DESIGN PREFERENCES OF MEDIA SPECIALISTS FOR ELEMENTARY SCHOOL MEDIA CENTERS IN THE STATE OF GEORGIA

by

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(Under the Direction of C. KENNETH TANNER)

ABSTRACT

The elementary media center can be a vital part of an elementary school instructional program and play a large part in the functionality and the effectiveness of the school. This study examined key design elements of an elementary media center in order to determine a design preference for each element. The elements selected were determined through a review of related literature. Eight categories were addressed in the survey of Georgia elementary school media specialists. The categories included lighting/windows, color, flooring, HVAC, space, furnishings, technological support, and miscellaneous items. This information was then incorporated in a survey of current Georgia elementary school media specialists. The survey was completed by 75 media specialists attending the Georgia Conference of Media Organizations in 2001. A frequency analysis was completed on each item and the responses ranked from absolutely vital to not desirable. Elements that were perceived as important or absolutely vital to the design of an elementary media center were windows, natural lighting, well located light switches, upholstery colors that disguise heavy use, carpeting, low humidity level, a separate air conditioning system, separate areas designated by usage, ample power outlets, and workstations with power/data ports. Items perceived as not important

included floor coverings other than carpet, windows that reach to the floor, brightly colored accent walls, and computer labs located within media centers. Specific information regarding shelving, tables, chairs, and an ideal layout was included in the study. Based upon the results of the analysis, recommendations were presented for enhancing the current method of planning and developing elementary school media centers in the state of Georgia. It was recommended that the state of Georgia rewrite the current facility guidelines, that the professional judgment of elementary media specialists' preferences be considered when establishing guidelines, that community-based school media centers be studied for their specific design needs, and that a similar study be conducted concentrating on the middle school and high school level.

INDEX WORDS: School Facilities, School Design, Media Center, Design Factors, Student Achievement, Elementary School, Library

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DEDICATION

This dissertation is dedicated to my parents. My father, Marvin Wesley Smith, Jr. (deceased) created a love of learning and a respect for continuing to learn throughout life in each of his four children. My mother, Kathleen Wood Smith, spent countless hours reading to me and with me. She inspired me to be a regular patron of the library. Their love for me has guided me in the past and will continue to guide me for the rest of my days.

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CHAPTER 1

INTRODUCTION

There are many problems facing the public education system of today, and one of these problems is the inability of school systems to meet the increasing demand of providing quality facilities for their school children. According to the U.S. Department of Education, there is a "national challenge to build thousands of new schools to meet the unprecedented demands of the Baby Boom echo" (2000, p. 1). A record breaking 55.3 million students will be enrolled in public schools by the year 2008. The trend is now to build smaller schools that are closer to where people live (U.S. Department of Education, 2000). Schools across the country are adding classrooms at an increased pace as legislation limits the number of students to be taught within a single teacher's classroom (Kennedy, 1999).

According to Keller (1999), $15.46 billion was spent in 1998 in the United States on the erection of new schools, adding to existing ones, and completing major facility upgrades. Keller asserts that this is just the beginning of an upward trend in school construction. In the state of Georgia, *The A Plus Education Reform Act of 2000* is causing school systems to lower the teacher: pupil ratio, contributing to the need for more schools to be built. As of June 2002, the Georgia Department of Education had received facility proposals which reflected that 218 schools were planned to be built prior to December 2005. Out of this number, 120 were elementary schools (Joyner, 2002, personal communication). With so much new construction in the offing there are many

questions that need to be addressed. What model will be used to determine the best facility design? Which features will be considered as necessities and which ones will be cut out as frills? Many aspects such as classroom square footage, number of restroom facilities, and accessibility for disabled individuals are mandated. However, there are no set standards for many of the other facets that make up a school facility. One particular area of the school building that needs close attention is the library media center. In 1999, Richard W. Riley, U.S. Secretary of Education said:

> Instead of building schools for 1950, let us build schools for 2050. We need schools that are healthy, energy smart, environmentally sensitive, using up-to-date technology-that complement and enhance academic excellence; schools designed by the community and with the students and the community in mind. (U S Department of Education, 2000)

Purpose of the Study

The library media center has become more than just a space to house a collection of books. The library media center is the technology and resource information center of the school. Information literacy is expected to be an essential survival skill in the 21st Century and quality media programs are, and will continue to be, essential for meeting education goals. Erikson and Markuson (2001), as a result of visiting libraries in Europe, realized that a well-designed library facility "will have a positive effect on usage and student behavior and will enhance the learning that takes place within the library walls" (p. xi). Therefore, it is vital that the design of the library media center be carefully planned to provide maximum beneficial usage for the students and the school staff. Currently, no guidelines exist in the state of Georgia regarding the design elements that should be considered when building an elementary school library media center. The last time specific guidelines were written for the state of Georgia was in 1980; however, in

1994, these guidelines were discontinued and only one of original guidelines, the square footage of the media center, is currently being enforced by the Georgia State Department of Education (Nance, 2002, personal communication). The purpose of this study was to identify design preferences for elementary school library media centers in the state of Georgia.

Research Question

The question that guided this study was, what are the design preferences for the elements of an elementary school library media center in the state of Georgia?
The elements of an elementary school library media center were grouped into the following categories:

- Lighting
- Color
- Flooring
- Heating, ventilation, and air-conditioning systems (HVAC)
- Square footage
- Essential areas
- Furniture
- Shelving
- Technological support

Definition of Terms

For the purpose of this study, the following definitions were used:

Elementary School- A school with any or all grades from pre-kindergarten through fifth grade.

Foot Candle-An illumination of one footcandle (fc) is produced when 1 lumen of luminous energy falls on 1 square foot of area.

Library Media Center-The area of the school facility which houses all of the materials which are made available as part of the library media program.

Library Media Specialist- The certified personnel within the school who develops and supervises the library media program.

Light reflectance value (LRV)-The measurement of a material's ability to reflect light. The LRV of a material is used to establish the brightness ratio or luminance ratio of a room.

Significance of the Study

The projection is that 120 elementary schools will be built in the state of Georgia in the next five years (Joyner, 2002, personal communication); therefore, it is extremely important for research results to direct their design causing these schools to be built to produce optimum benefits for the students and staff. Also useful in the design process would be the experiences and views of the professionals whose practice occurs within the facility. Utilizing professional judgment in this regard supercedes maximizing aesthetic considerations or minimizing financial obligations. This study was conducted to determine what factors should be included in the design standard for elementary media centers in the state of Georgia.

The outcome of this study will be relevant to architects as they create blueprints for future elementary schools. Architects would have specific information to follow as they plan and design elementary school media centers. Board of education members and

school leaders will benefit as they review plans submitted by the architects who design school buildings.

Assumptions and Limitations

An assumption of this study was that the elementary media center is used only by teachers and students and that rarely do parents and the community use the elementary school media center. It was also assumed that the elementary media specialists know the needs of the students and teachers who use the media center.

A limitation of this study is that no students were polled to assess their perception or preferences of the design elements of the elementary school library media center. An additional limitation was that the perception or preferences of the parents and community members were not considered as part of the study. As stakeholders, it is only natural for library media specialist to want more resources than can be budgeted. Therefore, a possible limitation to this study was that the library media specialists who completed surveys wanted "it all."

Organization of the Study

Chapter I presented the introduction, the purpose of the study, the research question, the definition of terms, and the significance of the study. Chapter II included a review of the related literature including specific design features associated with school facilities (e.g., lighting, color, flooring). Chapter III described the criteria for participant selection, the methodology, and the statistical treatment used to analyze the data from the survey developed by the researcher. Chapter IV reported the findings of the study. Chapter V summarized the findings and included conclusions and recommendations to be

considered for future research in the area of setting a design standard for elementary school media centers.

CHAPTER 2

REVIEW OF THE RELATED LITERATURE

Introduction

The purpose of this chapter was to review the literature regarding the function of the elementary school library media center and the key design elements of the library media center.

History of the School Media Center

John Dewey, the educator and philosopher, argued over one hundred years ago that the library should be the intellectual center of the school (Butin, 1999). In 1918, the first guidelines for developing and organizing school libraries were written. Traveling book collections were a main source for public school libraries until the 1950s. Beginning in the 1950s, the school library emerged as a more permanent fixture in schools, and Bard and Sakai (1981) reported, "School libraries experienced phenomenal growth and development in the years following World War II as part of the overall expansion and innovation occurring in elementary and secondary schools throughout the nation. The entire educational climate encouraged change" (p. 3). School libraries flourished, in part, due to the increase in World War II veterans who enrolled in college programs and the large number of college graduates in the 1950s and 1960s that began to demand excellence in public education as a better way of life for their children (Bard & Sakai, 1981).

According to the National Center for Education Statistics (USDOE, 1998), the federal role of supporting school library media centers has changed dramatically in the last 40 years. In 1958, the National Defense Education Act (NDEA) provided funds for purchasing books in foreign languages, mathematics, and science. Later, funding was provided by the NDEA for books in the area of humanities. The U.S. Office of Education, in a document entitled Public School Library Statistics for 1958-1959, reported that "approximately half of the nation's schools had no library at all" and that "two-thirds of the elementary schools had no library," and Bard and Sakai (1981) asserted that in 1960 the American Association of School Libraries (AASL) issued a new set of national standards (p. 3). The publishing of these standards heightened the public awareness of the need for more emphasis to be placed on the importance of providing books for children.

In 1961, C. E. Stouch, the president of the Knapp Foundation, asked the AASL to create a plan that could be used to improve inadequate school libraries. Using this plan, the Knapp Foundation provided $1,130,000 to eight schools to expand the library services to provide and promote the value of library resources. In 1967, the Knapp Foundation continued their support of school libraries by allocating $1,163,718 to study media center personnel (Bard & Sakai, 1981).

> The Knapp project gave a tremendous boost to the growth of programs and services by tangibly offering aid in the form of literature, consultative assistance, research results, and models. Private projects offer libraries the necessary encouragement to experiment with innovative programs and to develop in new directions. (Bard & Sakai, 1981, p. 5)

In 1965, Title II funds were available for the acquisition of library books and for training library media specialists. This legislation, The Elementary and Secondary

Education Act of 1965, caused considerable growth in the establishment of school library media centers, and according to Bard & Sakai (1981), "The first fiscal year saw an appropriation of $100 million and the establishment of thousands of new media centers" (p. 6).

School libraries have continued to evolve and according to the NCES (USDOE,1998):

> Library media centers are now almost universally available. In 1993-94, 98 percent of all public schools and 80 percent of all private schools had library media centers. This compares with 50 percent of the public schools in 1950, and 44 percent of private schools in 1962. (p. 4)

In most schools, the library media center provides resources to aid in the academic achievement of students and provides materials that support teachers. As a unit of the school, library media centers are staffed by a certified library media specialist. Craver (1995) wrote that school library media specialists "need to develop high-tech environments to provide the types of learning experiences that employers will require of their employees" (p. 13).

Factors of the Library Media Center that Affect Student Achievement

Learning is not just restricted to the classroom. Many areas of the school affect learning. In the gym, along with physical exercise, children learn to cooperate, to follow rules, and to apply strategies. In the art room, children learn the principles of color and develop aesthetic appreciation. Learning occurs in the media center; however, few studies have examined exactly how the media center affects academic achievement. Lance, Welborn, Hamilton-Pennell (1993) reported:

> During the past 30 years, fewer than 40 research studies have focused on the impact of school library media centers on academic achievement. The majority of

> those studies (27) occurred between 1959 and 1979. Obviously, the quantitative research in this field is limited. (p. 3)

The studies reported on by Lance, Welborn, and Hamilton-Pennell (1993) examined how factors such as the presence of a library media specialist, organized library resource programs, and book collection sizes affected student achievement.

According to the Report of the Commission on Reading in the United States, "reading is a cornerstone for success, not just in school, but throughout life" (Gallik, 1999, p. 481). Gallik reported that reading for pleasure improved reading comprehension, writing style, vocabulary, spelling, and grammatical development and that the relationship between reading and other academic skills is more evident at the elementary level. Gallik also reported that various studies showed a high correlation between the amount of time spent reading books outside of school to reading gains in comprehension, vocabulary, speed, and overall achievement. Lance, Welborn, and Hamilton-Pennell (1993) summarized Gallik's findings and other findings:

> The amount of free voluntary reading is the best predictor of reading comprehension, vocabulary growth, spelling ability, grammatical usage, and writing style…schools can promote reading achievement by creating a print-rich environment, providing large library collections, reading aloud, using sustained silent reading, encouraging readers, helping to form reading habits and modeling reading. All affect the amount read which in turn affects reading achievement. (pp. 142-143)

Gallik (1999) found that reading as little as 15 minutes a day contributed significantly to gains in reading achievement for 5th and 6th graders.

In 1991, Farris and Hancock investigated the use of literature in and outside of school and its relationship to student achievement in the area of reading. The design of their study used sixth grade students who were enrolled in elementary schools of less than 500 students that participated in the Scholastic Book Program. Even though no

significant difference was found between the reading comprehension achievement of students who spent more than $4.00 for paperback book purchases and those who spent less, there was a significant difference found between reading achievement and students who checked out more than 30 book volumes per year from the school media center and those who checked out fewer.

Student access to a variety of reading material could be related to the power of the local media center. This power is dependent on a large library media center collection, a full library media staff, access to community public libraries, and adequate library media center budgets. Hopkins and Zweizig (1999), researchers for the Library Power initiative, found common attributes that form the rationale for developing a full-service media center program in elementary schools. These attributes that encompass a fully-developed media center include shared vision, professional development, planning opportunities, leadership from the principal, support staff, complementary school reforms, and community/district advocacy. With these attributes in place, strong media center programs positively impact learning if integrated into the instructional program of the school. The library media specialist must play an important role in the process of integrating information literacy with learning outcomes, and Harada and Donham (1998) reported that the library media specialist needs to emphasize his/her role as the information specialist, an instructional partner, and the program administrator.

In 1993, Paul Simon, United States Senator from Illinois, proposed S.266 that became the Elementary and Secondary School Library Media Act. This act established a division of school library media services to provide information and leadership to school media programs, to provide continued funding for school library media program

improvements, to establish a partnership program in order to design resource and curriculum-based instructional activities, and to encourage uses of technology and the sharing of access to resources. Simon based the need for this act on the findings of the 1993 study by Lance, Welborn, and Hamilton-Pennell entitled, "Impact of School Library Media Centers on Academic Achievement." This study of 221 Colorado public schools was conducted by the Colorado Department of Education and funded by the Office of Library Programs and the U.S. Department of Education. Lance et al. reported that the single best predictor of student achievement was access to the school library media center collections. Students who come from schools that have more accessible library media center programs tend to score higher on standardized tests. Other findings of the study included that academic achievement is higher where library media centers are better funded and that students whose library media specialist participates in the instructional process are higher academic achievers. Moreover, findings suggested that the size of the library media center staff and collection is a predictor of student academic achievement.

