich. On the first tier, schools are sorted based on two variables. These variables are: (1) The degree to which educators report that within the school and community that it serves there is a shared sense of purpose and a focus on what is important for students, and (2) The degree to which the facility contributes to a shared sense of purpose and a focus on what is important for students. The selection of the four schools is made over the widest possible continuum of these two variables. This is consistent with the maximum variation strategy and better helps to offset concerns of external validity, transferability, and researcher bias which often arises during qualitative analysis. Based on the first-tier criteria, schools 09, 10, 12, and 15 are selected for analysis in the second-tier of the selection process.

On the second tier of the selection process, the profiles of the respondents within each school that are collected through the use of the survey instruments are utilized to ensure that along with the strategy of greatest variation, the sites selected are information-rich and provide the greatest opportunity to yield insights and understanding. The number of faculty that respond to the survey, the percentage of educators in each facility

involved with the planning process, and the number of educators employed in the building since its opening are all evaluated as a means to evaluate the potential quality and quantity of the data at each site.

Finally, a one way ANOVA and a Post Hoc Analysis (LSD) are performed on the means of the survey responses from each of the four schools considered for the study. This is completed to assure that the four schools selected demonstrate the greatest possible variance from each other and across the variables researched. These tests find that in using the survey responses as a whole, the four schools under consideration are significantly different from one another. In addition, a Post Hoc Analysis (LSD) is performed on the variables being studied. It is determined that the majority of the variables under investigation are significantly different across the four schools, and that no other schools within the population can provide a larger spread over the variables amongst the variables of interest. These are the same variables used to build the regression models in the quantitative phase of the study.

As a result of the two levels of analysis, schools 09, 10, 12, and 15 are selected for case analysis. The four schools selected are consistent with the maximum variation strategy and offer information-rich environments. The selection process is critical in offsetting concerns of external validity, transferability, and researcher bias. The selection process helps to show that the end result of the study affords the greatest degree of generalizability to other contexts and settings.

Profile of Schools Selected for Comparative Case Analysis

The four schools are selected based on the facts that they show the greatest variance over two core components of the systems model, the potential quality and quantity of qualitative data at each site, and that the usage of a one way ANOVA and Post Hoc (LSD) are significantly different than the other schools in the sample. School 12 (Twelve) is selected for having the highest mean responses to the degree at which educators believe that: "Within this school and community that it serves, there is a shared sense of purpose and a focus on what is important for students", and "This facility contributes to a shared sense of purpose and a focus on what is important for students. School 10 (Ten) is selected for having the lowest mean responses to these same two statements. School 09 (Nine) is selected for having a low mean response to the statement: "Within this school and community that it serves, there is a shared sense of purpose and a focus on what is important for students", and a high mean response to the statement: "This facility contributes to a shared sense of purpose and a focus on what is important for students." And finally, school 15 (Fifteen) is selected for having a high mean response to the statement: "Within this school and community that it serves, there is a shared sense of purpose and a focus on what is important for students", and a low mean response to the statement: "This facility contributes to a shared sense of purpose and a focus on what is important for students." In addition, although the schools are not selected based on differences in physical, social, cultural, economic, and academic characteristics, they are very diverse.

Summary of Qualitative Findings

The second phase of the investigation utilizes qualitative methods to complete a comparative analysis of four purposefully selected case studies. Identical to the first phase, it is done to examine the validity of the core components of the systems model and the systems model as a whole. Like the first phase, the second phase examines the five critical questions set forth in the research design, which again, are as follows: (1) Does the school have an articulated educational vision? (2) Do the design professionals and educators manage variables within the six domains of planning when they design the facility? (3) Do the design professionals and educators manage the interaction of variables across the six domains of planning when they design the facility? (4) Is the educational facility a physical representation of the educational visions? and, (5) Does the educational facility meet the needs of the stakeholders?

Interpretation and Cross-Validation: School 12

Does School Twelve have an Articulated Educational Vision?

Qualitatively, as evidenced in structured interviews, a review of local newspaper articles and public documents filed with the Pennsylvania Department of Education, a tour of the facility, and a review of artifacts from the school district, school twelve has a clearly articulated educational vision. The formation and communication of an educational vision is part of the established culture in the school district where school twelve resides.

Quantitatively, the survey reveals that when educators at school twelve are asked to respond to the statement: “This school has an educational vision”, their mean response is 6.818 out of a possible 7 (see table 35), which is higher than any of the other fourteen

schools in the sample.

Do the Design Professionals and Educators who Planned Twelve Manage Variables within Six Domains of Planning when They Design the Facility?

As evidenced in structured interviews, a review of local newspaper articles and public documents filed with the Pennsylvania Department of Education, a tour of the facility, and a review of artifacts from the school district, those responsible for planning school twelve understand and manage each of the domains of planning. In each of the six domains, planners are acutely aware of the variables. Although there are virtually no problems with economics and limited concerns with politics, those responsible for planning school twelve do an outstanding job of understanding the culture of the school district, the pedagogical needs of teachers and students, and the size, composition, and needs of the student body. In addition, architectural acuity was high. The lead architect has direct experience with the facility since it was a duplicate of another school that the architectural firm had already constructed.

Quantitatively, every educator is asked six questions, one for each of the domains of planning with regard to the degree at which those responsible for planning the facility understand each domain. Again, of the fifteen schools, the educators at school twelve have the highest mean response when the responses of all six questions are averaged. The mean of the mean responses to the six questions is 5.313 out of 7.0 (see table 13).

Do the Design Professionals and Educators Manage the Interaction of Variables across the Six Domains of Planning when They Design the Facility?

As evidenced in structured interviews, a review of local newspaper articles and public documents filed with the Pennsylvania Department of Education, a tour of the

facility, and a review of artifacts from the school district reveal that those responsible for planning school twelve understand the interaction of variables across the six domains of planning. An analysis of the qualitative data yields three themes with regard to the interaction of the six domains of planning. These themes are: (1) understanding, (2) modification, and (3) focus. Those responsible for planning school twelve understand the interaction between economic, political, and social forces at work in the school district, and also the needs of teachers and students. With an understanding of the economic, political, and social forces at work, planners strive to create a balance in these forces by making the appropriate adaptations. However, the planners demonstrate that to make adaptations does not mean to compromise their mission and vision. They remain focused on the needs of teachers, students, and the community—especially the students.

Quantitatively, an analysis of the survey reveals that when educators at school twelve are asked to respond to the statement: "Those responsible for planning and constructing this facility understood the interaction of economic, political, and social forces at work as well as the needs of teachers and students", their mean response is the highest of all fifteen schools that participate in the survey, 5.063 out of 6.0 (see table 35, survey statement 12).

Is School Twelve a Physical Representation of the School District's Educational Vision?