Loertscher (1993) reported that money spent in the area of school library media centers is money well spent if students access the materials. Therefore, the school library media center must have adequate facilities, materials and staffing as well as techniques that encourage effective use of these resources. That same year Miller and Shontz (1993) conducted a study that summarized specific developments in national trends in expenditures for media centers. Attention was focused on school library resources and collections, staffing, instructional involvement, and the emergence of technology in library media centers. Two major findings emerged from the study. The first finding was that, even with increased concern about students' poor reading abilities, fewer funds

were being allotted to purchase books as funds were being shifted to technology. The second finding was that many school library media centers are obsolete. This finding was attributed to the high price of books, the popularity of instructional video recordings, inflation, the rapid rate at which books go out-of-date, and the high cost of machines and software.

In summary, more than thirty-five years of research has consistently demonstrated a strong link between the school library media program and students' academic achievement (Hamilton-Pennell, Lance, Rodney, & Hainer, 2000). Students' test scores were higher when:

- The media specialist planned and taught cooperatively with the classroom teachers.
- In-service training was provided to the teachers.
- The media staff spent time teaching information literacy skills to students
- Access to technology such as the Internet was available.
- The media collection was larger than in the counterpart schools.
- Student visits to the library were higher than in the counterpart schools. (p. 44-46)

Specific elements of the library media center design are key to a successful program that provides a learning resource facility that encourages individual and group learning. The Washington Library Media Association recognized that "the library media center should provide adequate spaces to support instruction, for easy access to media, facilitate inquiry, and motivate students and teachers to use the materials and services necessary for learning and teaching" (1999, p. 1). The key facility design elements are addressed in the following sections.

Key Facility Design Elements Which Contribute to a Successful Library Media Program

Much research has been conducted on the effects that school facilities and their conditions have on student learning. In a paper delivered at the 1990 First National

Invitational Conference for Architects and Educators, James Banning quoted Winston Churchill, "We shape our buildings and they shape us" (p. 20). Tanner (1999) stated, "Since the developmental process of children can be influenced by characteristics of the physical setting, there are important fundamentals to be considered when designing and planning schools" (p. 3). In D.L. Duke's paper, "Does It Matter Where Our Children Learn?," he wrote:

> While this paper focuses on research, including what is known and what needs to be known regarding school facilities, it is important to point out that research is not required to justify high quality schools. Where we choose to send our children for educational purposes ultimately is a matter of ethics and morality. Even if no links between learning and facilities could be demonstrated scientifically, our society still would have a moral obligation to assign young people to safe and well-designed schools. (1998, p. 4)

Crow Island School (Winnetka, Illinois), built in 1940, has long been recognized for its architecture and is considered by many as the first modern elementary school (Perkins, 2001). Elizabeth Hebert, a recent principal of Crow Island School, stated, "the specific features of the Crow Island design promotes respectful behavior, enhances learning, and honors children" (Hebert, 1998, p. 1). Even though Crow Island School is over 60 years old, Hebert emphasized:

> The issues of space, accessibility, innovative design, and thoughtful planning continue to be valued at Crow Island School as we look ahead to our students' education for years to come … As school enrollments grow, educators will need to reorganize current school spaces and plan future school building. School leaders must be deliberate and thoughtful in considering the effects of space on learning. By focusing on the enduring qualities of childhood, we can create buildings that respond to a larger vision of school and its place in the community. (p. 3)

The SHW Group, one of the nation's leading educational architecture firms, maintained, "the design of the school facilities has everything to do with student attitudes about their school. Positive environments equal positive attitudes" (1999, p. 1). The

SHW Group cited a study released in 1999 by Cornell University that directly linked the quality of school buildings to student performance. The report summary stated, "this study demonstrates a positive relationship between upgraded school facilities and math achievement" (p. 2). The study tracked reading and math scores of students in three elementary schools in Syracuse, New York before, during, and after major renovations. Cornell University researchers reviewed the research of more than a dozen earlier reports and concluded that "the quality of school buildings, whether a renovation or entirely new facility, can be directly linked to student achievement" (p. 2).

Moreover, the U.S. Department of Education's study on the impact of inadequate school facilities on student learning concluded:

> A number of studies have shown that many school systems, particularly those in urban and high-poverty areas, are plagued by decaying buildings that threaten the health, safety, and learning opportunities of students. Good facilities appear to be an important precondition for student learning, provided that other conditions are present that support a strong academic program in the school. A growing body of research has linked student achievement and behavior to the physical building conditions and overcrowding. (2000, p. 1)

Taylor, Aldrich, and Vlastos (1988) have studied the effects of learning environments on the behavior and learning of children since 1972, and they reported "We are convinced that school environments have a largely untapped potential as active contributors to the learning process" (1988, p. 1). They asserted, "every object, color, texture, and spatial configuration, as well as there selection and placement, has educational significance" (1988, p. 2). Taylor, et al. outlined four important premises for achieving well-ordered learning that are woven into the school structure. These premises are:

1. People are considered an integral part of, not apart from, the environment.
2. The architectural environment, as a work of art in and of itself, can affect behavior.
3. The environment can be designed, engineered, and provisioned to serve as an additional learning tool.
4. The learning environment can be evaluated, as a learning tool if it has the developmental needs of children and students as a basis for design. (1988, p. 2)

Often, a school library media center becomes part of the building plan without conscious thought given to the specific design elements needed for this area. D. L. Duke introduced the notion of "intentionality" in his research and discussion of educational facilities (1998). Duke suggested:

> That learning may occur everywhere but every setting is not necessarily designed primarily for the purpose of learning. Furthermore, many settings are not designed at all. They either are natural or they result from the unplanned actions of individuals. The present concern is with learning environments intentionally designed for the primary purpose of learning. (1998, p. 6)

With evidence supporting the importance of the school facility as it positively relates to student achievement, it appears that all aspects of the building should be carefully planned in order to promote achievement. Erikson and Markuson (2001) in writing specifically about the design of school media centers noted:

> Research indicates that the level of comfort in the work environment affects the quality of the work done there. Knowing this, it stands to reason we would want to design a comfortable environment that will enhance, rather than detract from, the type of work activities for which it is intended. (p. 62)

Erikson and Markuson (2001) believed that design elements of a library media center:

> Are usually not given the attention they deserve, and because they are so highly specialized and technical, planning is frequently left entirely to the architects and engineers. All too often, the result of poor planning for lighting, acoustics, mechanical design (heating, ventilating, and air conditioning), and ergonomics becomes apparent only after the new facility is occupied. (p. 62)

Duke's idea of intentionally designing learning environments for the primary purpose of learning can, and should be, used when designing school library media centers. With this goal, literature pertaining to the key design elements of a school library media center was reviewed. In keeping with the purpose of this study, staff quality and number of available volumes will not be further addressed.

Artificial Lighting

In the Guide for School Facility Appraisal developed in cooperation with the Council of Educational Facility Planners, International (CEFPI) Hawkins and Lilley (1998) addressed the adequacy of lighting. Hawkins and Lilley wrote:

> Illumination in instructional areas is of major importance. For many years the tendency was to increase the quantity of light. More recent studies, however, place equal value on the quality of light. Lighting authorities disagree on whether illumination has a direct effect on learning. It is certain though that a minimum standard must be maintained to make school work possible. (p. 15)

Hawkins and Lilley (1998) believed that the quality of light is based on several factors. These factors are brightness, which is defined as "the relative amount of light available at the work surface in relation to the level of illumination in the field of view," glare which is " the light which hits the work surface at the same angle as it is reflected into the eye," and visual comfort, which is "the ease of seeing based on fixture design and placement, amount of contrast and ceiling colors" (1998, p. 15).

Many recommendations are made regarding the quantity of light, and Figure 1 outlines recommended levels of light in the library media center as published by several sources.

	Illumination Engineering Society (also adopted by CEFPI) (1998)	North Carolina Public Schools (2000)	Erikson and Markuson (2001)	Sannwald (2001)
Reading Rooms	70	50-75	55	30-40
Stacks	30	30-50	50	30
Book repair and bindings; Workrooms	70	75-100 (task lighting)	70+	Not addressed
Check in and out, catalogs, card files	50	50-75	55	Not addressed
AV and other storage	Not addressed	7.5-10	30	Not addressed
Office Areas	Not addressed	50-75	Not addressed	50
Carrels	70	Not addressed	Not addressed	Not addressed
Computer Usage	Not addressed	Not addressed	50	Not addressed
Small conference or group study rooms				30-40

Figure 1: Suggested Illumination Levels (Foot Candles)

Various areas require individual lighting considerations; therefore, lighting intensity should be controllable and Baule (1999) suggested that controlling lighting could:

> Be done in a number of ways. The first is to ensure that at least one of the light banks installed in each instructional area can be dimmed. This allows for more variable lighting than if each bank of lights can only be turned on or off. A second method is to install the regular florescent lights and then add a second set of can lights that can be controlled with a dimmer. In areas that have been remodeled to be used primarily for computer presentations, indirect lighting in the form of floor lamps can be added to an existing lighting scheme to provide more variability in lighting than would be available in a traditional classroom. Wall sconces provide indirect lighting and can also serve a decorative purpose. (Baule, 1999, p. 36)

Hawkins and Lilley (1998) noted, "maintenance of the lighting system is also of great importance. Fixtures should be located so as to permit easy replacement of fluorescent tubes and bulbs. Accumulation of dust and dirt on fixtures also greatly decreases lighting efficiency" (p. 16). According to Kennedy (2001), schools are using principles of sustainable design as they build or renovate facilities and that:

> The principles call for designs that save energy and water, reduce maintenance costs, encourage recycling and enhance occupants' health. Designs include more windows and skylights in schools. Daylight is cheaper than artificial light, and studies show that students exposed to increased amounts of daylight perform better. More energy-efficient windows allow schools to have more windows without letting heat loss jeopardize energy savings. Dimmers and other lighting controls allow schools to use light more efficiently. (p. 1)

Lang (1996) also addressed the issue of design features that control energy usage, and he wrote:

> High energy costs caused the design and production of efficient lighting systems for both business and school facilities. Incandescent fixtures have been replaced by fluorescent fixtures as the most common electric light source with classrooms. The human need and desire for natural sunlight and for views to adjacent spaces (for orientation) requires that the two illumination sources be balanced for a variety of activities. Because daylight varies with the season, time of day, weather and position of glazing, controls are necessary for its admission into the interior. Electric light sources are more easily controlled not only when balancing with sunlight but for the specific tasks that need illumination. (p. 3)

Lang (1996) concerned with lighting, which results in glare, wrote, "Glare caused by the imbalance of light sources within one's field of view or bounced off of a reflective surface (marker board or computer monitor) is one of the major causes of irritation and is a detriment to learning" (p. 3). With regard to the subject of glare, Hawkins and Lilley (1998) suggested, "a test for glare can be accomplished by placing a mirror on the desktop to ascertain if excessive light is reflected into the eyes of the students" (p.16).

Erikson and Markuson (2001) also addressed glare and advocated, "Glare should be avoided because it creates visual stress and headaches and may eventually lead to vision-related health problems" (p. 65). They further wrote, "Computer screens are especially susceptible to glare. Natural light either in front of or behind a computer monitor will cause glare and washout problems. Direct electric light will reflect off the monitor screens" (p. 65). Erikson and Markuson also recommended "Computer areas are best lit with indirect systems or direct light fixtures equipped with parabolic louvers or grids optically designed to limit brightness for computer environments" (p. 65).

Perkins (2001) noted, "the lighting system is a critical factor in the design of a school, both in terms of its impact on energy costs and its effect on the health, performance, and stress levels of students" (p.167). It is interesting to note that Perkins's father, Lawrence Perkins, wrote in 1957:

> Lighting can make a classroom come alive. … Lighting must also contribute to the mood for learning. It must be a stimulant. Bland, coldly uniform, " 'scientifically planned' lighting usually has the opposite effect: it bores and depresses. The classroom can have lighting that changes, that is a shifting interplay of opposites-warm and cool, light and shadow, soft and hard, level light and accent light. (as cited in Perkins, 2001, p. 167)

When deciding on lighting for a school library media center it is important that consideration is given to the instructional purpose of each area of the center as "school libraries must accommodate a variety of activities, each of which requires different types of lighting and different amounts of light" (Erikson & Markuson, 2001, p. 63). Butin (1999) related the issue of lighting specifically to the library media center and noted:

> Illumination should be both direct and indirect to reduce glare on computer screens and provide for adequate reading light. Task light may be useful for reading and study areas. Separate lighting zones and independent lighting controls are important. Reading areas should have adjustable lighting. The open stack area of the media center needs to have lighting which runs parallel to the shelves so

> that fewer shadows are formed. Presentation areas need to have adjustable lighting that can be easily controlled. (p. 24)

The Public Schools of North Carolina Early Childhood Education Facilities Planner (1998) went further in making recommendations for varying the lighting used throughout the library media center. They recommended:

> Parabolic or indirect lighting for all applications, but especially for areas where computers will be operated. Illumination should not be less than 50 foot-candles if parabolic fixtures are used or 75 foot-candles if other fixtures are used. Task lighting should be provided for reading activities. (p. 5)

The issue of lighting is addressed in the Maine School Library Facilities Handbook (1999). Specifically, "controls should be located in a convenient, centralized place with dimming and down light control available in some areas" (p. 9) and that "standards issued by Illuminated Engineering Society of N.A. should be used" (p. 9). The handbook further stipulates that "overhead ambient lighting should be kept low enough to avoid glares and shadows and that supplemental adjustable arm task lighting should be added to work areas" (1999, p. 9).

It is important that all possible uses of the library media center be considered when establishing the lighting design because:

> Sophisticated audiovisual presentations have become more prevalent with advances in technology, especially in more affluent schools. Here the architect may have to introduce multilevel switching and dimming whereby, for example, three or four rows of lights may be operated individually to set the required light levels. (Perkins, 2001, p. 171)

Perkins (2001) further indicated, "Lighting should accommodate the various activities and areas that typically make up a library, primarily the reading room(s) and stacks" (p. 177). Stein and Reynolds (2000, p. 1305) recommended "library stack lighting is best accomplished by fixtures with lenses specifically designed for the purpose. Fixtures with

baffles and plastic diffusers generally do not give adequate vertical surface illumination" (cited in Perkins, 2001, p. 177). Perkins also suggested, "reading rooms may be lit with the use of general lighting, such as fluorescent of HID sources, or lower-level general lighting reinforced by fluorescent tasklighting at the carrels or tables. Beware of noisy ballasts" (p.178). He further specified, "for the stacks, specially designed fluorescent fixtures, mounted between and 2 ft above the shelving, are available to light the vertical surfaces. Work and checkout areas require lighting similar to that of the reading room, with higher lighting levels" (p. 178). Finally, Perkins noted, "direct-indirect lighting is recommended for computer areas" (p. 178).

According to Erikson and Markuson (2001) a critical area to consider when making decisions regarding lighting is the stack area. They asserted:

> Planning effective lighting is particularly difficult for stack areas of the library. … Stacks create shadows, and it is difficult to predict exactly how this will affect the lighting. Placing light fixtures perpendicular rather than parallel to stacks will help to reduce that shadows caused by people standing at the shelves. … Finally, consider that shelving, especially tall shelving, affects the distribution of light throughout the space. (p. 64-65)

Baule's (1999) recommendation regarding the lighting of the stacks conflicts with the recommendations of Erikson and Markuson (2001). Baule wrote:

> Positioning the lighting is particularly important in several areas. In the open stack section of the library media center, lighting is extremely important if patrons are to be able to browse the stack easily. Such lighting should run parallel with the shelves. If lights run perpendicular to the shelves, they tend to throw more shadows than if the lights are directly above the aisles. (p. 36)

Brown (1992) interviewed students to see what they wanted and needed in a library design. After conversing with the students about essentials of library design, Brown related:

> Lighting comes up in many of our student conversations, both natural lighting and artificial light sources. Students describe natural light as giving a space warmth and a beautiful quality. It is important to capture natural light artfully and use it judiciously within a space to bring out its best features. Artificial lighting was most often described as too bright, too dark, or an awful color. Many students felt fluorescent lighting was cold, sterile, and too much like their classrooms or the gymnasium. Lighting needs to be employed for a variety of uses: as general illumination for the space; task lighting for a specific activity, and finally decorative lighting, which gives character and scale to the source of light. In addition to spatial and decorative design, lighting can create a mood or atmosphere which supports a more studious and formal setting or, a casual and informal environment. All too often, poor lighting design adversely affects the space and the students who are using it. (p. 34)

Another aspect to be considered in regard to lighting is the light reflectance value. Brubaker (1998) wrote:

> There is a general agreement among the experts that school environments should have an average light reflectance value of 50 to 60 percent and that brightness ratios in the field of view should be uniform. Interior planning should include careful consideration of a material's light reflectance value (LRV). In simple terms, LRV is the measurement of a material's ability to reflect light. All materials reflect and absorb light, and recommended LRVs should fall into different ranges for different areas. (p. 148)

Perkins (2001) noted, "research and experience point to the desirability of uniform brightness ratios in the field of vision and an average LRV of 50 – 60 percent in school environments. The maximum brightness difference should not exceed 3 to 1" (p. 167). Figure 2 was adapted by Perkins from William C. Brubaker's, Planning and Designing Schools (Perkins, 2001, p. 169). This information should be used when selecting finishes and colors for the surfaces and/or materials of items in the library media center.

Castaldi (1994) also addressed the reflectance from interior surfaces, "The light reflection characteristics of interior surfaces, furnishings, and equipment are extremely

Surface or Material	LRV (%)
Furniture	40-50
Equipment	40-50
Doors and door frames	40-50
Floors	20-30
Walls	50-55
Teaching Walls	45-50
Accent Walls	45-50
Ceilings	90-100
Average for typical classroom	40-60

Figure 2: Light Reflectance Values (LRVs) of Surfaces and Materials
(Source: Perkins , 2001, p. 169)

critical in designing a well-balanced visual environment within an instructional space" (p. 258). Specifically, Castaldi recommended:

> Floors should be as light in color as possible. Floor surfaces should possess light reflection coefficients ranging between 30 and 40 percent. Walls, including the wainscoting, should be quite reflective. The light reflection coefficient of walls should be greater than 60 percent. Ceilings should diffuse as much light as possible. Reflection factors of over 90 percent are suggested for soffits and ceilings. Furniture surfaces, such as desk tops and chairs, should possess a light-reflecting factor of about 40 percent (p. 258).

Sannwald (2001) suggested several questions to consider regarding lighting and the media center:

- Is the intensity of the general lighting sufficient for reading?
- Is the "task lighting" adequate for carrels, work stations, separate desks, lounge furniture, and shelving areas?
- In addition to general and task light, do certain areas of the library have special lighting? For example, do wall display areas have track lighting?
- Is lighting adequate at the lower shelf areas in book stacks?
- Are light switches conveniently located?
- Can library staff control the switching of lights from a central control point or points?
- Is the lighting control system designed so that customers can't switch lights on and off in those areas where public control is not desirable? (pp. 132-133)

Natural Lighting from Windows and Skylights

During the 1950s and 1960s, most schools were designed following the "finger school" design. This design provided ample daylighting from windows on two sides of the classroom and attention was given to orientation and sun angles. "Wing schools" were built in the late 1960s and early 1970s with wings of back-to-back classrooms with each room having a single window wall. Many times tinted glass was used in the windows to reduce the heat produced by sunlight. In the 1970s, many school systems began building schools using the "open plan." These plans did not incorporate the use of natural lighting into the learning areas. In the recent years, there has been a resurgence of interest in daylighting in schools (Brubaker,1998).

The California Board for Energy Efficiency funded a study in 1999 to investigate the relationship between daylighting and human performance. The study included a focus on skylighting as a way to isolate daylight as an illumination source, and separate illumination effects from other qualities associated with daylighting from windows. "In this project, we established a statistically compelling connection between daylighting and student performance, and between skylighting and retails sales. This report focuses on the school analysis" (California Board for Energy Efficiency, 1999, p. 2). Test scores results for over 21,000 elementary students from three districts were analyzed. Architectural plans, aerial photographs, and maintenance records were reviewed, and schools were visited to classify the daylight conditions in over 2000 classrooms.

> Controlling for all other influences, we found that students with the most daylighting in their classrooms progressed 20% faster on math tests and 26% on reading tests in one year than those with the least. Similarly, students in classrooms with the largest window areas were found to progress 15% faster in math and 23% faster in reading than those with the least. Students that had a well-designed skylight in their room, one that diffused the daylight throughout the

> room and which allowed the teachers to control the amount of daylight entering the room, also improved 19-20% faster than those students without a skylight. (California Board for Energy Efficiency, 1999, pp. 2-3)

A study was conducted in 1992 in Sweden that examined at the impact of daylight on the behavior of elementary school children. The health, behavior, and hormone levels of 88, 8-year-old students in 4 classrooms were followed during the course of 1 school year. Two of the four classrooms had daylight, two had none; two had warm white (3000K) florescent lamps, two had very cool (5500K) fluorescent lamps. A significant correlation was found between patterns of daylight levels, hormone levels, and students' behavior. The Swedish researchers concluded that windowless classrooms should be avoided (cited in California Board for Energy Efficiency, 1999).

Lighting is an important consideration in the design of an educational setting, and Baule (1999) believed "there is a general agreement that the method of illumination can affect the educational environment" (p. 35). Baule addressed the specific types of artificial lighting when he wrote:

> Three basic types of illuminations are used in schools; natural light, direct artificial light, and indirect artificial light. Direct artificial light is the most commonly used lighting source in schools, though many feel that this is the least desirable. A mixed lighting solution that relies on multiple forms of illumination is generally preferred. (p.35)

In a study released by a California architecture firm, it was found that natural light improved student performance (Wilson, 2000). "Students in classrooms with the most daylight learned roughly 25 percent faster than students in classrooms with only electric light" (Wilson, 2000, p. 56). Skylights or windows can supply this light. However, the skylight must be well designed so that light is fully diffused. Consideration should also be given to the placement of skylights. Baule (1999) reported, "because of the possible

interference of natural light with computer generated presentations, skylights should be avoided in those areas. However, skylights might be appropriate in areas designated for leisure reading, where class presentations are unlikely" (p. 36).

Tanner has written extensively about windows. In 1999, Tanner maintained that windows were important for several reasons. He wrote, "schools need many windows for natural light, full-spectrum light is critical to a child's health and development, and students need daylight to regulate circadian rhythms" (p. 11). Tanner also noted that "poorly lit classrooms can cause students to experience a daily form of jet lag" and that "windows should be low enough for children to see out" (p. 11). In 2000, Tanner indicated that windows:

> Should give the best possible views overlooking life and bring natural light into the school building. The School Design Planning Laboratory recommends at least 72 square feet for windows in 900 square feet classrooms. . . . Artificial light plus natural light from the outside, preferably on two sides of ever room is ideal. Natural light influences student behavior and attitudes. (p. 2)

Grocoff (1995) also believed that natural lighting was an important design element and that "in instances where it may not be feasible to have windows, skylights provide an excellent alternative" (p. 5). Grocoff elaborated:

> Skylights provide outstanding color rendering and high levels of illumination. Numerous studies from the National Institute of Mental Health indicate that illumination levels typically provided in schools and offices (i.e., 50-100 fc) can cause people to become lethargic, irritable, and depressed. Illumination levels provided by skylight (150-200 fc) have been found to reverse these effects, helping to keep students alert. (Grocoff, 1995, p. 5)

Fielding (2000), an educational planner, architect, and the editor of Design Share, agreed that skylights are a good alternative to windows. Fielding suggested that schools "utilize day lighting wherever possible, providing windows on one or two walls; where

window walls are limited, utilize skylights. For all but northern exposures, provide overhangs or blinds to allow for control of direct light" (p. 3).

Some possible reasons that natural lighting positively affects student learning are improved visibility, improved light quality, improved health, and improved mood (Kennedy, 1999). This supports the use of installing multiple windows in the media center. Butin (1999) specified that:

> Incorporating daylight in the media center is also beneficial – research has shown the positive affects of daylight on psychological mood, behavior, and academic achievement. At the same time one must remember that excessive daylight can create heat gain, fade books, cause glare, and wash out multimedia presentations. It should be possible to dim a large part of the media center for films, videos and presentations. (p. 25)

There have been many diverse opinions regarding the use of windows in schools. Perkins (2001) wrote:

> The issue of windows in classrooms has been much debated, ranging from the introduction of windowless classrooms at one time in the state of Florida, to laws in New York State that require 50 percent of a window wall to be glazed. … A report in the *Archives of Internal Medicine* advocates the compulsory use of windows as a necessary relief. The report states that the type of distraction caused by windows is 'soft,' and that without windows students become even more focused on doodling in their books and can less easily refocus their attention on the teacher. (p. 172)

The placement of windows in the school library media center needs to be carefully planned. The Early Childhood Education Facilities Planner, published in 1998 by the North Carolina State Board of Education, suggested that:

> Natural light should be provided, and, wherever possible, direct visual contact and access to the outdoors. Windows should be low enough to allow children to see outside but not lower than eight inches above floor level, should be arranged to take advantage of the natural climate for both light and ventilation, and should equal at least eight percent of the floor area. Windowsill seating can provide an excellent reading or quiet niche. (p. 5)

Numerous states have guidelines that offer suggestions for the use of windows in library media centers. For example, the issue of windows is addressed in the Maine School Library Facilities Handbook (1999). Specifically, "Windows should not hinder space utilization, should not admit distracting light, and should be able to be opened without step stools or gadgets" (p. 5). Additionally, the handbook suggested, "that window covering should be used to eliminate VDT glare and that computer screens should be positioned away from uncovered windows" (p. 5).

The Facilities Guidelines published by the North Carolina Public Schools in March 2000 outlined that:

> Windows are recommended in the main media center room (reading, listening, and viewing), but are not recommended for electronic equipment storage rooms. They are recommended in the support areas, but are not necessary if there are windows into the main room (reading, listening, and viewing). (p. 23)

Hubler (2001), in The School Design Primer: A How-to Manual for the 21st Century, addressed how "the technology revolution has impacted schools nationwide, turning most school libraries into sophisticated media centers" (p. 8.5). He provided several guidelines developed to address the unique design challenges presented by these centers, and indicated, "The main reading, listening and viewing areas of the media center should have outside windows, except in the rooms where electronic equipment is stored and production work is carried out. Windows should have black-out draperies or shades" (Hubler, 2001, p. 8.5).

Erikson and Markuson (2001) addressed the subject of window treatments and reported:

> Control of natural light using window treatments is essential. Windows should have curtains, drapes, blinds, or screens. Screens that filter sunlight and control

> glare, but also let in some light and allow for visibility to the outside, are an effective and attractive option. (p. 66)

Another suggestion from Erikson and Markuson was "to eliminate noise from outside and to avoid placing windows in distance learning classrooms or audio/video production areas. If there are windows in these areas, they must have treatments that allow for control of sunlight" (2001, p. 66). Sannwald (2001) suggested several questions to consider regarding windows and the media center:

- Has the library considered the trade-off between the positive aspects of windows (natural light, fresh air, and pleasant vistas) vs. the negative factors (the possible waste of energy, the loss of outside walls as bookstack areas, and the impact of uncontrolled sunlight on materials and readers)?
- Are some of the windows placed close to the ceiling to allow a higher intensity of light?
- Are some of the windows placed at eye level, especially in reading areas and in areas occupied by the staff for positive psychological effect?
- Can windows be shaded on demand to prevent light from interfering with reading and other activities?
- Are books stored away from direct sunlight to protect the bindings from fading and to prevent paper deterioration?
- If the regional climate allows it, are windows operable to allow for natural cooling and ventilation?
- Are a limited number of windows operable to allow for maintenance and emergency situations?
- If windows can be opened, are they securable by the staff from the inside? (p. 133-134)

Color

Just as research suggests that lighting may influence learning, it is also believed that color has a direct impact on learning. In the mid-1920s, the use of color was selected for more than just its aesthetic appeal (Alexander, 1972). Alexander related that "it was definitely determined that control of color in an interior had a vital bearing on human efficiency and well-being" (1972, p. 81-82). Birren (1977, cited in Chan & Petrie, 1998) reported that warm colors and brilliant lighting increased muscular tension, respiration

rate, pulse, blood pressure, and brain activity. In the CEFPI, Hawkins and Lilley (1998) stated, "The quality of light is based on several factors: brightness, glare and visual comfort" (p.15). Visual comfort is defined as "the ease of seeing based on fixture design and placement, amount of contrast and ceiling colors. Recommended colors are ivory, white, light beige and pale yellow" (CEFPI, p. 15).

It is important that education facility planners become knowledgeable about the effects of color on behavior and perception (Burbridge, 1993). Smith emphasized "carefully planned experiments by psychologists have well proven that modern principles of color applied to schools will greatly improve the scholastic performance of students, especially in the early years" (1980, p. 6).

Colors are grouped into the categories of warm and cool, and "color experts agree that reds, oranges and pinks are warm and stimulating colors, while most blues and greens are considered cool and relaxing" (Smith, 1980, p. 6). Smith (1980) reported in her research that:

> The atmosphere of the primary school should be intimate, secure, warm and informal with as much homelike atmosphere as possible. Colors that would acknowledge this mood are red, blue, green, violet, orange, and yellow. … While young children prefer bright colors, high color contrasts are to be avoided because they can produce fatigue. To avoid high color contrasts, it would be appropriate to paint the rooms using warm colors (i.e.,peach, pink or yellow) and apply primary color accents for emotional release. (p. 6)

Rosenfeld (1977, p. 169)) noted, "Kindergarten children prefer red, yellow, and blue. Color preferences change with age from warm to cool colors as a child grows older." Thompson (1973 as cited in Rosenfeld, 1977) stated, "In the elementary classroom, color specialist recommend warm yellows, peach and pink as the dominant

colors. These colors are stimulating for young children, encouraging them to move about, to participate and to express themselves" (p. 169).

Chan (1980) studied the results of several research studies on the effects of the environment on students. On the subject of color, he concluded, "interior pastel coloring, especially a proper combination of pastel colors, has a positive influence on pupil achievement" (p. 4). However, when Chan conducted his own study, he found that school buildings with interior pastel coloring and school buildings without interior pastel coloring had no significant effect on student achievement (1980).