Qualitatively, as evidenced in structured interviews, a review of local newspaper articles, public documents filed with the Pennsylvania Department of Education, a tour of the facility, and a review of artifacts from the school district, school twelve is a physical representation of the school district's educational vision.

The combination of practical experience and working knowledge of existing

facilities gives the principal and lead architect a tremendous advantage in the design and arrangement of spaces in a manner that facilitates a middle school model consistent with the educational mission and vision of the school district. The teachers on the core planning team are equally successful at formulating goals, programs, policies, and procedures to govern the educational program within the new facility to reflect an expectation of academic excellence commensurate with the four existing middle schools.

In the end, even with the educational spaces designed to be generic, flexible, and built for change, it is understood by those involved with the planning that the design and layout of the facility is necessary and represent the stress of rapid population growth experienced by educators, school district and township officials, and citizens within the community.

Quantitatively, the survey reveals that when educators at school twelve are asked to respond to the statement: "The design and appearance of this facility conveys the educational vision of the school", their mean response is 6.485 out of a possible 7 (see table 35, survey statement 23), and is thereby higher than any of the other fourteen schools in the sample.

Does School Twelve Meet the Needs of the Stakeholders?

Qualitatively, as evidenced in structured interviews, a review of local newspaper articles, public documents filed with the Pennsylvania Department of Education, a tour of the facility, and a review of artifacts from the school district, school twelve meets the needs of stakeholders.

From the onset, based on a forty year tradition of treating the middle grades as a unique group within the educational program, the educators who are involved with

planning school twelve are charged with the responsibility of making sure that the academic program is commensurate with the existing middle schools. To this end, the core planning team's primary goal is the development, communication, and implementation of the school district's and principal's vision of what the middle school program can be within the new facility. During the building tour (2006), the structured interviews with educators, and the times when the researcher is free to move about the building and interact with faculty and students, everyone readily speaks about how pleased they are with the facility. Formally and informally educators speak of how the building meets their needs and the needs of their students.

Although initial concerns are raised with regard to the school district's proposal to build the school on an environmentally-sensitive property, an agreement with township supervisors provide an alternative site, save the school district nearly $500,000, provide for community-wide use of the campus and adjoining township property during the school day, and result in the selection of a facility design that allows community use of athletic and common areas within the school after hours. As a result, both the facility and the campus better meet the needs of the community.

Quantitatively, the survey reveals that when educators at school twelve are asked to respond to the statement: "This facility meets the needs of faculty, staff, students, and the community", their mean response is 5.813 out of a possible 6.0, which is higher than any of the other fourteen schools in the sample. The qualitative results are consistent with the quantitative results.

Table 45

Cross-Validation Table: Summary of Critical Research Questions Qualitative and Quantitative Results from School Twelve

Research Question	Quantitative Result	Qualitative Result
Does school twelve have an articulated educational vision?	YES	YES
Do the design professionals and educators who plan school twelve manage variables within six domains of planning when they plan the facility?	YES	YES
Do the design professionals and educators who plan school twelve manage the interaction of variables across six domains of planning when they design the facility?	YES	YES
Is school twelve a physical representation of the school district's educational vision?	YES	YES
Does school twelve meet the needs of the stakeholders?	YES	YES

Conclusions of Case Study for School Twelve

Twelve is consistent with the prediction made by the Systems Model for Educational Facilities Planning. The Systems Model for Educational Facility Planning predicts that if there is an articulated vision and the facility is a physical representation of that vision, then the facility meets the needs of those it serves if during the planning of the facility, the physical, social, pedagogical, cultural, and economic components of the environment are managed. School twelve has an articulated educational vision and the facility is a physical representation of that vision. The educators and design professionals responsible for planning school twelve consider each of the six domains of planning and the interaction of each of these domains during the planning process. School twelve meets the needs of faculty, staff, students, and the community. This case study, in part,

validates the Systems Model for Educational Facility Planning.

Interpretation and Cross-Validation: School 15

Does School Fifteen have an Articulated Educational Vision?

Qualitatively, as evidenced in structured interviews, a review of local newspaper articles, public documents filed with the Pennsylvania Department of Education, a tour of the facility, and a review of artifacts from the school district, school fifteen has an educational vision.

The school district in which school fifteen resides currently operates three middle schools. When school fifteen is constructed, the school district has more than a decade worth of experience with middle level education. During structured interviews, collectively, the educators at school fifteen establish that they maintain a shared sense of purpose and a focus on what is important for students. The educators evidence their beliefs through a demonstration of pride in their school, their programs, and their students. Even when they readily list obstacles to their educational programs due to the design of the facility, they still emphasize the positive things that occur and the ways that faculty has adapted.

Quantitatively, the educators' at school fifteen mean response to the statement: "Within this school and community that it serves, there is a shared sense of purpose and a focus on what is important for students" is 5.086 out of a possible 6.0. Additionally, when asked to respond to the statement: "This school has an educational vision", the mean response is 5.629 on a scale of 7.00 (see table 38, survey statement 18). These results are consistent with the findings during the qualitative study.

Do the Design Professionals and Educators who Plan School Fifteen Manage Variables within Six Domains of Planning when They Design the Facility?

As evidenced in structured interviews, public documents filed with the Pennsylvania Department of Education, a tour of the facility, a review of artifacts from the school district, and a historical examination of the county, those responsible for planning school fifteen experience difficulty in the management of the six domains of planning. Of particular difficulty for planners are the quantitative and qualitative variables within the domains of economics, politics, and culture. This is not to indicate that the domains of pedagogy and architectural acuity are not important. However, they are overshadowed by the complexity of the qualitative and quantitative variables in the other four domains.

Quantitatively, every educator is asked six questions, one for each of the domains of planning with regard to the degree at which those responsible for planning the facility understand each domain. Of the fifteen schools, the educators at school fifteen have the lowest mean response when the responses of all six questions were averaged. The mean of the mean responses to the six questions is 3.23 out of 6.0 (see table 13).

Do the Design Professionals and Educators at School Fifteen Manage the Interaction of Variables Across the Six Domains of Planning when They Design the Facility?

As evidenced in structured interviews, public documents filed with the Pennsylvania Department of Education, a tour of the facility, a review of artifacts from the school district, and a historical examination of the county, those responsible for planning school fifteen experience difficulty in the management of the interaction of variables across the six domains of planning. This investigation identifies and describes

complicated social, cultural, political, and economic mechanisms at work in the school district where school fifteen resides. The interaction of economic, political, and social forces at work in the school district and community contend with the needs of teachers and students, and they limit the resources available to the educators and design professionals responsible for the design and construction of a facility which is a physical representation of the school district's educational visions.

Quantitatively, an analysis of the survey reveals that when educators at school fifteen are asked to respond to the statement: "Those responsible for planning and constructing this facility understood the interaction of economic, political, and social forces at work as well as the needs of teachers and students" their mean response is the lowest of all fifteen schools that participate in the survey—2.943 out of 6.0. This is the lowest mean response of the fifteen schools.

Is School Fifteen a Physical Representation of the School District's Educational Vision?

Qualitatively, as evidenced in structured interviews, a review of local newspaper articles, public documents filed with the Pennsylvania Department of Education, a tour of the facility, and a review of artifacts from the school district, school fifteen is not a physical representation of the school district's educational vision.

From the onset, it was a challenge for those responsible in planning school fifteen to design a facility that was a physical representation of an educational vision. With plans already drawn for a new elementary school, rather than lose the investment in architectural fees, those responsible for planning school fifteen are directed to utilize the same blue prints and simply designate the facility as a middle school. As a result of this action, it is not unexpected when, out of fifteen schools in the sample, the educators at

school fifteen have the lowest mean responses (4.171 out of 7.0) to the statement: “The design and appearance of this facility conveys the educational vision of the school” (see table 13). This sentiment is also echoed during structured interviews when 100% of the educators convey dissatisfaction with the way that the building addresses the size, needs, and composition of the student body.

Given the fact that school fifteen is the oldest school to participate in the study, it it is arguable that after thirteen years of operation, the educators respond to the survey questions based on current conditions of the facility, and that the low degree to which they indicate that the facility meets the needs of faculty, staff, parents and the community are the result of events that can not have been anticipated even by the most astute facility planners. To this end, it is necessary to point out the fact that the design issues which cause the greatest concerns today, begin almost immediately after the facility is opened. Three of the educators who participate in structured interviews indicate that within two years of the facility opening, teacher planning centers are converted into additional classroom spaces, and the common areas, especially the halls, show that they are not designed to manage the increasing number of students. As the elementary schools continued to be pressed for space, the school district is forced to begin planning a major addition to school fifteen. The problems that arise and lead up to the construction of the addition, and the concerns raised with the inadequacy of the addition, have been consistent over the thirteen years since school fifteen has opened

Does School Fifteen Meet the Needs of the Stakeholders?

By all qualitative and quantitative measures, school fifteen does not meet the needs of the stakeholders. As a result of a building tour (2006) and structured interviews

with educators (2006), although school fifteen is a well maintained, functional building, it is limited in the degree to which it meets the needs of faculty, staff, students, and the community.

On the quantitative survey in phase one of this study when the educators at school fifteen are asked to respond to the statement: “This school meets the needs of faculty, staff, students, and the community”, their mean response is 2.371 out of 6.

Table 46

Cross-Validation Table: Summary of Critical Research Questions Qualitative and Quantitative Results from School Fifteen

Research Question	Quantitative Result	Qualitative Result
Does school fifteen have an articulated educational vision?	YES	YES
Do the design professionals and educators who plan school fifteen manage variables within six domains of planning when they design the facility?	NO	NO
Do the design professionals and educators who plan school fifteen manage the interaction of variables across six domains of planning when they design the facility?	NO	NO
Is school fifteen a physical representation of the school district’s educational vision?	NO	NO
Does school fifteen meet the needs of the stakeholders?	NO	NO

Conclusions of Case Study School Fifteen

Fifteen is consistent with the prediction made by the Systems Model for Educational Facilities Planning. The Systems Model for Educational Facility Planning predicts that if there is an articulated vision, but the facility is not a physical

representation of that vision, then the facility does not meet the needs of those it serves. School fifteen has an articulated educational vision, but the facility is not a physical representation of that vision. The educators and design professionals responsible for planning school fifteen experience difficulty in the management of variables within the six domains of planning and the interaction of those domains during the planning process. This case study, in part, validates the Systems Model for Educational Facility Planning.

Interpretation and Cross-Validation: School 09

Does School Nine have an Articulated Educational Vision?

Qualitatively, as evidenced in structured interviews, a review of local newspaper articles, public documents filed with the Pennsylvania Department of Education, a tour of the facility, and a review of artifacts from the school district, school nine has an educational vision and the facility is constructed to represent that vision. However, due to an inability to sustain that educational vision and not having reformulated a new vision, the educators at school nine have a low mean response in response to the statement: "Within this school and community that it serves, there is a shared sense of purpose and a focus on what is important for students." There are only three schools out of the fifteen that participate in the study that have a lower mean on this statement. The findings from the case study indicate that a far more complicated set of dynamics are at work in the school district where school nine resides, and also that this low mean score can not simply be explained by the presence or absence of an educational vision. Given the fact that Nine receives national recognition after its first year in operation, it is not likely that an absence of an educational vision is the reason for the low mean scores on the survey. The survey results from school nine may have been very different if

conducted at the end of the first year its operation (2002/2003).

Do the Design Professionals and Educators who Plan School Nine Manage Variables Within Six Domains of Planning when They Design the Facility?

As evidenced in structured interviews, public documents filed with the Pennsylvania Department of Education, a tour of the facility, and a review of artifacts from the school district, those responsible for planning school nine, with the exception of limits placed on the school district as a result of having a lower bond rating, have no challenges to their management of the design and construction of the new middle school. By the recognition received after its first year in operation, those responsible for planning school nine do an exceptional job in the management of the domains of architectural acuity, culture, and pedagogy. In addition, it appears that the district does a satisfactory job dealing with the domain of politics. However, though there were no questions raised at the time of planning and construction, in the domains of demographics and economics, shortsighted planning results in an inability to sustain the school district's educational vision.

Quantitatively, when every educator is asked six questions, one for each of the domains of planning with regard to the degree at which those responsible for planning the facility understand each domain, the educators at school nine have the fifth highest mean response when the responses of all six questions are averaged. The mean of the mean responses to the six questions is 4.667 out of 6.0 (see table 13).

Do the Design Professionals and Educators who Plan School Nine Manage the Interaction of Variables Across the Six Domains of Planning when They Design the Facility?

Based on the recognition received after its first year in operation, those responsible for planning school nine do an exceptional job in the management of the domains of architectural acuity, culture, and pedagogy. In addition, it appears that the district does a satisfactory job dealing with the domain of politics and with the interaction of the qualitative and quantitative variables across domains. In the end, those responsible for planning school nine are able to leverage the resources necessary to construct a new middle school in an economically distressed school district. However, though there are no questions raised at the time of planning and construction, in the domains of Demographics and Economics, shortsighted planning results in an inability to sustain the school district's educational vision.

Quantitatively, an analysis of the survey reveals that when educators at school nine are asked to respond to the statement: "Those responsible for planning and constructing this facility understood the interaction of economic, political, and social forces at work as well as the needs of teachers and students" their mean response is the third highest of all fifteen schools that participate in the survey. Their mean response is 4.364 out of 6.0 (see table 13).