Rice (1953) concluded, "Color in the environment of a child affects his moods, his scholastic achievements, and his physical well-being. The selection of those colors is the concern, in some degree, of all who determine the activities and the environment of that child" (Rice, 1953, p. 8). However, the planning of color is a tailor-made job, and Rice indicated:

> The project must be fitted to the age of the group, the kind of activity for which the room is planned, the compass orientation of the room, the source and quantity of light that enters the room, and the manner in which light is reflected from all surfaces within the room. (p. 8)

In 1964, Ketcham recommended, "The interiors of schools should be at once comforting and inspiring—not too relaxing but adequately buoying to the spirit and the minds; cheerful without being gay or discordant; completely free from distracting or depressing aspects" (p. 61). Ketcham suggested that the color raw red be avoided because it irritates and increases tension; that purple should be avoided because it is melancholy and austere as well as depressing; and white should be avoided because it is neutral which neither calms nor stimulates.

When selecting colors for the library media center, it is important to be wary of having the colors become an historic marker. Some color combinations that were most popular over the decades are included in Figure 3.

1960s	Avocado green and harvest gold
Early 1970s	Bright primary colors: red, yellow, blue
Mid 1970s	Electric blue and Kool-aid orange
Early 1980s	Gray with mauve and jade accents
Late 1980s	Miami Vice pastels
Early 1990s	Dark earth tones: gold, green, burgundy
Late 1990s	Pale citrus tones: tangerine lemon lime

Figure 3: Popular Color Combinations by Decades (Source: Fenton, 1999, p. 30)

Woodward (1999) also cautioned against selecting colors based on what is currently in vogue. She advised, "think pragmatic, since today's color schemes are tomorrow's passé palette" (p. 44). Brown (1992) wrote, "The use of color and the variety of textures and decorative treatments available have a great impact on students. White is too plain and uninteresting for many students" (p. 34). Brown interviewed a group of fifth and sixth grade students who "spoke of taking their existing white library and decorating it with wallpaper, peach walls, and fun patterns" (p.34). Brown recommended, "rooms for young children should be bright and festive with the decorations that attract these young eyes" (p. 34).

The Maine School Library Facilities Handbook (1999) suggested, "creating an environment that is welcoming and pleasing to library patrons and staff will enhance the

success of your library program" (General Consideration, p. 7). The Maine School Library Facilities Handbook further recommended that colors should be chosen that are conducive to learning, but this Handbook does not recommend a particular color.

Baule (1999) emphasized that it is important to try to make the library media center look friendly and inviting, and that planners should:

> Choose one or two primary colors, a wood stain, and possibly one or two accent colors to be used throughout the media center. Where possible, the colors should be basic and based upon the school colors or some other combination that will not become obsolete in a few years. (p. 37)

Erikson and Markuson (2001) reported, "Colors chosen for a school library can enhance or detract from how it functions and how it succeeds as a place of learning, inquiry, and information retrieval. Because colors affect learning behavior, making suitable color choices is important; it can also be quite complicated" (p. 60). Erikson and Markuson found in their literature review an observation made by Margaret Bush: "Red, orange, and yellow can work well as accent colors, but tend to be too powerful if they dominate the environment. Instead, blues and greens are suggested as main colors" (p. 60).

Erikson and Markuson (2001) suggested that colors could be used effectively to define and separate functional areas of the media center. The disadvantage to using colors for this purpose is that it may make it harder to rearrange the media center in the future.

Sannwald (2001) suggested several questions to consider regarding color:

- Have colors that may quickly become outdated been avoided?
- Has particular attention been given to the psychological effects of color on both users and staff?
- Has color been considered with respect to the function of the area?

- Has color been used to avoid an institutional (drab) aspect with respect to walls, book stacks, floors, and furniture?
- Do book stacks on different floors or areas utilize different colors for easy identification?
- Have standard paint colors (not mixed) been supplied by the manufacturer for easy, cost-effective maintenance and touch-ups?
- Will the upholstery colors selected disguise heavy and sometimes abusive use?
- Has the relationship of wall, furniture, and floor colors to the lighting of the various areas been considered? (p. 138-139)

Flooring

Flooring is another design element that deserves to be carefully considered when building a library media center. According to Woodward (1999):

> The floor coverings and surfaces selected for a library or archives should not simply be left to planning professionals. They will have far more impact on the library's ability to function effectively than any architect realizes, and one size does not fit all. Each area must be considered separately. Most buildings require different materials for different purposes. (p. 45)

There is much discussion regarding the use of carpet. The Wisconsin Department of Public Instruction suggested, "Carpeting the library media center will help eliminate the noise that originates at floor level. A library is intended to support a great deal of movement while maintaining an atmosphere conducive to quiet study and reflection" (2001, p. 1).

Castaldi maintained, "the use of carpeting in spaces such as and libraries involves several considerations related to function" (1994, p. 254). Specifically, the need to:

1. Eliminate cold floors and conserve energy.
2. Reduce the severity of injuries due to falls.
3. Eliminate floor-generated noises due to the movement of chairs, desks, and the like.
4. Absorb noises and improve the acoustical environment.
5. Create an atmosphere that is quiet, aesthetically pleasing, and conducive to effective learning. (Castaldi, p. 254)

Erikson and Markuson also endorsed the use of carpet in school libraries, especially elementary schools (2001). They reported that carpet "appeals to children and teenagers, creates a warm atmosphere, helps to improve the acoustics, and provides a safe surface" (2001, p. 59). Erikson and Markuson also recommended using carpet everywhere unless the library has an entrance from the outdoors in which case the entryway should be covered in tile or some other easy to clean material. Due to the amount of wear, carpet will receive; it should be of the best quality affordable and should be antistatic and antimicrobial. Erikson and Markuson further suggested using different colors of carpet to designate different areas of the library as well as traffic lanes (2001).

With regard to acoustics and noise reduction, Baule made the following recommendation:

> Where possible, each areas of the library media center should be as isolated from the noise of the other areas as possible. One of the best noise reducers around is carpet. If at all possible, carpet the media center as carpet is the best first step towards an acceptable noise level in your media centers. (1999, p. 36)

Scott (1999) stated, "carpeting, rather than tile or wood, improves acoustics and absorbs airborne sound, reduces surface noise, such as footsteps and furniture movement, and helps block sound transmission to rooms below" (p. 3). Scott recommended that ample padding should be used under the carpet because it will further absorb noise and reduce transmissions.

The Maine School Library Facilities Handbook also addressed the issue of carpet versus other flooring materials (1999). Specifically this Handbook reported that:

> All floors should be finished with aesthetically appealing, sound absorbent materials. Static free, high quality, commercial grade carpeting is recommended for most areas. Acoustical vinyl or tile flooring, which is easy to care for and non-static, is recommended for media production and project areas, audiovisual equipment maintenance and storage areas, studio, darkroom, electrical service

> area, media reception and distribution areas where cables and wiring will be present, major traffic pattern aisles, and areas where running water will be in use. Antistatic matting may provide additional protection where needed. (p. 2)

One of the major concerns regarding carpet involves indoor air quality. Erikson and Markuson, 2001, recommended asking for information on emissions from the manufacture as well as using low-emitting adhesives for installation. Carpeting increases the possibility of static electricity in the media center. Static electricity poses a hazard to delicate electronic equipment. Specifically, static can cause printers to spatter pages with unwanted toner, can burn out tiny spots in a monitor when it passes through it, and can interfere with the functioning of computers, making rebooting frequently necessary (Spradlin, 2002). Some static electricity can be prevented by lowering the heat, using anti-static spray on the carpeting, wearing an anti-static wrist strap whenever working on the inside of a piece of electronic equipment, and using grounding devices. (Spradlin, 2002). Woodward (1999) also addressed the issue of carpet creating harmful static electricity but stated, "There are newer varieties that effectively reduce static buildup" (p. 45).

Carpeting poses another threat, and according to Woodward:

> Printed materials are endangered by the dust and other pollutants that carpets inevitably bring with them. No matter how frequently it is cleaned, a carpet is a comfy home to all sorts of creepy, crawly things that peacefully coexist with people but not with paper. There are, indeed, carpets that release fewer pollutants into the air but where collections are the priority, they really cannot be considered safe. (1999, p. 45)

Woodward goes on to say, however, that in areas utilized by children, that the collections will not be around long enough for preservation issues to be the concern, and that carpeting decisions should be based on meeting patron preferences and programming needs.

The Maine Association of School Libraries Facilities (1999) had two recommendations with regard to safety that involved flooring. Specifically, throw rugs and slippery, waxed floors should be avoided and that unnecessary steps or changes in floor levels should also be avoided.

Heating, Ventilation, and Air Conditioning

In recent years, much attention has been given to the effect of heating, ventilation, and air conditioning on learning. The quality of the air breathed by students is of concern due to resulting health problems and the effect on learning. Duke (1998) found that poor air quality could result in problems that range from respiratory infections and allergies to drowsiness and shorter attention spans. According to Duke, "if students do not feel good when they are in school or if they miss school due to air quality problems, learning is likely to be affected adversely" (p. 21).

Researchers have found that the thermal environment affects student achievement. Chan and Petrie (1998) asserted that oxygen is essential for proper brain functioning. "Without fresh air, we can't expect the brain to function at its best. School facility planners can't afford to neglect the requirements of quality ventilation" (1998, p. 1). According to Chan and Petrie, "researchers agree that an optimal learning environment requires comfortable temperatures and protection from distracting sounds. Physical discomfort and noise sends distress messages to the brain, causing the cerebellum to limit the brain's normal operations" (p. 3).

The number one recommendation of school superintendents throughout Virginia was to "provide state support to help school divisions provide air conditioning for every school" (Fanning/Howey Associates, Inc., 2001, p. 2). The justification for this

recommendation is that "effective learning and teaching is virtually impossible in hot, humid classrooms that lack adequate ventilation" (Fanning/Howey Associates, Inc., 2001, p. 1).

In addition to student achievement, other factors are involved in the selection of heating, ventilation, and air conditioning in a school library media center. As stated in the Maine School Library Facilities Handbook (1999), "a climate control system for heat and air is essential for the entire library media center, maintaining a temperature range at a maximum level of 70-77 degrees F. and a humidity of 60%" (1999, p. 3). The Maine School Library Facilities Handbook also stipulated that the library media center have a separate system which ensures that temperature and humidity be regulated specifically for the media center and that also allows the media center to be used when school is not in session (1999). Further recommendations included "Proper temperature and humidity are crucial for suitable storage and preservation of materials and equipment" (Maine Association of School Libraries Facilities Committee, 1999, p. 3). Specific considerations outlined in the Maine School Library Facilities Handbook are:

- Independent climate control system-Heat/air
- Humidity 60%
- Temperature 70-77 degrees
- Operational windows
- Electrostatic filters on air conditioning units
- Humidifier/Dehumidifier (p. 3)

The Texas School Library Association outlined certain items that were essential in the delivery of an exemplary school library program. The association specified that an exemplary school library program have "an energy management system that ensures a draft-free and comfortable environment that is appropriate for preservation of materials" (Texas Education Agency, 2001, p. 2).

In Abilene, Texas the designers studied library trends and concluded that there should be "more effective temperature and humidity controls, sensoring devices and filters to preserve the diversity of library formats—books, audiovisual materials, computer tapes, and related electronic equipment" (Abilene Library Task Force, 1990, p. 2).

Butin also addressed the issue of heating, ventilation, and air-conditioning (HVAC) systems. Butin (1999) recommended, "HVAC systems should be able to maintain a very narrow temperature (68-74 F degrees) and humidity (30-50%) range. They also should be able to accommodate part-load settings to allow for such different environments as a room filled with computers, an informal reading area, and a storage area for books and electronic equipment" (p. 24).

The Facilities Guidelines published by the Public Schools of North Carolina State Board of Education recommended for the media center:

> The HVAC system should be separately zoned from those parts of the building which are not mechanically conditioned year-round. Special attention must be given to adequate ventilation and humidity control to prevent mold and mildew year-round. Computer hardware and software must be protected from temperature and humidity extremes. (2000, p. 23)

Furthermore, "the Media Center and Administration Area are operated during summer months when traditional-calendar schools are closed. For this reason, separate system(s) to cool these spaces should be considered. A split system DX or split system heat pump is recommended. Heating may be tied into the central system" (2000, p. 53). Another recommendation in the Facilities Guidelines published by the Public Schools of North Carolina State Board of Education was "the Main Head-End Room for computer equipment often generates so much heat that it must be cooled both summer and winter.

This space should also have a separate system. A split-system DX or heat pump is recommended" (2000, p. 53).

There are several items in the area of heating and air that the North Carolina Public School Facilities Guidelines does not recommend. One of these was a rooftop unit. Specifically, the guidelines pointed out that rooftop units are very difficult to maintain, they are a frequent cause of roof leaks, and they add significantly to the cost of reroofing. In addition, rooftop units have a potentially shorter life due to poor maintenance/harsh environment, they present fire hazards due to poorly maintained gas lines on the roof, the heavier-than-air propane on a roof can seep into the building if a leak occurs, and they are noisy if placed over classrooms (2000). The North Carolina Public School Facilities Guidelines (2000) also does not recommend wall-hung self-contained heat pumps because the actual cost of installation may be deceptive due to high cost for electrical improvement, the noise level, the installation causes a loss of window area, and the air distributed within the classroom is poor.

Specific design considerations and recommendations for heating, ventilating and air conditioning of media centers are included in the North Carolina Public School Facilities Guidelines (2000). The recommended indoor temperature for winter is 72 degrees F. and 75 degrees F. for summer. The relative humidity should be maintained at 50% because good control of humidity is important in media centers to prevent mildew on books. For ventilation, there should be 7.5 CFM/student fresh air. The control should be designed with one thermostat located in the main room and a separate HVAC system installed for the media center. Miscellaneous considerations for the entire school facility should include high efficiency air filters (60%) to enhance air quality.

The placement of the HVAC system is also important. Scott (1999) pointed out that "the goal is to isolate noisy HVAC sources from activity spaces. Therefore, classrooms and other areas where students and staff require intense concentration should be kept away from HVAC noise and mechanical rooms" (p. 2). Scott recommended that the established standards of the American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE) should be considered in regard to the sound output of mechanical equipment. Further, Scott believed that the noise from air-handling systems could be limited by "installing long duct runs, increasing the duct lowering the air-flow velocity, installing absorptive fiberglass duct liners or creating noise diffusers or sound traps in the space" (p. 2).

According to Burbridge (1993),

> If a heating and air conditioning system will be installed in the library, find out how noisy it will be. If the vendor has installed a similar system in a nearby school, visit that school for a noise check. When our system, installed in the equipment storage room, is running, we can't hear anything. (p. 2)

Burbridge warned against storing electronic equipment near the heating or air conditioning system because of the danger of water leaks.

Hubler (1996) wrote, "the heating and ventilation system should be separated from the rest of the school. Ventilation and humidity control are especially important to prevent mold and mildew from forming on equipment" (p. 8.6). Hubler also warned that in areas with a concentration of electronic equipment, additional ventilation, cooling and security measures are necessary (Hubler, 1996, p. 8.6).

Erikson and Markuson (2001) agreed that the school media center should have a separate HVAC system:

> Because a school library houses an expensive inventory of materials and equipment and may operate outside scheduled school time, it should have a separate, independent HVAC system. An independent system will permit use of the library during non-school hours and will maintain temperature and humidity levels for proper storage of materials and equipment at all times. (p. 67)

Square Footage Allocations and Essential Areas

There is a large discrepancy in the amount of square footage that should be allocated to an elementary school media center. This point is demonstrated in Figure 4.

Source	Recommended Square Footage	Additional Information
Butin (1999)	1,600 minimum	Applies to study and research area only
Castaldi (1994)	900-1000	Per 15 teachers; a student population of 500 would cause the figure to double
Georgia Department of Education (2000)	2,850	Based on FTE count of 500-525 students
Maine Public Schools (1999)	3,715	Student population of 500
North Carolina Public Schools (2000)	2,914 for Media RLV 1,200 for support spaces	Based on 500-600 students

Figure 4: Square Footage Allocations

According to the Maine School Library Facilities Handbook (1999):

> Library media center size should not be determined by school population. It should reflect patterns of use, which often mean that whole classes, small groups, and individuals will be using the library media center at the same time for different purposes. In order to provide a comprehensive program, a school library media center must include all essential areas listed. (p. 2)

Therefore, in determining the square footage that should be designated to the Media Center, each area to be included in the media center should be allocated square footage individually and then a net square footage calculated.

The most predominant area of an elementary media center is the general reading and browsing, listening, viewing area (RLV). According to the Maine School Library Facilities Handbook this is "the central room of the library media center for student and faculty use. This area allows adequate space for shelves both wall and free standing" (1999, p. 17). Also included are the circulating core collection, reference, electronic information retrieval, periodical area, audiovisual software, vertical file, and storage area for back issues of periodicals, media, and seldom used materials. The recommended space for this area is student population x 10% x 40 sq.ft. per student (Maine School Library Facilities Handbook, 1999, p. 10). Butin (1999) defines this same space as the study and research area, and he indicated:

> The study and research area is the primary open-space of the media center. It should be a minimum of 1,600 square feet, and be able to accommodate either 30 students or eight to ten percent of the total enrollment, whichever is larger. …The study and research area contains the information desk, card catalogs, and computer terminals, low-height shelving containing the media center collection, and furniture for individual reading and research as well as small-group projects. (p. 25)

The North Carolina Public Schools Facilities Guidelines (2000), recommended that the Reading, Listening and Viewing (RLV) Main Room have 4'-6' per student average daily membership (ADM) but not less than 1,600 square feet. In addition, the total capacity should by 40 students or 10% of the ADM, whichever is greater. The support areas in a K-5 school should have 1,200 square feet. Some of the typical support areas are the media office, workroom, production, darkroom, professional area,

conference/small group area, equipment storage/distribution/maintenance, and periodical storage.

The Washington Guidelines for School Library Media Program, 1990, does not address square footage requirements. It does, however, specify which spaces should be included in the design. These spaces would include:

- Instruction areas for small and large groups.
- Areas for reading, listening, viewing, computing and independent study with easy access to materials collections.
- Conference rooms for committee meetings of students and staff.
- A large multipurpose area adjoining or near to the library media center for viewing, lecture, and other media related activities.
- Storage space for the various media collections and their anticipated growth with consideration for their distribution and control.
- Included in this function are display, automated systems for security and circulation, reference services and reserve materials.
- A production area for the preparation of student and teacher media projects.
- A work space for the selection, organization, preparation and maintenance of materials.
- A storage space for media equipment and its distribution and maintenance.
- The capacity for the flexible utilization of equipment with ample electrical outlets, conduits, light control and access to phone lines and television cables for information retrieval.
- Standardized and modular wall, storage and seating units to maximize flexibility.
- Attention must also be given to access to hallways and classrooms for ease of equipment delivery and other purposes (pp. 5.1–5.2).

The Wisconsin Department of Public Instruction makes the following recommendations in the area of design considerations for school library media centers:

> Noise generating activities can be housed in one large rear area rather than in a series of small rooms. Such activities would include production of graphic and audiovisual materials, group study, storage of periodicals and equipment, and library materials processing. It is good to have at least one conference room and a small office where privacy can be assured. (2001, p. 1)

Further recommendations by the Wisconsin Department of Public Instruction include:

> An enclosed stack area with a single entrance controlled by a charging desk is preferable to single-faced bookshelves mounted to surrounding walls. This enclosed stack area will encourage students to check out materials before taking them to a table. The stacks can also serve as a screen to separate activities. One or two small work tables might be included in the stack area near the charging desk to permit short-term reference work. (2001, p. 1)

Hubler (1996) wrote, "ancillary support areas for the media center include office space, work and/or production rooms, meeting rooms, stacks for book collection, and periodical and audiovisual storage" (p. 8.5). Hubler did not address the subject of size.

Baule (1999) made size recommendations for essential spaces by relating the size of the areas in the media center to the size of a classroom. For example, the circulation desk area should equal the size of .5 classroom, which means the circulation area should be at least ½ the space allotted for a classroom in the same building. The area for general shelving should equal three classrooms. The space dedicated to reference shelving and reference computers should equal .5 classroom each. The catalog terminals, which provide access to search the library holdings, should equal .25 classroom. The area for class seating should equal the space of .5 classroom. The storage area for audio/visual equipment should equal one classroom. Two other areas, which should each equal one classroom, are the story area/large group area and the library workroom. Both the student production area and the teacher production area should equal .75 classrooms each. Finally, the periodical storage should equal .75 classroom (Butin, 1999, p. 10).

Erikson and Markuson (2001) suggested that the following spaces be considered when planning the library media center in a school with an anticipated enrollment of less than 1000 students. The entry/circulation/information area should be allocated 500-800 sq. ft.; the allocation for the individual reading/study area should have 30 sq. ft. for each

seat and 36-45 sq. ft. per computer workstation. The computing area should have 36-45 sq. ft. per computer workstation and the leisure reading area should have 32-68 sq. ft per number of seats. In the storytelling area there should be 15 sq. ft. per child. Both the group study area and the conference rooms/small-group activities area should have 30 sq. ft. per number of seats. The group projects/instruction area should contain 900-1,300 sq. ft. and the computer instruction area should be between 800-1,500 sq. ft. The area allotted for multimedia production should be 300-800 sq. ft. The television studio should be 1,600 sq. ft and adjacent to the distance learning classroom which should be 900-1,300 sq. ft. The area used for teacher resources should be 600 sq. ft or more. Some of these spaces are needed by all libraries but some are only needed when the program require them.

Baule (1999) suggested several questions to consider in planning what areas are essential to the library media program and how much space is needed for each:

- What is the total student population?
- How many classes will use the library media center at a time?
- What is the size of the collection?
- How do students use the library media center outside of class time?
- What other programs or functions use the library media center space?
- What kind of displays do you put up?
- Where do you showcase new materials?
- What area(s) do you use for direct instruction? (p. 7-8)

Furniture and Shelving

Once the library design has been decided, it is time to make decisions about furniture. According to Erikson and Markuson (2001) the following criteria must be considered when purchasing furniture for a school library:

- Appearance-Furniture should enhance the architecture and be age appropriate.

- Functionality-The activities of the library should be reviewed and furniture selected to accommodate the activities.
- Comfort-Even though comfort should be considered, the typical user in an elementary media center is not seated at one place for an extended time.
- Durability and Ease of Maintenance-Avoid furniture with texture as it will be harder to clean. Upholstered furniture should be easy to reupholster. Check references in regard to the history of durability of furniture from a particular manufacturer.
- Safety-Avoid furniture with sharp edges. Chairs should be well balanced and heavy enough to prevent tipping over. Wall shelving should be firmly attached to the wall and double-faced shelving units over forty-two inches high should be combined with other units. (pp. 47-48)

Baule (1999) asserted that:

> Choosing the specific furniture your team desires for each area of the library media center is an important issue. Library media center furniture can easily be required to have a natural life of over 20, and sometimes nearly 30 years of student use. (p. 30)

Baule also suggested that durability and warranty are two of the most important considerations for furniture. Textured surfaces and fabrics should be avoided.

Erikson and Markuson (2001) recommended giving shelving the top priority when selecting furniture. Shelving should be durable enough to last the lifetime of the facility and strong enough to bear prescribed loads without sagging, bending, or collapsing. Even though other furniture for the library can be bought from a variety of furniture suppliers, library shelving should be purchased from a reputable library furniture manufacturer. Baule (1999) wrote, "One of the most important and largest single area within the media center is general shelving, "the stacks," and that even with technology on the rise, "books will be a core part of the school library media center" (pp. 14-15).

Shelving can be manufactured from wood, steel, or a combination of wood and steel. Since much of the shelving surface is covered with books and materials, the selection of strong steel shelving will provide durability without detracting from the appearance of the media center (Erikson & Markuson, 2001). Some specific features to look for in shelving included easily adjustable-height shelves, integral backs, light colors which do not show dust and scratches, book supports that operate from a back trough, ease of leveling, and durable finish that can endure cleaning and normal wear and tear (Erikson & Markuson, 2001). Specifications for shelving as reported by Erikson and Markuson, (2001, p. 92), are listed in Figure 5.

Baule (1999) recommended that elementary media centers plan shelving to house 20 book items per linear foot with a normal shelving height of three shelves high. In addition, CDs and CD-ROMs will normally shelve at 24 items per linear foot and a normal shelve height of five shelves high. Ten videos will normally fit in a linear foot and the shelve should be about five shelves high.

The Maine School Library Facilities Handbook (1999) suggested that in determining type and placement of shelving to consider the following:

- Freestanding double-faced stacks placed in rows of 4-6 sections are the most preferred stack arrangement.
- Single-fact units place around outside walls is recommended only in very small library media centers.
- Counter height shelving may be used for picture books, reference books and to create special interest areas.
- Special shelving will be needed for periodicals, audiovisual software, displays and equipment.
- Shelves should not be more than two thirds full. It is recommended that the top and bottom shelves be initially reserved for collection expansion or used for display.
- To insure continuity, purchase enough shelving to meet future needs.
- Adjustable shelving that can fall apart if one metal clip is removed should be avoided.

- Backstops should be added to pen shelving to avoid books sliding to the shelf behind.
- Shelves that are longer than 36" may warp. (1999, p. 26)

Shelving Heights (inches)	
42-45	3 shelves
60-66	5 shelves
72-82	6 shelves
84-90	7 shelves
Shelving Depths (inches)	
10	Standard
12	Reference and picture books
15	Multimedia
Shelving Capacity Estimates	
Average size	30 per shelf
Picture books	60 per shelf
Reference books	20 per shelf

Figure 5: Specifications for Shelving (Source: Erikson and Markuson, 2001, p. 92)

Two additional types of shelves that should be considered for an elementary media center are display shelving and closed shelving (Baule, 1999). Display shelving can be used effectively as a break within the regular shelving areas and to advertise materials. In addition, display shelving can be used to market items in areas that receive considerable student traffic such as the entryway. Closed shelving is used to store items such as back issues of periodicals and non-print materials (Baule).

Today's media center requires tables for two basic functions: (1) study and reading, and (2) using computers (Erikson & Markuson, 2001). Figure 6 provides the recommended heights for tables and the accompanying chairs.

Chair Seat Heights (inches)	
K-Grade 1	10-14
Grades 2-4	14-16
Grades 5-6	16-18
Table Heights (inches)	
K-Grade 1	20-22
Grades 2-4	24-26
Grades 5-12	27-29
Computer workstations	26-69
Seat height to table height distance (inches)	
Preschool, kindergarten, and grade 1	8-10
Grades 2-12	10-11

Figure 6: Recommended Heights for Tables and Chairs (Source: Adapted from Erikson and Markuson, 2001)

It is important that the allocated number of tables is sufficient for group use and Baule (1999) suggested, "in planning for class use, always allow for at least one more table than would be necessary for your largest classes regularly using the library media center" (Baule, p. 20). This allows a space for the classroom teacher to work with individual students while the media specialist is working with the large group. Also, Baule (1999) recommended using square tables that seat four students or could be pushed together to accommodate large groups. Rectangular tables, which seat six students, were

a second option. Round tables do not provide flexibility. Baule warned against purchasing tables with stretchers, as students will use the stretchers as foot rests.

The design of the circulation desk should be given attention, and Erikson and Markuson (2001) suggested:

> The circulation desk should have a distinctive look to announce itself as a library service point and should be planned carefully, because staff members spend a great deal of time there. If it is not functional or does not meet your specific needs, it can be a constants and permanent irritation. (p. 57)

Baule emphasized the importance of the circulation desk when he wrote, "Traditionally, it is here (the circulation desk) that much of the library's business is attended to" (1999, p. 21). Both Erikson and Markuson (2001) and Baule (1999) recommended that for an elementary school library the standard surface height of the circulation desk should be twenty-nine inches.

Technology Support

In 1996, President Bill Clinton stated, "Nothing - nothing- is as important as preparing the American people and our young people for the 21st Century world in which they will live" (Fannin/Howey Associates, Inc., 2001, p. 74). Clinton then championed a $2 billion, five-year Technology Literacy Challenge to ensure that every student had access to computers and other forms of technology with training provided as part of daily learning. As a result, existing schools had to make many adjustments in equipment and wiring in order to meet this challenge.

Technology has a profound impact on school design. Fanning/Howey Associates, Inc. (2001) maintain that:

> In addition to outlets and access to electric power, the infrastructure "basics" necessary to meet typical technology and communications requirements in

> schools include good lighting, flexible furniture, adequate cabling, cable trays, phone lines, a climate control system, security, and storage. (p. 78)

These considerations are certainly important in the design of an elementary media center as well as the entire school.

Information in the area of technology changes every day. Perkins (2001) acknowledges, "the variety of applications of computers in educational programs does not allow development of a definite set of design guidelines. The system needs constant adjustment as educational foci and teaching styles change" (p. 186). However, it is important that the media center design considers certain basic issues such as location of outlets, availability of data ports and printers, and the accessibility of a computer laboratory.

Baule (1999) postulates that planning for electrical and data networking needs is the singles most difficult aspect to plan. Baule states, "trying to plan three to five years ahead in technology is difficult" (p. 33). Instead, you must determine the placement of electrical outlets and date drops based on where every piece of equipment and computers will be placed within the library media center. Baule warns that:

> The future of microform machines is unclear, but it is better to be safe, not sorry. Remember that when you are doing renovation or construction, the cost of installing an electrical and networking backbone is much less than if you have it done later; so, wire for the future. (p. 33)

Erickson and Markuson (2001) agree with Baule in that "technology planning can be one of the greatest challenges of the planning process" (p. 14). They further agree in that "it is difficult at best to predict much farther than three years into the future, and it is impossible to predict technology requirements five years from now (p. 14). Erickson and

Markuson recommend that the best practices of today be used to project the expanded needs of tomorrow, and:

> Because of this expansion, our school library facilities will be facing increasing electrical demands and will require wiring systems capable of continued growth and development in order to support transmission of larger and larger amounts of data at higher and higher speeds. (2001, p. 14)

Summary

The review of the literature has provided information from researchers who studied specific design features and/or features specific to elementary media centers. The information included in this chapter progressed from the history of the school media center, to how the library media center can affect student achievement, to the key facility design elements, which contribute to a successful library media program. The specific design elements reviewed were lighting, color, flooring, HVAC, square footage, essential areas, furniture, shelving, and technology support. Ideally, each design feature included in this chapter would receive attention in designing an elementary media center for the students in the State of Georgia.