Is School Nine a Physical Representation of the School District's Educational Vision?

Qualitatively and quantitatively school nine is a physical representation of the educational vision for which it is built. However, due to financial problems, a decline in enrollments, a decrease in property values, and high fixed operating costs, the school

district can no longer sustain the vision for which school nine is built.

When educators at school nine are asked to respond to the statement: “The design and appearance of this facility conveys the educational vision of the school”, their mean response is the fourth highest of the fifteen schools, 6.73 out of 7.0. (see table 13). At the same time, when asked to respond to the statement: “Within this school and community there is a shared sense of purpose and a focus on what is important for students”, they have the fourth lowest mean, 5.909 out of 7.0 (see table 13). As established earlier, it is not that the school district does not have an educational vision or that they lack the expertise, experience, or the facilities to achieve that vision. Unfortunately, the school district does not have the financial stability to sustain their vision within the facility, and it has not yet reformulated their vision to address the current reality of the environment.

Does School Nine Meet the Needs of the Stakeholders?

The educators at school nine have demonstrated the expertise, experience, and the facility necessary to achieve their vision. This is evidenced by the national recognition that is received by the faculty and staff for increased attendance and standardized test scores after only one year in operation. During a tour of the facility and structured interviews, it was evident that the facility is specifically designed to be a middle school for urban children. Middle school principles and methods of instruction that are supported by the National Middle School Association (NMSA, 2006) and held common by the school district and architectural firm are embedded in the overall design of building and arrangement of spaces within the facility. Beyond the design, the location of the new middle school is outside of economically distressed neighborhoods. This results in educators being better able to address the health and safety needs of their

students.

On the quantitative survey in phase one of this study when the educators at school nine are asked to respond to the statement: “This school meets the needs of faculty, staff, students, and the community”, their mean response is 4.362 out of 6 (see table 41, survey statement 12). This mean response is higher than more than half of the schools in the study.

Table 47:

Cross-Validation Table: Summary of Critical Research Questions Qualitative and Quantitative Results from School Nine

Research Question	Quantitative Result	Qualitative Result – Currently	Qualitative Result – After First Year in Operation
Does school nine have an articulated educational vision?	NO	NO	YES
Do the design professionals and educators who plan school nine manage variables within six domains of planning when they design the facility?	YES	YES	YES
Do the design professionals and educators who plan school nine manage the interaction of variables across six domains of planning when they design the facility?	YES	YES	YES
Is school nine a physical representation of the school district’s educational vision?	YES	YES	YES
Does school nine meet the needs of the stakeholders?	YES	YES	YES

Conclusions of School Nine

The quantitative data indicates that: (1) the school does not have an articulated educational vision, (2) the facility is a physical representation of an educational vision, (3) the design professionals and educators manage variables within the six domains of planning, and (4) the educational facility meets the needs of the stakeholders. This set of statements does not match what the System Model for Educational Facilities Planning predicts for a new facility and suggests that the Systems Model for Educational Facilities planning is not valid in this case. However, in the case of school nine, the qualitative data indicates that the environment changed so quickly that the timing of the study, in comparison to events in the school district, shed a different light on the analysis. The qualitative research indicates that if this study is completed a year after the school opens, the results are likely to indicate that: (1) the school has an articulated educational vision, (2) the facility is a physical representation of that vision, (3) the design professionals and educators manage variables within the six domains of planning, and (4) the educational facility meets the needs of the stakeholders. This set of statements matches what the system model predicts and holds the Systems Model for Educational Facilities planning valid (see table 46). In this light, school nine is consistent with the prediction made by the Systems Model for Educational Facilities Planning. The Systems Model for Educational Facility Planning predicts that if there is an articulated vision, the facility is a physical representation of that vision, and that the facility meets the needs of those it serves.

Interpretation and Cross-Validation: School 10

Does School Ten have an Articulated Educational Vision?

During structured interviews and a building tour, the teachers at school ten are divided in their pedagogical approaches for teaching young adolescents. Educators attribute this lack of focus and direction to the fact that from the time discussions begin with regard to the construction of a new school through its second year of operation, the faculty has been led by four different building level administrators and three different central office administrators.

Quantitatively, the survey reveals that when educators at school ten are asked to respond to the statement: "This school has an educational vision", their mean response is 5.333 out of a possible 7— the lowest mean of all fifteen schools (see table 13).

Do the Design Professionals and Educators who Plan School Ten Manage Variables Within Six Domains of Planning when They Design the Facility?

As evidenced in structured interviews, a review of local newspaper articles, public documents filed with the Pennsylvania Department of Education, a tour of the facility, and a review of artifacts from the school district it is demonstrated that those responsible for planning school ten experience difficulty in the management of variables in all of the domains of planning. Although the Board of School Directors ultimately had the resolve and financial solvency to proceed with the project, their difficulty in the management of variables in all six of the domains of planning has had lasting consequences.

Quantitatively, when every educator is asked six questions, one for each of the domains of planning with regard to the degree at which those responsible for planning the facility understand each domain, the educators at school ten have the third lowest mean

response when the responses of all six questions are averaged. Their mean of the mean responses to the six questions is 4.097 out of 6.0 (see table 13).

Do the Design Professionals and Educators who Plan School Ten Manage the Interaction of Variables Across the Six Domains of Planning when They Design the Facility?

Qualitatively and quantitatively those responsible for planning school ten experience difficulty in the management of the interaction of variables across the six domains of planning, especially in the domains of politics, culture, economics, architectural acuity, and pedagogy. As previously stated, though the Board of School Directors has the financial solvency and the resolve necessary to proceed with project, the design and cost of the final product creates divisions on the Board of School Directors and within the community. Over time, the divisions created may have been worthwhile had the facility been ranked as strongly meeting the needs of faculty, staff, students, and the community. However, the educators' mean response to the statement: "This facility meets the needs of faculty, staff, students, and the community" is 3.981 on a 6.0 point scale (see table 41, survey statement 12).

Quantitatively, educators' mean response rank school ten eleventh out of the fifteen schools in the degree to which educators feel that those responsible for planning their facility understand the interaction of economic, political, and social forces, as well as the needs of teachers and students.

Is School Ten a Physical Representation of the School District's Educational Vision?

While school ten demonstrates many traditional designs attributes of a middle school, the educational program at school ten cannot be classified as a elementary,

middle, or junior high school. The sixth, seventh, and eighth grade, and also the creative arts teachers are all assigned to different instructional spaces and scheduled with different educational philosophies. The overall layout of the building is disjointed. Students report that the building confuses, while faculty report that the building isolates.

Quantitatively, school ten is chosen as one of the four purposefully selected sites for a comparative case study from the population of fifteen schools surveyed because it holds the lowest mean response of the degree to which educators believe that the design of their facility contributes to a shared sense of purpose and a focus on what is important for students—4.33 on a scale of 6.0 (see table 13).

Does School Ten Meet the Needs of the Stakeholders?

Qualitatively, it is clear that the design and layout of the facility, along with the mixed pedagogical approaches, impact the level of dissatisfaction that educators have with the facility. Design features which are extremely difficult to change will continue to create confusion for students and isolate teachers. As stated earlier, though the facility contains many of the traditional design features of a middle school, it is utilized, depending on the group of teachers, with an elementary, junior high, or middle school philosophy. At best, the statement could be made that given the way school ten is currently utilized, it marginally meets the needs of teachers and students.

Quantitatively, the response of educators to the statement: “This school meets the needs of faculty, staff, students, and the community” rank school ten eleventh out of the fifteen, with a mean score of 3.981 out of 6.0 (see table 13).

Table 48

Cross-Validation Table: Summary of Critical Research Questions Qualitative and Quantitative Results from School Ten

Research Question	Quantitative Result	Qualitative Result
Does school ten have an articulated educational vision?	NO	NO
Do the design professionals and educators who plan school ten manage variables within six domains of planning when they design the facility?	NO	NO
Do the design professionals and educators who plan school ten manage the interaction of variables across six domains of planning when they design the facility?	NO	NO
Is school ten a physical representation of the school district's educational vision?	NO	NO
Does school ten meet the needs of the stakeholders?	NO	NO

Conclusions of Case Study for School Ten

School ten is consistent with the prediction made by the Systems Model for Educational Facilities Planning. The Systems Model for Educational Facility Planning predicts that if there is not an articulated vision and/or the facility is not a physical representation an articulated educational vision, then the facility does not meet the needs of those it serves. School ten does not has an articulated educational vision, and the facility is not a physical representation of a clearly articulated educational vision. The educators and design professionals responsible for planning school ten experience difficulty in the management of variables within the six domains of planning and the

interaction of these domains during the planning process. This is especially true for the domains of economics, politics, and culture. School ten is limited in the way it meets the needs of faculty, staff, students, and the community. This case study, in part, validates the Systems Model for Educational Facility Planning.

Conclusions of Study

The Systems Model for Educational Facilities Planning is a theoretical construct which delimits and explains, in a systematic way, complex patterns, interactions, and relationships between the physical, social, pedagogical, cultural, and economic components of educational facilities planning. The pragmatic model assumes that educational facilities planning in a democratic society arises out of actions, situations, and consequences rather than antecedent conditions. As a result, by its nature, the Systems Model for Educational Facilities Planning has applications regardless of the school of thought on pedagogical practices, educational facilities planning, or architecture.

As this study begins, it is entirely possible that as logical and well grounded as the model seems, it simply is not valid. In addition, due to the complexity of the model, even if it is valid, to determine its degree of validity is a challenge. However, through the utilization of a research design that is creative, multi-layered, and grounded in sound methodological practices, leverage is gained over the complexity of the system and the Systems Models for Educational Facilities Planning demonstrates that it is cohesive, significant, and valid.

Model Revisions Based on Research

Throughout the thematic analysis of text, synthesis of literature from education, educational administration, architecture, organizational sociology, and discussions with nationally recognized experts in educational facility planning, the Systems Model for Educational Facilities Planning is refined and gains sophistication. The version of the model that culminates from those efforts is shown in chapter 1, figure *2*.

During the case studies it becomes apparent that there is a facet of educational facilities planning for which the model does not account. In each case study, the development, implementation, and maintenance of policies, programs, procedures, and schedules to organize the educational program within the facility enhances the degree to which the building meets the needs of faculty, staff, students, and the community. From the most basic operating procedures, such as which staircase students utilize to move to lunch, to more complicated decisions on how teachers and facilities can be effectively and efficiently scheduled, all impact the level of satisfaction that educators have with the facility.

Take for example, the case of school twelve; the core planning team of teachers has little impact on the overall design of the facility. However, their primary responsibility is to refine and fashion goals, programs, policies, and procedures to govern the educational program within the new facility. During structured interviews, it is evident that their efforts enhance educators' satisfaction with the facility.

In the case of school ten, the facility is designed with many of the characteristics of a traditional middle school. Particularly, the rooms are arranged so that they are assigned to interdisciplinary teams of teachers. This is consistent with the middle school

philosophy to which the school district subscribes to in PlanCon documents (PlanCon 10, 1999). However, in practice, the seventh and eighth grade rooms are assigned in departmental groups rather than in an interdisciplinary team, the sixth grade rooms are utilized with an elementary school approach, and the creative arts rooms are utilized with a middle school approach. Structured interviews indicate that this lack of focus and purpose in the organization of the educational program within the facility increases the level of dissatisfaction with the facility.

In the case of school fifteen, the facility is originally designed to be an elementary school. Compounding that problem, a large addition increases the size of the student body by one third, yet common spaces like the halls, library, gymnasium, and cafeteria are not enlarged. Although during structured interviews educators readily list obstacles to their educational programs due to the design of the facility, they still emphasize the positive things that are occurring and the ways that faculty has adapted. The educators at school fifteen find creative and successful methods to organize educational programs within the facility in order to better meet the needs of their students.

In the case of school nine, educators develop policies, programs, procedures, and schedules to utilize the facility in a manner that enhances movement toward their educational vision. However, due to financial problems, a decline in enrollment, a decrease in property values, and high fixed operating costs, the school district no longer maintains the policies, programs, procedures, and schedules that are developed, implemented, and made successful for the organization of the educational program within the facility. This leads to a loss of focus, drop in morale, and decline in the belief that the together, the educators and the facility make a positive impact on the lives of urban

youth.

It is important to note that in all these cases, it is not suggested that the vision or the facility be changed. What is suggested is that the building can better meet the needs of faculty, staff, students, and community through reorganization of goals, programs, policies, and procedures that are used to govern the educational program within a facility.

The Systems Model for Educational Facilities planning assumes that change is inevitable. The change may come slowly or it may come quickly, but change is inevitable. Inevitable change is assured by the simple fact that all facilities age. It is change that creates an imbalance between the educational vision and the ability of the educational facility to meet the educational vision. It is the need to again achieve balance that drives the model. In some situations during the research, it becomes evident that change is addressed by a reorganization of goals, programs, policies, and procedures that are used to govern the educational program within a facility. In this manner, neither the educational vision nor the facility is changed, yet balance is achieved and the facility is a better utilized as a physical representation of the educational vision.

As a result of the study, it is recommended that “Reorganization” be added as a heading in the box just prior to “Architectural Form”. This indicates that in order to maintain the balance between architectural form and architectural function educators can exercise this option (see figure 6).