CHAPTER 3

DESIGN OF THE STUDY

Introduction

This chapter reports the design of the study including the methodology, sample selection, instrumentation, procedure for data collection, and analysis of the data. The chapter begins with a review of the research question and a brief explanation of the research process. A detailed description of the collection procedures and the statistical treatment follows.

Research Question

The primary question that guided this study was what are the design preferences for the elements of an elementary school library media center in the state of Georgia? To ascertain an answer to the research question, this study provided current elementary media specialists in the State of Georgia the opportunity to rate how desirable specified design features are to the media center facility design. The design features included in the rating process were selected after a thorough review of literature. The participants also had the opportunity to respond to an open ended question in order to gain a better insight of those currently employed in an elementary media center. The responses were then scored in order to rank them from vitally important to not at all important.

Participants

The study population consisted of active members of the Georgia Library Media Association who attended the 2001 Georgia Conference of Media Organizations annual conference. All participants in the study were fully certified media specialists who were working as a media specialist in a public or private school located in the State of Georgia at the time that the survey was completed. The researcher offered the survey to all Georgia Library Media Association conference attendees who met the above criteria and who visited the professional development table. The researcher explained the purpose of the study and acquired consent from participants prior to the completion of the study. Surveys were completed and returned by 75 of the 102 participants who were given a survey. This provided a return rate of 73.5%.

Instrumentation

The "Elementary School Media Center Facility Survey**"** **(**Appendix A) was used to assess the media specialists' perceptions of ideal media center design elements. The "Elementary School Media Center Facility Survey" was constructed by the researcher based on a review of literature pertaining to school and media center facilities. Many of the survey items were derived from the Checklist of Library Building Design Considerations (Sannwald, 2001).

The survey was divided into the same elements that were addressed in the review of literature. Specifically, items pertaining to lighting, color, heating/air, flooring, acoustics, technology, furniture, designated space, and square footage were included. Corresponding headings were used for each of these sections so that the respondents were aware of the emphasis of each question.

The survey items were followed by a four point Likert scale so respondents were able to rate the importance of each design element in an elementary media center. This survey allowed information to be gathered regarding each respondent's perception of the specific design element. The respondents were instructed to mark number one if the item was perceived as "not desirable," number two if "acceptable, but could function without," number three if "important," or number four if "absolutely vital." The survey also offered participants the opportunity to respond to open-ended questions. This allowed the participants to list any additional desirable design features that were not included in the survey and to offer additional comments.

The survey was generated on a form that allowed participants to quickly indicate their answers by placing a mark in the corresponding area. Once completed, the researcher hand tabulated the results. An assistant validated the results to ensure accuracy. The data were then transferred to an SPSS database. The design features were then ranked. This ranking was used in making conclusions and recommendations in Chapter 5.

The responses to the open-ended items were recorded and then analyzed by the researcher. The researcher used qualitative methods to identify trends in the participants' responses. The responses are reported in Appendix B.

Methodology

The "Elementary School Media Center Facility Survey" was administered to all consenting participants at the Georgia Conference of Media Organizations annual conference. Only media specialists currently working in an elementary school were

invited to participate. All participants were asked to indicate their rating of the importance of each design item.

Participants were asked to provide demographic information regarding the type of school (public or private), the type of community (rural, urban, or suburban), the age of the building (0-5 years, 6-15 years, 16-30 years, or 31-50+ years), and their years of experience as an elementary school media specialist. These demographics served as variables to be examined as part of the data analysis for this study.

Statistical Treatment

Percentages were used to determine which items were perceived as the most important. The design elements were then ranked to determine what elements were perceived as absolutely vital or important to not desirable or acceptable but could function without by the respondents.

The Statistical Procedure for Social Sciences (SPSS) program was used to obtain descriptive statistical measures. Tables were produced to report all descriptive data. Verbal descriptions were also included in the interpretation.

At the end of the survey, participants were provided the opportunity to provide additional design items that would improve the ability of the Library Media Specialist to fulfill his/her role. Responses were coded across the design elements (e.g., color, HVAC) of the survey.

Summary

This chapter has described the procedures and the methods that were used to analyze data in this study. The description included information on the instrument, details about the subjects in the sample population, and the statistical treatment used in

analyzing the data. This information will be the basis for determining the answer to the research question, what are the design preferences for the elements of an elementary school library media center in the state of Georgia?

CHAPTER 4

FINDINGS

Introduction

This chapter discusses the results of the surveys that were completed by 75 Georgia media specialists at the Georgia Conference of Media Organizations. The results, an analysis of the results, and a summary are included in this chapter.

Survey Results

Following the data collection procedures as described in Chapter III, an analysis was conducted on the data collected through the survey instrument. Out of the 75 completed surveys, 5 cases had to be deleted because they were missing various data points.

First, a frequency analysis was completed on each item. This analysis showed how many people responded 1, 2, 3, or 4 on each question. Respondents who answered "1" indicated that, to them, the design element was not desirable, "2" indicated that the element was acceptable but a media center could be functional without it, "3" indicated that the element was perceived as being important, and a response of "4" indicated that this item was considered absolutely vital to the functionality of the media center. These results showed the respondents' perception of the importance of each of the issues presented. Eight categories were addressed in this portion of the survey. The results in each category are discussed in this chapter and tables ranking the components in each category from the elements perceived to be most important or absolutely vital to those

perceived to be acceptable or not desirable are presented. The ranking was determined by combining the results of the items marked "important" or "absolutely vital." The items that received 75% or higher on either end of these scales will also be discussed. The items that were reported as "not desirable" and "acceptable, but could function without" are also included for comparative purposes.

Lighting/Windows

Table 1 reveals the rank of each dimension that was addressed in the area of lighting/windows. The results reflect the percentage of respondents that marked that particular space on the survey. The ranking was determined by combining the total percentages of the respondents that marked either the "important" or the "absolutely vital" column.

According to the results, windows in the media center received the highest ranking in the area of lighting/windows. The percentage of respondents that answered that windows were either important or absolutely vital was 91.4 while 92.9 percent of those surveyed answered that having no windows in the media center was not desirable. The item that received the second highest percentage of important or absolutely vital was that operable windows should be securable (88.6 %); however, only 44.3% of the respondents felt that it was important or absolutely vital that windows are operable. The participants' response to installing operable windows contradicts the findings of the literature review.

Three items received the same percentage of respondents answering important and absolutely vital. Adjustable general lighting provided according to the task

Table 1: Survey Ranking of Lighting/Window Elements

	#1 Not Desirable %	#2 Acceptable %	#3 Important %	#4 Absolutely Vital %	#3 & #4 Preferred %	#3 & #4 Ranked
Windows for natural lighting are	01.4	07.2	44.3	47.1	91.4	1
If windows are operable, installing securable windows is	00.0	11.4	22.9	65.7	88.6	2
Adjustable general lighting provided according to the task performed in the area is	01.4	17.2	54.3	27.1	81.4	4
Task lighting for certain areas such as carrels, shelving, etc. is	01.4	17.2	60.0	21.4	81.4	4
Locating lighting switches in close proximity to each area is	01.4	17.2	45.7	35.7	81.4	4
Windows at eye level that allow for outside views are	04.3	20.0	58.6	17.1	75.7	6
Shading or covering for windows is	02.9	21.4	30.0	45.7	75.7	7

A central control point for all lighting accessible only to staff is	01.4	37.1	38.6	22.9	61.5	8
Using the same type of lighting throughout the center is	21.4	21.4	41.5	15.7	57.2	9
Operable windows that allow for natural ventilation is	12.9	42.8	31.4	12.9	44.3	10
Skylights to supply natural lighting are	05.7	51.4	32.9	10.0	42.9	11
Windows that have shelving underneath are	17.1	48.6	30.0	04.3	34.3	12
Windows that reach all the way to the floor are	21.4	57.1	18.6	02.9	21.5	13
Having no windows in the media center is	92.9	02.8	02.9	01.4	4.3	14

performed, task light for certain areas such as carrels, shelving, etc. and locating lighting switches in close proximity to each area were marked by 81.4 of the respondents as important or absolutely vital. Over half of the respondents perceived that having

windows that reach all the way to the floor (57.1%) and that installing skylights to supply natural lighting (51.4%) was acceptable but not important.

Two more areas in the survey ranked high as indicated by 75.7% of the respondents who marked either important or absolutely vital. These were windows at eye level that allow for outside views and shading or covering for windows.

Color

Table 2 reveals the rank of each dimension that was addressed in the area of color. The results reflect the percentage of respondents that marked that particular space on the survey. The ranking was determined by combining the total percentages of the respondents that marked either the "important" or the "absolutely vital" column.

The design element color received the lowest ratings in the areas of important or absolutely vital than the other design elements. Only one item in the area of color was perceived by over 75% of the respondents as being important or absolutely vital. Upholstery colors that disguise heavy use were perceived by 88.5% of the respondents as being important or absolutely vital. However, a majority of the respondents indicated that it was acceptable to utilize a variety of color to designate areas designed to house different activities (58.5%) and to paint two brightly colored accent walls (58.6%).

Flooring

Table 3 reveals the rank of each dimension that was addressed in the area of flooring. The results reflect the percentage of respondents that marked that particular space on the survey. The ranking was determined by combining the total percentages of the respondents that marked either the "important" or the "absolutely vital" column.

Table 2: Survey Ranking of Color Elements

	#1 Not Desirable %	#2 Acceptable %	#3 Important %	#4 Absolutely Vital %	#3 & #4 Preferred %	#3 & #4 Ranked
Upholstery colors the disguise heavy use are	02.9	08.6	51.4	37.1	88.5	1
Paint in warm colors such as peach and yellow due to positive psychological effects shown through research is	02.9	42.8	41.4	12.9	54.3	2
Adjusting lighting according to colors used is	04.4	44.1	42.9	08.6	51.5	3
Choosing standard paint colors for easy, cost-effective maintenance is	21.4	38.6	35.7	04.3	40.0	4
Utilizing a variety of colors to designate areas designed to house different activities is	08.6	58.5	32.9	00.0	32.9	5
Painting two brightly colored accent walls is	15.7	58.6	25.7	00.0	25.7	6

Table 3: Survey Ranking of Flooring Elements

	#1 Not Desirable %	#2 Acceptable %	#3 Important %	#4 Absolutely Vital %	#3 & #4 Preferred %	#3 & #4 Ranked
Carpet colors that conceal soiling are	00.0	01.4	44.3	54.3	98.6	1
Carpet colors that resist fading are	00.0	04.3	41.4	54.3	95.7	2
Utilizing carpeting to create a quiet, aesthetically pleasing atmosphere is	00.0	08.6	21.4	70.0	91.4	3
Utilizing carpeting to eliminate noise is	00.0	10.0	18.6	71.4	90.0	4
Carpet that is static free is	00.0	15.7	44.3	40.0	84.3	5
Antistatic matting in computer areas is	00.0	25.7	35.7	38.6	74.3	6
Special floor coverings at entry areas are	01.4	30.1	47.1	21.4	68.5	7
Avoiding the use of throw rugs is	12.9	27.1	31.4	28.6	60.0	8

Wood or tile floors for easy movement of book carts are	22.9	60.0	11.4	05.7	17.1	9
Floor covering other than carpet is	40.0	45.7	14.3	00.0	14.3	10

According to the survey results, the items that addressed carpet received the highest ranking in the area of flooring. The percentage that answered that carpet colors that conceal soiling are either important or absolutely vital was 98.6%. The percentage that answered that carpet colors that resist fading are either important or absolutely vital was 95.7%.

Utilizing carpeting to eliminate noise and utilizing carpet to create a quiet, aesthetically pleasing atmosphere also received a high percentage of respondents answering either important or absolutely vital (91.4% and 90.0% respectively). One more element in the area of flooring ranked high as 84.3% of respondents indicated that carpet that is static free is important or absolutely vital.

In contrast, respondents indicated that two of the response items were definitely not preferred. Only 17.1% of the respondents indicated a preference for wood or tile floors which would aid in the movement of book carts. Finally, only 14.3% of the respondents indicated a preference for a floor covering other than carpet.

All of the items that specifically addressed carpeting were perceived by at least 75% of the respondents as being important or absolutely vital. On the opposite end of the

spectrum, wood or tile floors for easy movement of book carts was perceived by 82.9% of the respondents as either not desirable or acceptable but could function without.

Heating, Ventilation, Air Conditioning

Table 4 reveals the rank of each dimension that was addressed in the area of heating, ventilation, and air conditioning portion of the survey. The results reflect the percentage of respondents that marked that particular space on the survey. The ranking was determined by combining the total percentages of the respondents that marked either the "important" or the "absolutely vital" column.

In the area of heating, ventilation, and air conditioning, maintaining a low humidity level was perceived by 92.8% of the respondents as being either important or absolutely vital. The item that received the second highest percentage of important or absolutely vital was that a separate heating/air conditioning system should be installed for the media center (91.5%). The location of the system also received high rankings with over 75 % of the respondents indicating that the items in this area were perceived as either important or absolutely vital. Locating supply and return air vents with regard to drafts was marked by 88.6% of the respondents and locating the HVAC system away from activity spaces was marked by 75.8% of the respondents. It is interesting to note that all areas except one in the area of HVAC were perceived by none of the respondents as not desirable; zone controls for each area was only marked by 1.4% of the respondents as not desirable.

Table 4: Survey Ranking of HVAC Elements

	#1 Not Desirable %	#2 Acceptable %	#3 Important %	#4 Absolutely Vital %	#3 & #4 Preferred %	#3 & #4 Ranked
Maintaining a low humidity level is	00.0	07.1	31.4	61.4	92.8	1
A separate heating/ air conditioning system for the media center is	00.0	08.6	32.9	58.6	91.4	2
Locating supply and return air vents with regard to drafts is	00.0	11.4	68.6	20.0	88.6	3
Locating the HVAC system away from activity spaces is	00.0	24.3	42.9	32.9	75.8	4
Installing a humidifier/dehumidifier is	00.0	30.0	34.3	35.7	70.0	5
Emergency generators are	00.0	37.1	40.0	22.9	62.9	6

Zone controls for each area are	01.4	38.6	35.7	24.3	60.0	7

Space

Table 5 reveals the rank of each dimension that was addressed in the area of space. The results reflect the percentage of respondents that marked that particular space on the survey. The ranking was determined by combining the total percentages of the respondents that marked either the "important" or the "absolutely vital" column.

For the design element of space, all items referring to separate areas were perceived by over 75% of the respondents as being either important or absolutely vital. Having a separate area for large groups received the highest ranking with 97.2% of the respondents indicating that this item was either important or absolutely vital; coming in a close second was having a separate area for equipment storage which was marked by 97.1% of the respondents as either important or absolutely vital. Other items that were marked as either important or absolutely vital by at least 90 % of the respondents were computer/research work areas (95.7%), an area for the staff work room (95.7%), a story telling area (92.9%), an area for meetings (91.4%), and a media production area (90.0%). The final three areas received the following percentages: an area for small groups (88.6%), a quiet reading area (87.2%), and an independent study area (78.5%).