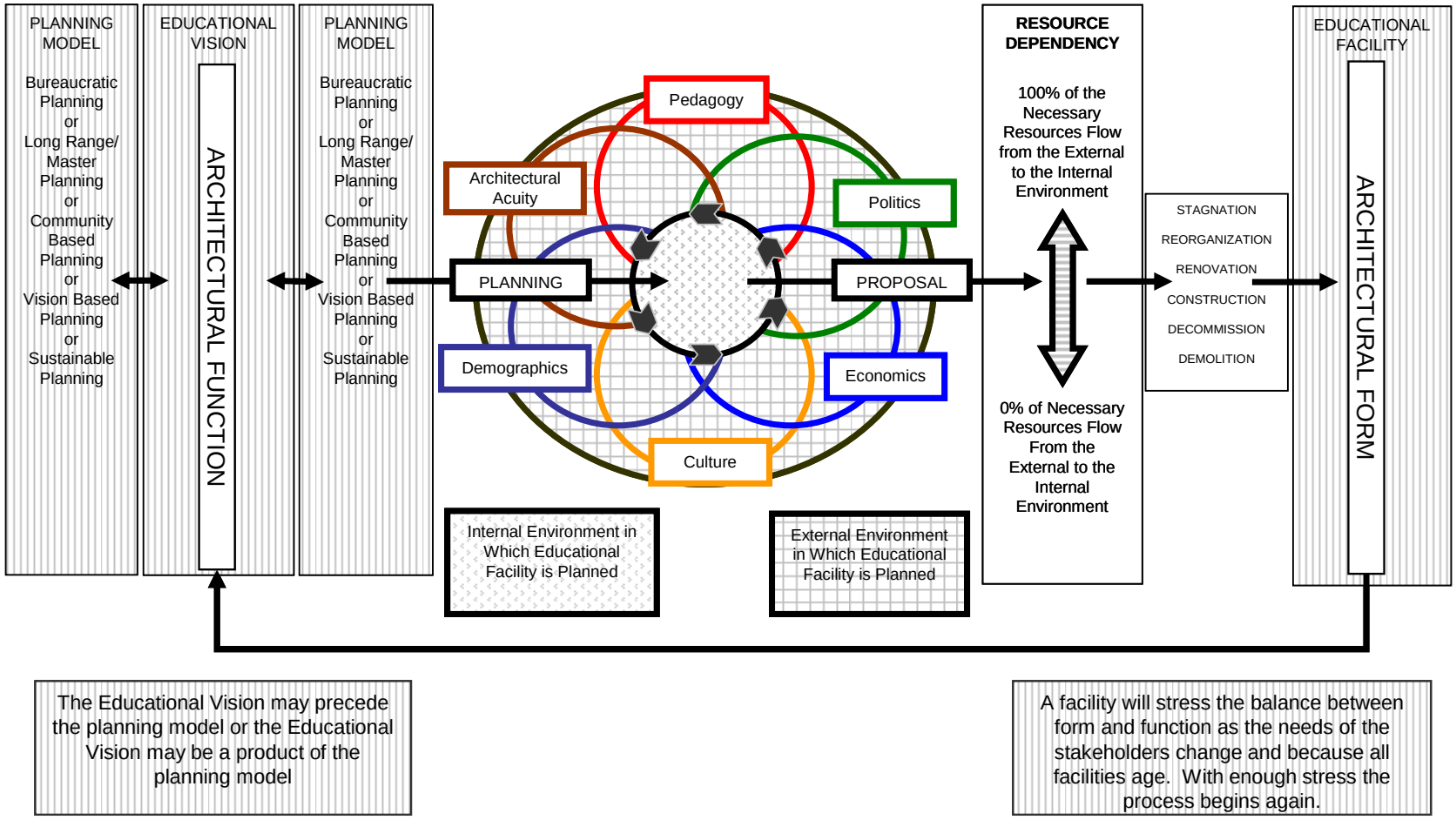

Figure 6. Revised Systems Model for Educational Facilities Planning

Recommendations for Further Research

This study results in the conception and development of a Systems Model for Educational Facilities Planning. The investigation finds the model to be cohesive, significant, and valid. However, the model is extremely complex and continued research is clearly needed. As a result of the study, five recommendations for continued research are clear. They are as follows: (1) Research needs to be conducted on the model which utilizes the planning of elementary, high schools, and non-traditional schools. (2) The planning of schools in the Commonwealth of Pennsylvania has regulations that, to a certain extent, govern the planning process. Research on the model needs to be conducted with schools that are planned in different states or in settings ungoverned by these regulations. (3) The study reveals that the survey instrument may have value beyond this study. Further research and refinements of the survey instrument are a worthwhile endeavor. (4) The study reveals that the development, implementation, and maintenance of policies, programs, procedures, and schedules to organize an educational program within an educational facility enhances the degree to which the building meets the needs of faculty, staff, students, and the community. Research into educational leadership under these conditions is warranted. (5) The model is built on the architectural premise that "form follows function". There are movements within educational facilities planning to design and construct facilities which follow the architectural premise that "function follows form". The model needs to be evaluated against such a planning process.

Recommendations for Practice

Early in the development of this study, it becomes evident that in order to address the void in the research base, the complexity of the environment in which public schools are planned, and concerns with regard to the empirical assessment of schools as organizations that a unify theoretical construct is needed. However, such a construct does not exist, nor does a broad empirical research base on which such a construct can be built.

The Systems Model for Educational Facilities Planning is developed as a theoretical construct to delimit and explain, in a systematic way, complex patterns, interactions, and relationships between the physical, social, pedagogical, cultural, and economic components of educational facilities planning.

The model represents a theoretical construct from which design professionals and educators can better organize, understand, analyze, communicate, and research complex cause and effect relationships that occur when educational facilities are designed and constructed. The Systems Model for Planning of Educational Facilities: (1) identifies and describes complicated social, cultural, political, and economic mechanisms at work when public schools are designed and constructed in a pluralistic democratic society, (2) makes understandable the relationships between those mechanisms and educational facility planning, and (3) formalizes causal inferences between social, cultural, political, and economic mechanisms, educational facility planning, and educational facilities.

This research study found that the Systems Models for Educational Facilities Planning is cohesive, significant, and valid. Even so, based on the fact that the model is pragmatic, its true worth is not measured by the analytical results of this study. Its true

value is measured by its application. The Systems Model for Educational Facilities Planning needs to be utilized as a practical structure against which the planning of educational facilities can take place. The model must be transitioned from the theoretical to real world applications.

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APPENDIX A

Systems Model Survey

Survey Instructions

Building Level Administrator Reads:

You are being asked to participate in a doctoral study that seeks to: (1) describe complicated social, cultural, political, and economic mechanisms at work when public schools are designed and constructed, (2) elaborate on the relationships between those mechanisms and educational facility planning, and (3) cross-validate, through quantitative and qualitative methods, a systems model which formalizes causal inferences between social, cultural, political, and economic mechanisms, educational facility planning, and educational facilities.