Unfortunately, the item "specifying square footage requirements by area rather than by total media center space" could not be ranked due to a high number of missing data points (30). Perhaps this item was inadvertently skipped by a high number of

Table 5: Survey Ranking of Space Elements

	#1: Not Desirable %	#2: Acceptable %	#3: Important %	#4: Absolutely Vital %	#3 & #4: Preferred %	#3 & #4 Ranked
Having separate areas for large groups is	00.0	02.8	44.3	52.9	97.2	1
Having separate areas for equipment storage is	01.4	01.4	21.4	75.7	97.1	2
Having separate areas for computer/research work is	00.0	04.3	38.6	57.1	95.7	3.5
Having separate areas for staff work room is	01.4	02.9	35.7	60.0	95.7	3.5
Having separate areas for story telling is	00.0	07.1	47.1	45.7	92.9	5
Having separate areas for Meetings (conference room) is	01.4	07.2	45.7	45.7	91.4	6
Having separate areas for media production is	00.0	10.0	45.7	44.3	90.0	7
Having separate areas for small groups is	00.0	11.4	42.9	45.7	88.6	8
Having separate areas for quiet reading is	00.0	12.8	44.3	42.9	87.2	9
Having separate areas for independent study is	00.0	21.5	47.1	31.4	78.5	10

respondents because of its location on the survey. As the first entry in this category that was then followed by a list of individual items, the question could have visually perceived as a lead-in statement to the indented list that followed.

Furnishings

Table 6 reveals the rank of each dimension that was addressed in the area of furnishings. The results reflect the percentage of respondents that marked that particular space on the survey. The ranking was determined by combining the total percentages of the respondents that marked either the "important" or the "absolutely vital" column.

In the area of furnishings, the design element that received the highest percentage of respondents indicating that the element was perceived as either important or absolutely vital was that chairs are sturdy and durable. Ranked second, third and fourth were the three items that all referred to types of shelving. Specifically, 97.1% of respondents perceived shelving with adjustable-height shelves as important or absolutely vital, 92.9% of respondents perceived shelving with integral backs and book supports as important or absolutely vital, and 92.9% of respondents perceived special shelving for items such as software, periodicals, displays, etc. as important or absolutely vital. Only 75.7% of the respondents felt that moveable shelf units were important or absolutely vital.

Tables and chairs in a variety of heights were perceived as important or absolutely vital by 81.4% of the respondents. Also perceived as important or absolutely vital by the respondents was the item concerning a variety of seating areas (80.0 %). The areas that were marked by less than 75% of the respondents as important or vitally important were lounge seating for quiet reading (64.3) and carrels for individual studying (44.2). These

Table 6: Survey Ranking of Furnishings Elements

	#1 Not Desirable %	#2 Acceptable %	#3 Important %	#4 Absolutely Vital %	#3 & #4 Preferred %	#3 & #4 Ranked
Chairs that are sturdy and durable are	00.0	01.4	31.5	67.1	98.6	1
Shelving with adjustable-height shelves is	00.0	02.9	30.0	67.1	97.1	2
Shelving with integral backs and book supports is	01.4	05.7	44.4	48.6	92.9	3.5
Special shelving for items such as software, periodicals, displays, etc. is	00.0	07.1	44.3	48.6	92.9	3.5
Tables and chairs in a variety of heights are	01.4	17.2	47.1	34.3	81.4	4
A variety of seating areas is	00.0	20.0	51.4	28.6	80.0	5
Moveable shelf units are	01.4	22.9	50.0	25.7	75.7	6
Lounge seating for quiet reading is	01.4	34.3	41.4	22.9	64.3	7
Carrels for individual studying are	08.6	47.2	37.1	07.1	44.2	8

two items were also the items that received the lowest ranking under the design element of space.

Technological Support

Table 7 reveals the rank each dimension that was addressed in the area of technological support. The results reflect the percentage of respondents that marked that particular space on the survey. The ranking was determined by combining the total percentages of the respondents that marked either the "important" or the "absolutely vital" column.

According to the survey results, installing power outlets at frequent intervals was perceived by 95.7% of the respondents as important or absolutely vital in the area of technological considerations in the media center. Installing power and data ports at each workstation receive 94.3% of the respondents marking either important or absolutely vital while installing power and data ports at some workstations only received 65.7% of the respondents marking either important or absolutely vital.

The responses for the items addressing the location of computer lab indicated that the preferred location is separate from the media center. Of the respondents, 75.8% regarded this as important or absolutely vital while only 55.7% indicated that locating the computer lab adjacent to the media center and only 31.4% indicated that locating the computer lab within the media center was important or absolutely vital. In fact, 38.6% of the respondents indicated that locating the computer lab within the media center was not desirable.

Table 7: Survey Ranking of Technological Support Elements

	#1 Not Desirable %	#2 Acceptable %	#3 Important %	#4 Absolutely Vital %	#3 & #4 Preferred %	#3 & #4 Ranked
Installing power outlets at frequent intervals is	00.0	04.3	18.6	77.1	95.7	1
Installing power and data ports at each workstation is	00.0	05.7	35.7	58.6	94.3	2
Student access to high speed Internet	00.0	08.6	25.7	65.7	91.4	3
A separate workstation area for teachers is	01.4	18.6	40.0	40.0	80.0	4
Networking student workstations to a central printer is	04.3	18.6	31.4	45.7	77.1	5
A computer lab separate from the media center is	07.1	17.1	24.3	51.4	75.8	6
Student workstations with printers are	08.6	24.2	34.3	32.9	67.2	7
Installing power and data ports at some workstations is	20.0	14.3	37.1	28.6	65.7	8

A computer lab adjacent to the media center is	10.0	34.3	31.4	24.3	55.7	9
A computer lab within the media center is	38.6	30.0	25.7	05.7	31.4	10

In the area of workstations, 80.0% of the respondents perceived a separate workstations area for teachers as important or absolutely vital. Networking student workstations to a central printer received a higher percentage (77.1) than student workstations with printers (67.2) of respondents perceiving this as important or absolutely vital.

Miscellaneous

Table 8 reveals the rank of each dimension that was addressed in the miscellaneous area. The results reflect the percentage of respondents that marked that particular space on the survey. The ranking was determined by combining the total percentages of the respondents that marked either the "important" or the "absolutely vital" column.

Three of the items in the miscellaneous category received a high percentage of respondents indicating that there were important or absolutely vital items. These items were phone lines (97.1%), locating the circulation desk near the entrance (94.3 %), and an interior book drop that is easy to empty (94.3%). Only 57.2% of the respondents perceived an automated security system as important or absolutely vital.

Table 8: Survey Ranking of Miscellaneous Elements

	#1 Not Desirable %	#2 Acceptable %	#3 Important %	#4 Absolutely Vital %	#3 & #4 Preferred %	#3 & #4 Ranked
Phone lines are	00.0	02.9	21.4	75.7	97.1	1
Locating the circulation desk near the entrance is	00.0	05.7	38.6	55.7	94.3	2.5
An interior book drop that is easy to empty is	01.4	04.3	31.4	62.9	94.3	2.5
An automated security system is	02.9	39.9	28.6	28.6	57.2	4

Variety and Number of Tables

Respondents were given the opportunity to rank the shape of tables that are possible to place in a media center. The majority of respondents felt that a mixture of tables was the most desirable; however, if only one table was to be used, rectangular tables that seat six to eight students were selected as being more desirable than square tables that seat four students. Round tables that seat four to six students were ranked as the least desirable.

Respondents were also given the opportunity to rank the number of students that it would be possible to seat at one time. The majority of respondents felt that tables should be provided that would seat one entire class with two or three extra tables placed in a different area of the media center. Ranking second was that enough tables should be

available to seat two entire classes with two or three extra tables placed in a different area. Ranking third was that enough tables should be available to seat two entire classes only. Enough tables for just one entire class only ranked fourth.

Demographics of Respondents

The majority of the respondents currently work in a public school (96.8%). When looking at the area that the respondents work in 41.9% work in a suburban area, 37.1% work in a rural area, and 21.0% work in an urban area. Because the survey intent was to gain perceptions of media specialists about elementary media centers, elementary media specialists were actively sought as survey respondents. In actuality, 90.3% of the respondents currently work in an elementary media center; 9.7% currently work in a middle school media center. None of the respondents currently worked in a high school media center.

The age of the building in which the respondents worked was distributed between the four answer choices. Specifically, 22.6% work in a building that is 0-5 years old, 21.0% work in a building that is 6-10 years old, 25.8% work in a building that is 16-30 years old, and 30.6% work in a building that is 31-50+ years old.

The final question in regard to demographics concentrated on years employed as an elementary media specialist. On this item, 40.3% of the respondents had been employed as an elementary media specialist for 15 or more years, 11.3% for 11-15 years, 14.5% for 6-10 years, and 33.9% for 0-5 years. By combining subgroups, about one-half of the respondents (51.6%) had been employed as an elementary media specialist for more than 10 years and about one-half of the respondents (48.4%) had been employed as an elementary media specialist for l0 years or less.

Open Ended Survey Question

The survey concluded with an open-ended question, "Please list any additional design items (not included on the survey) that would improve your ability to fulfill your role as an elementary school media specialist" and the invitation for participants to share any other information, "Please offer any additional comments." Response items in their entirety are reported in Appendix B. Of the 75 usable surveys, 28 participants listed 56 items.

Comments were coded according to their content. Five categories emerged and included Technological Considerations, Climate, Lighting/Windows, Space, and Storage. Content analysis showed that although participants were asked to report additional design items *not* included on the survey, three of the five categories were included in the survey. The categories not included in the survey were Climate and Storage with Technological Considerations, Lighting/Windows, and Space representing the categories included in the survey.

Frequencies of responses, although somewhat negligible, were recorded. Comments that fell outside of the design elements of the survey were examined and frequencies were recorded. The following table, Table 9, includes data from the open-ended responses across categories. This data is descriptive.

In the category, Technological Considerations, each of the responses appeared only once with the exception of a production area; two respondents included this item. In the category, Lighting/Windows, both of these items were included in the Likert scale portion of the survey. Operable windows were favorably marked by 44.3% of the respondents. Locating lighting switches in close proximity to each area and adjustable

Table 9: Grouped Responses from Open-Ended Survey Portion

Area	Responses	Frequency
Technological Considerations	• Production area • Include mini computer lab in the Library Media Center • More computers • Plenty of electrical outlets • Mounted televisions	• 2 • 1 • 1 • 1 • 1
Lighting/Windows	• Windows that open • Good lighting controls	• 1 • 1
Space	• Staff bathroom • Sink in workroom • Screening room/projection area • Reading loft • Proximity of the office to the circulation desk • Flow of movement • Doors to important areas • Conference room • Adequate storage for equipment • Separate room for the file server and computer equipment • Large enough to seat faculty • Reading area (well) away from the circulation desk • Movable stage area • Media production area close to the circulation desk • Individual study rooms • Carrels • Media production close to check out • Media office close to check out	• 5 • 3 • 3 • 2 • 2 • 1 • 1 • 1 • 1 • 1 • 1 • 1 • 1 • 1 • 1 • 1 • 1 • 1
Climate	• Ability to see (line of vision) • Displays • Bright, child friendly • Plants • Good acoustics • Sound-proof area	• 5 • 5 • 1 • 1 • 1 • 1

Storage	• Height of shelving • Height of circulation desk • Equipment storage close to the check-out desk • Height of circulation desk	• 2 • 2 • 1 • 1
Miscellaneous	• Meets SACS requirements • Handicapped access • Carpet should be padded	• 1 • 1 • 1

general lighting provided according to the task performed in each area were both preferred by 81.4% of the respondents.

The element, Space, received the greatest number of responses collected in the open-ended question area of the survey. Many of the items in this category were suggested by more than one respondent. Specifically, having a reading loft and locating the office in proximity to the circulation desk appeared twice, and including a screening/projection room and a sink in the workroom appeared three times. Having a staff restroom included as part of the media center design was suggested by five of the respondents. One respondent noted that the flow of movement within the media center should be considered; this suggestion is supported in the literature review.

Two areas not included as design features but appeared in the open-ended responses of the participants included Climate and Storage. Five respondents suggested that display areas be provided to display student work within the media center. Also, the importance of maintaining clear visibility was noted by five respondents; the importance of this feature was also noted in the literature review. Both of the items regarding height were included in the literature review with specific measurement suggestions provided.

CHAPTER 5

SUMMARY, RECOMMENDATIONS, AND IMPLICATIONS

Introduction

This chapter presents a summary of the study and reviews the findings of the research. This information is the portrayed visually as a layout for an ideal library media center. The chapter concludes with recommendations for the enhancing the existing facility plan for the state of Georgia, and implications for further research.

Summary of the Study

The Georgia Legislature continues to see the necessity for building new schools. The 2002 legislative session approved the funding for 5000 additional classrooms to be built at the cost of $626 million dollars. More classrooms being built will necessitate the building of new schools, which, in turn, will require media centers.

Based on the review of literature and the perceptions indicated by current elementary media specialists who participated in this study, certain design elements in the area of lighting and windows are important to the functionality of the media center. The review of literature and the survey results agree that windows and natural lighting are important features in the media center and that artificial lighting should be controllable with the use of switches that are well located. Two other considerations that received favorable ratings in the literature review and were significant in the survey were that windows should be at eye level to allow for outside views and that lighting should be tailored to the area or task.

In the review of literature, it was reported that color has an impact on student learning (Alexander, 1972; Brown, 1992; Burbridge, 1993; Chan, 1980; Chan & Petrie, 1998; Erikson & Markuson, 2001; Ketcham, 1964; Rice, 1953; Rosenfeld, 1977; Smith, 1980); however, the majority of survey respondents rated the items pertaining to color as either "not desirable" or just "acceptable." The only item that was perceived as important or absolutely vital by 75% of the respondents was that upholstery colors should disguise heavy use. The majority of respondents indicated that the psychological effects of colors were not regarded as important. The researcher surmises that this is due to a lack of knowledge of the impact that color has been reported as having on educational environments.

Carpeting was considered an important element in the media center in both the review of literature (Baule, 1999; Castaldi, 1994; Erikson & Markuson, 2001; Maine School Library Facilities Handbook, 1999; Scott, 1999; Wisconsin Department of Public Instruction, 2001; Woodward, 1999) and in the survey results. It was perceived that carpeting reduces noise levels while providing a slip free surface. However, as reported in the review of literature, consideration must be given to either the purchase of static free carpet or to using antistatic matting in the computer area.

In the area of heating, ventilation, and air conditioning two elements received a high level of attention. It was perceived by the survey respondents that maintaining a low humidity level was of utmost concern. The review of literature concurred with this perception because maintaining a low humidity level will protect the media center collection (Abilene Library Task Force, 1990; Butin, 1999; Maine School Library Facilities Handbook, 1999; North Carolina Public Schools, 2000; Texas Education

Agency, 2001). The survey respondents also perceived installing a separate air conditioning system as important or absolutely vital. According to the literature review, this is an important design element because it allows for utilization of the media center during hours when the entire school is not being occupied.

The survey respondents indicated that separate areas should be provided for large groups, equipment storage, computer/research work, staff work room, story telling, meetings, media production, small groups, quiet reading, and independent study. Similar information was also included in the review of literature (Baule, 1999; Butin, 1999; Castaldi, 1994; Erikson & Markuson, 2001; Georgia Department of Education, 2000; Hubler, 1996; Maine School Facilities Handbook, 1999; North Carolina Public Schools, 2000, Wisconsin Department of Public Instruction, 2001). Guidelines established in other states specify that space for these individual areas should be included in the design of a media center. Unfortunately, the survey did not generate the respondents' perception as to whether or not square footage amounts should be allotted for each space separately. However, the responses to the open-ended question indicated a strong interest in the element of space with 15 individual items suggested.

In the area of furnishing, shelving was considered important in both the review of literature (Baule, 1999; Erikson & Markuson, 2001; Maine School Library Facilities Handbook, 1999) and the survey results. This is understandable as books are regarded by most as the most important asset in a library media center. Tables and chairs were also regarded as important items in a library media center. The survey respondents ranked having enough tables to seat one entire class with extra tables available elsewhere in the

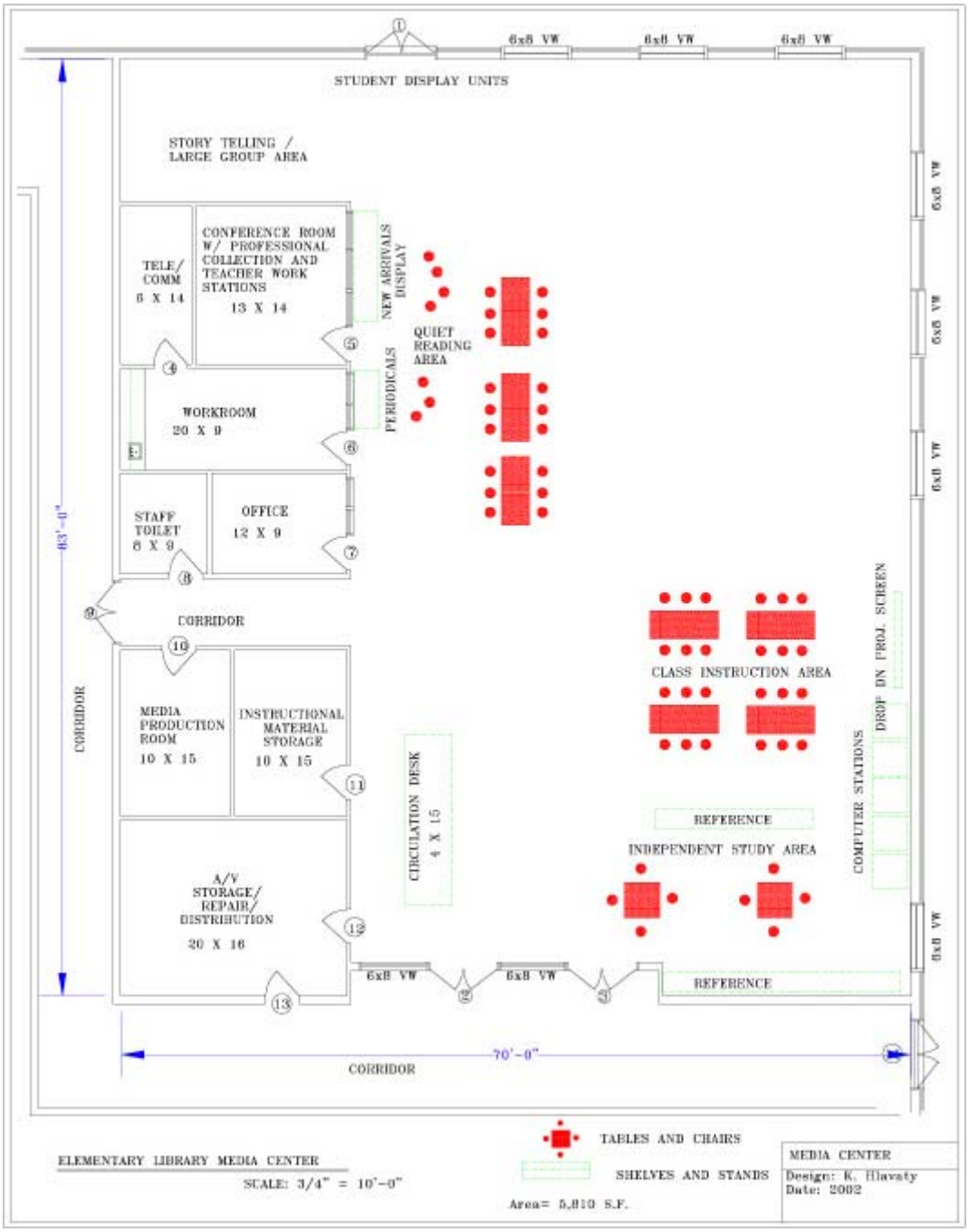
media center as being the most desirable. It was also found that these tables should be rectangular in shape and large enough to seat six to eight students.

The study found that to provide proper technology for the students in the media center, power outlets should be installed at frequent intervals and workstations should have power and data ports installed. The student workstations should be networked to a central printer. The survey respondents strongly felt that the computer lab should not be located in the media center. They also indicated that phone lines are an important consideration.

For the most part, the open-ended questions at the end of the survey reflected enumeration of the areas included in the survey. However, the most often occurring responses of elements not appearing in the survey centered on issues of climate in the library media center. Respondents indicated with a frequency of n=3 that they desired a library media center to be bright and child friendly, to be decorated with plants and displays, and to have good acoustics and a soundproof area. All of these responses are supported in the literature (e.g., Brown, 1992; Tanner, 2000; Taylor, 1999).

The information gleaned from the review of literature, the survey results, and the responses to the open ended questions was used to develop a model design of an elementary school library media center. The design, Figure 7, reflects the preferred elements in the areas of windows, space allocations, furnishings, and support areas (e.g., conference room and storage areas). Also, square footage is specified in the design. An elaborate iteration that illustrates the placement of items not included in the survey is reported in Appendix C.

Figure 7: Design of Elementary Media Center



Recommendations

Research, as reported in the literature review, shows that the elementary media center can make a difference in the achievement level of the students. Therefore, the elementary media center and should be designed in ways found to support achievement. The following recommendations are presented for enhancing the current method of planning and developing elementary school media centers:

1. The state of Georgia should rewrite the current facility guidelines for the elementary media center so that they specify more than square footage. The guidelines issued by the Department of Education in North Carolina, Wisconsin, Maine, and Washington are an excellent source of information and could be used as a starting point for those in Georgia.
2. The professional judgment of elementary media specialists should be considered when establishing facility guidelines. Their perceptions in this study correlated with the concepts presented in the review of literature.
3. The media specialist, students, parents, and community members who will be using new media centers should be involved in the planning of these facilities.
4. The findings in each of the areas of this study should be considered while establishing new guidelines in the state of Georgia.

Implications for Further Research

While collecting data at the Georgia Conference of Media Organizations, media specialists at the middle school and high school level expressed a strong interest in the survey and wanted a similar one conducted for their level. It is recommended that a similar study be conducted concentrating on the middle school and high school

level so that facility guidelines can be established that address the individual uses of each level of media centers in educational facilities.

In addition, the review of literature revealed a growing trend in establishing school media centers that are also available for use by the residents in the community. Community-based school media centers should be studied for their specific design needs and the factors impacting their success.

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APPENDIX A: ELEMENTARY MEDIA CENTER DESIGN SURVEY

Thank you for your interest and your time in completing this survey. The results will be tabulated to develop design preferences that can be referred to by architects, facility planners, administrators and school boards when planning school construction that includes elementary media centers. A summary of the results will be submitted to the Georgia ALA for inclusion in a future publication in order to make the final results available to today's participants.

Demographic Data

I currently work in: (please circle one item on each line)

1. Public School Private School
2. Rural area Suburban area Urban area
3. Elementary School Middle School High School

The age of the building in which I currently work is:

0-5 years 6-15 years 16-30 years 31-50 years

Number of years employed as an elementary media specialist:

0-5 years 6-10 years 11-15 years 15 year +

Directions:

Please rate the importance of each item based on your perception of how the item helps to fulfill the role of an elementary media center. Indicate your rating by placing a check mark (√) in the appropriate column.

1……..2……..3…….……4

Not Desirable Acceptable (but could function without) Important Absolutely Vital

	1	**2**	**3**	**4**
Lighting/Windows				
Using the same type of lighting throughout the center is ____				
Adjustable general lighting provided according to the task performed in the area is _____				
Task lighting for certain areas such as carrels, shelving, etc. is _____				
Locating lighting switches in close proximity to each area is _____				
A central control point for all lighting accessible only to staff is _____				

1……..2……..3…….……4
Not Desirable Acceptable (but could function without) Important Absolutely Vital

	1	**2**	**3**	**4**
Having no windows is the media center is _____				
Windows for natural lighting are _____				
Skylights to supply natural lighting are _____				
Windows that reach all the way to the floor are _____				
Windows that have shelving underneath are _____				
Windows at eye level that allow for outside views are _____				
Shading or covering for windows is _____				
Operable windows that allow for natural ventilation are ____				
If windows are operable, installing securable windows is___				
Color				
Paint in warm colors such as peach and yellow due to positive psychological effects shown through research is _____				
Painting two brightly colored accent walls is_____				
Utilizing a variety of colors to designate areas designed to house different activities is _____				
Choosing standard paint colors for easy, cost-effective maintenance is _____				
Upholstery colors that disguise heavy use are _____				
Adjusting lighting according to colors used is_____				
Flooring				
Utilizing carpeting to eliminate noise is _____				
Utilizing carpeting to create a quiet, aesthetically pleasing atmosphere is _____				
Floor covering other than carpet is _____				
Carpet that is static free is_____				
Antistatic matting in computer areas is _____				
Avoiding the use of throw rugs is _____				
Special floor coverings at entry areas are _____				
Carpet colors that conceal soiling are _____				
Carpet colors that resist fading are _____				
Wood or tile floors for easy movement of book carts are_____				
Heating, Ventilation, Air Conditioning				
Maintaining a low humidity level is _____				
A separate heating/air conditioning system for the media center is _____				
Installing a humidifier/dehumidifier is _____				

1……..2……..3…….……4
Not Desirable Acceptable (but could function without) Important Absolutely Vital

	1	2	3	4
Locating the HVAC system away from activity spaces is____				
Locating supply and return air vents with regard to drafts is__				
Zone controls for each area are _____				
Emergency generators are _____				
Space				
Specifying square footage requirements by area rather than by total media center space is _____				
Having separate areas for: Small groups is_____				
Large groups is_____				
Story telling is _____				
Meetings (conference room) is __				
Computer/Research work is_____				
Quiet reading is_____				
Media production is_____				
Independent study is_____				
Staff work room is_____				
Equipment storage is_____				
Furnishings				
Shelving with adjustable-height shelves is_____				
Shelving with integral backs and book supports is _____				
Moveable shelf units are _____				
Special shelving for items such as software, periodicals, displays, etc. is _____				
Carrels for individual studying are_____				
Lounge seating for quiet reading is _____				
A variety of seating areas is _____				
Chairs that are sturdy and durable are _____				
Tables and chairs in a variety of heights are _____				
Technological Considerations				
A computer lab separate from the media center is _____				
A computer lab adjacent to the media center is _____				
A computer lab within the media center is _____				
Installing power and data ports at each workstation is _____				
Installing power and data ports at some workstations is _____				
Student workstations with printers are_____				
Networking student workstations to a central printer is _____				
Installing power outlets at frequent intervals is _____				
Student access to high speed Internet is _____				
A separate workstation area for teachers is _____				

1……..2……..3…….……4
Not Desirable Acceptable (but could function without) Important Absolutely Vital

Miscellaneous				
Phone lines are _____				
An automated security system is _____				
Locating the circulation desk near the entrance is _____				
An interior book drop that is easy to empty is _____				

There are a variety of tables available for placement in a media center. Please rank the following choices of tables with #1 being the most desirable and #4 being the least desirable:

____ Square tables that seat four students
____ Rectangular tables that seat six to eight students
____ Round tables that seat four to six students
____ A mixture of tables

Comments:

With regard to tables, how many students should it be possible to seat at one time? Please rank the following choices with #1 being the most desirable and #4 being the least desirable:

____ One entire class only
____ Two entire classes
____ One entire class with two or three extra tables placed in a different area
____ Two entire classes with two or three extra tables placed in a different area

Comments:

Please list any additional design items (not included on the survey) that would improve your ability to fulfill your roles as an elementary school media specialist:

Please offer any additional comments.

APPENDIX B: SURVEY RESPONSES TO OPEN ENDED ITEMS

- Windows that open
- Doors to important areas (workroom to mainfloor)
- Sink in workroom
- Bathroom in Media Center
- Mini computer lab
- Production area
- Conference room
- Adequate storage for equipment
- More computers
- SACS requirements
- Proximity of media office/workroom near circulation desk
- Ability to see behind shelves at all times
- Height of shelving
- Plenty of electrical outlets
- Sink is essential
- Height of circulation desk geared to students
- Shelf height geared to students
- Shelves should not block view across room
- Bright, child-friendly "stuff" around to create an inviting environment
- Living, growing plants
- A good flow/movement through areas of the media center
- Learning exhibits display student projects
- A reading well as a story area that is situated away from the circulation desk
- Carpet should be padded
- Good acoustics
- Good light control enabling areas to be dimmed sufficiently for viewing and to avoid glare on computers
- Good visibility of all areas; no high shelving
- Walls to hang things that could be changed out
- Shelves to display students' work
- A loft that provides interest and a different place to teach and enjoy reading
- A separate screening room that is always set up with smart board/projector/computer that also has a laser disk setup available
- Moveable stage area
- Projection area to provide for technology presentations
- Equipment storage area close to check out desk
- Media production close to check out desk
- Office for media specialist close to check out desk

- Separate room for file server and other computer equipment; should be temperature controlled
- Staff restrooms
- In reading area, the students should not be facing the entrance to the media center; the media specialist should be positioned so that she/he can see the media center
- Sink
- Media center should be large enough to seat the entire faculty
- Bathroom facilities
- Projection area
- TV production "studio" area
- Bathroom
- Bathroom
- Handicapped access
- Reading loft
- Carrels
- Wall space for achievement awards
- Ceilings low enough to suspend banners
- Sound proof areas
- Individual study rooms
- Child height circulation desk.
- Windows from media office to media center should have clear visibility from a sitting position
- Mounted TVs in large group areas

Additional comments:

- Good luck!
- I am pleased to see this survey, someone actually wants the media specialist to contribute to the design of our media centers!
- Media specialists should have as much input as possible; we know what will work and will not work.
- Thanks for your survey!
- Thanks for asking!
- A practicing school media specialist (preferably the one who will be using the facility) should be consulted by the architect before final plans are submitted and the media specialist should have a working relationship with the contractor to assure that the plans are being carried out to specifications.
- Good survey!

APPENDIX C: SUGGESTED DESIGN OF AN ELEMENTARY MEDIA CENTER