Permission to conduct this study has been granted by the superintendent of schools and your building principal. However, you are under no obligation to participate. If you choose to participate, you are free to withdraw your consent at any time.

Your name will never appear on any survey or research instruments. No identity will be made in the data analysis. All written materials and consent forms will be stored in a locked file in the researcher's home. Your response(s) will only appear in statistical data summaries. All materials will be destroyed at the completion of the research.

A summary of the results of this research will be supplied to you, at no cost, upon request. Information on how to request a summary of the results is on your copy of the Voluntary Consent form.

I am now providing you with two copies of the Voluntary Consent form and the survey. If you agree to participate please sign one of the Voluntary Consent forms and return it to me. Please retain the other for your records. (Please place the Voluntary Consent forms in the envelope marked “Voluntary Consent Forms). All Voluntary Consent forms will be kept separate from the surveys.

In a minute, I am going to ask you to complete the survey. However, before you do you may now complete the survey. Please do sign or place your name anywhere on the survey form.

Survey Questions

1. What best describes how you currently serve the student population of this building?
   (A) Teacher (B) Administrator/Counselor/ Nurse/Librarian/Or Other PA Certified Professional (C) Other

2. How many years have you been employed by the district?
   (A) 0-5 (B) 6-10 (C) 11-15 (D) 16-20 (E) 20+

3. How many years have you taught in this building?
   (A) 0-3 (B) 4-6 (C) 7-9 (D) 10-12

4. Did you move into the building the year it opened?
   (1) Yes (2) No

5. Were you involved in the planning process for this facility?
   (1) Yes (2) No

		Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
6.	This school has a shared sense of purpose and a focus on what is most important for students.	1	2	3	4	5	6
7.	This facility (building) contributes to a shared sense of purpose and a focus on what is most important for students.	1	2	3	4	5	6
8.	Those responsible for planning this building understood the size, composition, and needs of the student body.	1	2	3	4	5	6
9.	Those responsible for planning this building understood principles and methods of instruction.	1	2	3	4	5	6
10.	Those responsible for planning this building understood values, attitudes, beliefs, standards, traditions, and customs of the school district and community.	1	2	3	4	5	6
11.	Those responsible for planning this building understood the economics of the school district and community.	1	2	3	4	5	6

	Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
12. Those responsible for planning this building understood the relationships between educators, elected officials, parents, community groups, and citizens within the community.	1	2	3	4	5	6
13. The architect and design professionals who designed and built this building understood the needs of the school district and community.	1	2	3	4	5	6
14. Overall those responsible for planning this building understood the physical, social, cultural, economic, and instructional needs of the school district and community.	1	2	3	4	5	6
15. This building meets the needs of faculty, staff, students, and the community.	1	2	3	4	5	6

	Strongly Disagree	Disagree	Somewhat Disagree	Neither	Somewhat Agree	Agree	Strongly Agree
16. There is a shared sense of purpose among educators in this school.	1	2	3	4	5	6	7
17. There is a shared sense of purpose among parents in this school.	1	2	3	4	5	6	7
18. There is a shared sense of purpose among students in this school.	1	2	3	4	5	6	7
19. There is a shared sense of purpose within the community regarding this school.	1	2	3	4	5	6	7
20. There is a focus on what is most important for students among educators in this school.	1	2	3	4	5	6	7
21. There is a focus on what is most important for students among parents/guardians of this school.	1	2	3	4	5	6	7

	Strongly Disagree	Disagree	Somewhat Disagree	Neither	Somewhat Agree	Agree	Strongly Agree
22. There is a focus on what is most important for students within the community of this school.	1	2	3	4	5	6	7
23. Students in this school understand their importance in the learning process.	1	2	3	4	5	6	7
24. Educators, parents, students, and members of the community have a share sense of responsibility for student learning.	1	2	3	4	5	6	7
25. Our school building helps promote a sense of shared purpose among educators.	1	2	3	4	5	6	7
26. Our school building helps promote a sense of shared purpose among parents.	1	2	3	4	5	6	7
27. Our school building helps promote a sense of shared purpose within the community.	1	2	3	4	5	6	7
28. Our school building promotes focus on what is important for students.	1	2	3	4	5	6	7
29. Our school building helps students become active learners.	1	2	3	4	5	6	7
30. Our school building helps teachers meet the needs of students.	1	2	3	4	5	6	7
31. Planning this facility required a detailed understanding of teaching and learning.	1	2	3	4	5	6	7
32. Those responsible for planning and constructing this facility understood teaching and learning.	1	2	3	4	5	6	7
33. Teaching and learning impacted the final design of this facility.	1	2	3	4	5	6	7

	Strongly Disagree	Disagree	Somewhat Disagree	Neither	Somewhat Agree	Agree	Strongly Agree
34. Planning this facility required a detailed understanding of size, composition, and needs of the student body.	1	2	3	4	5	6	7
35. Those responsible for planning and constructing this facility understood the size, composition, and needs of the student body.	1	2	3	4	5	6	7
36. The composition and needs of the student body impacted the final design of this facility.	1	2	3	4	5	6	7
37. Planning this facility required a detailed understanding of economics of the community.	1	2	3	4	5	6	7
38. Those responsible for planning and constructing this facility understood the economics of the community.	1	2	3	4	5	6	7
39. The economics of the community impacted on the final design of this facility.	1	2	3	4	5	6	7
40. Planning this facility required a detailed understanding of the relationships between educators, elected officials, parents, community groups, and citizens within the community.	1	2	3	4	5	6	7
41. Those responsible for planning and constructing this facility understood the relationships between educators, elected officials, parents, community groups, and citizens within the community.	1	2	3	4	5	6	7

	Strongly Disagree	Disagree	Somewhat Disagree	Neither	Somewhat Agree	Agree	Strongly Agree
42. The relationships between educators, elected officials, parents, community groups, and citizens within the community impacted the final design of this building.	1	2	3	4	5	6	7
43. Planning this facility required a detailed understanding of the values, beliefs, attitudes, standards, traditions, customs of the school district and community.	1	2	3	4	5	6	7
44. Those responsible for planning and constructing this facility understood the values, beliefs, attitudes, standards, traditions, customs of the school district and community.	1	2	3	4	5	6	7
45. The values, beliefs, attitudes, standards, traditions, customs of the school district and community impacted on the final design of this facility.	1	2	3	4	5	6	7
46. This school building helps promote a sense of community.	1	2	3	4	5	6	7
47. This building helps promote promote a sense of school pride.	1	2	3	4	5	6	7
48. Planning this facility required the architects and design professionals to have a detailed understanding of the needs of the school district and community.	1	2	3	4	5	6	7
49. The architect and design professionals responsible for planning and constructing this facility understood the needs of the school district and community.	1	2	3	4	5	6	7

	Strongly Disagree	Disagree	Somewhat Disagree	Neither	Somewhat Agree	Agree	Strongly Agree
50. The architect and design professionals understanding the needs of the school district and community impacted the final design of this facility.	1	2	3	4	5	6	7
51. Planning this facility 4required a detailed understanding of the interaction between educational, economic, political, and social forces at work in this school district and community.	1	2	3	4	5	6	7
52. Those responsible for planning and constructing this facility understood the interaction between educational, economic, political, and social forces at work in this school district.	1	2	3	4	5	6	7
53. Those responsible for planning and constructing this facility understood the interaction between educational, economic, political, and social forces at work in this school and reflected those relationships in the design of the facility.	1	2	3	4	5	6	7
54. Our facility meets the needs of teachers.	1	2	3	4	5	6	7
55. This facility meets the needs of students.	1	2	3	4	5	6	7
56. This facility meets the needs of the community.	1	2	3	4	5	6	7
57. This school has an educational vision.	1	2	3	4	5	6	7
58. This school building is a physical representation of the school's vision.	1	2	3	4	5	6	7

	Strongly Disagree	Disagree	Somewhat Disagree	Neither	Somewhat Agree	Agree	Strongly Agree
59. Those responsible for planning this facility managed the physical, social, pedagogical, cultural, and economic components of the school district and community.	1	2	3	4	5	6	7

60. Since the opening of this building, has it been used as intended by the designers?
(1) Yes (2) No

61. Since the opening of this building have there been any sudden changes in the teaching practices?
(1) Yes (2) No

62. Since the opening of this building have there been any sudden changes in the size, composition, and/or needs of the student body?
(1) Yes (2) No

63. Since the opening of this building have there been any sudden changes in the economics of the community?
(1) Yes (2) No

64. Since the opening of this building have there been any sudden changes in the relationships between educators, elected officials, parents, community groups, and citizens within the community?
(1) Yes (2) No

65. Since the opening of this building have there been any sudden changes in the values, beliefs, attitudes, standards, traditions, customs the school district and community?
(1) Yes (2) No

APPENDIX B
Standardized Open Ended Interview

Interview Instructions

Principal Researcher Reads:

You are being asked to participate in a doctoral study that seeks to: (1) describe complicated social, cultural, political, and economic mechanisms at work when public schools are designed and constructed, (2) elaborate on the relationships between those mechanisms and educational facility planning, and (3) cross-validate, through quantitative and qualitative methods, a systems model which formalizes causal inferences between social, cultural, political, and economic mechanisms, educational facility planning, and educational facilities.

The significance of this…

Permission to conduct this study has been granted by the superintendent of schools and your building principal. However, you are under no obligation to participate. If you choose to participate, you are free to withdraw your consent at any time.

Your name will never appear on any survey or research instruments. No identity will be made in the data analysis. All written materials and consent forms will be stored in a locked file in the researcher's home. Your response(s) will only appear in statistical data summaries. All materials will be destroyed at the completion of the research.

The interview will be taped. Once taping begins please refrain from using your name or the names of other individuals. If by accident a name is used, it will be stricken form the record. Again, no identity will be made in the data analysis. The consent forms will be stored in a locked file in the researcher's home separate from the transcript of this interview. All materials will be destroyed at the completion of the research

A summary of the results of this research will be supplied to you, at no cost, upon request. Information on how to request a summary of the results is on your copy of the Voluntary Consent form.

I am now providing you with two copies of the Voluntary Consent form. If you agree to participate please sign one form and return it to me. Please retain the other for your records.

Assuming Consent, Principal Researcher Reads:

I am beginning to tape our conversation: “Now” (Tape player on). Today’s date is (Month, Day, Year). This is an interview is being conducted by Fred S. Withum III as partial fulfillment of the requirements for the doctoral degree in educational leadership at Duquesne University. I am going to ask you 12 questions. These are the same 12 questions asked of all participants in the study. The first five questions are followed by choices. The remaining seven questions are open-ended. However, I may use a prompt

in order for you to expand an answer or to seek further clarification for my benefit. Again, you are under no obligation to participate in this study. You are free to withdraw your consent to participate at any time. And please refrain from using your name or the name of any other individual during this interview. I will now begin a series of 12 questions. Remember, for the first five questions please wait for the choices.

Interview Questions

1. What best describes how you currently serve the student population of this building?
   (A) Teacher (B) Administrator/Counselor/ Nurse/Librarian/Or Other PA Certified Professional (C) Other

2. How many years have you been employed by the school district?
   (A) 0-5 (B) 6-10 (C) 11-15 (D) 16-20 (E) 20+

3. How many years have you taught in this building?
   (A) 0-3 (B) 4-6 (C) 7-9 (D) 10-12

4. Did you move into the building the year it opened?
   (1) Yes (2) No

5. Were you involved in the planning process for this facility?
   (1) Yes (2) No

1. Do you believe that this school has a shared sense of purpose and a focus on what is most important for students?

    a. Can you provide any examples to illustrate your beliefs?

2. Can what you described be considered the educational vision of this school?

    a. If yes, why?
    b. If not, can you describe what you believe the educational vision of this school is?

3. Do you think that this facility (building) contributes to a shared sense of purpose and a focus on what is most important for students?

    a. Can you provide any examples to illustrate your beliefs?
    b. Do you think this building physically represents the educational vision you described in question six? Why?

4. Overall do you believe that this building meets the needs of those who use it?

    a. Does the building meet the needs of educators?
    b. Does the building meet the needs of students?
    c. Does the building meet the needs of parents?
    d. Does the building meet the needs of the community?

5. What type of factors, both in the school district and/or community, influenced the final design of this building?

    a. Do you believe the size, composition, and needs of the student body impacted the final design of the building?
    b. Do you believe instructional methods and strategies employed by educators in this school impacted the final design of the building?
    c. Do you believe that the values, attitudes, beliefs, standards, traditions, and customs of the school district and community impacted the final design of this building?
    d. Do you believe that the relationships between educators, elected officials, parents, community groups, and citizens within the community influenced the final design of this building?
    e. Do you believe the economy of the school district and community impacted the final design of the building?
    f. Do you believe the degree to which the architect and design professionals understood the needs of the school district and community impacted on the final design of the building?
    g. Can you think of any other factors that influenced the final design of this building?

6. Do you believe that overall those responsible for planning this building understood the physical, social, cultural, economic, instructional needs of the school district and community?

7. In the end the resources and materials needed to build this facility came from outside the school district, in your opinion, did the community provide the school district enough materials and resources to construct a facility that meets the needs of educators, students, and the community.

    a. If yes, why?
    b. If not, why?
    c. Can you provide any examples to illustrate your beliefs?