A Descriptive Study of Technology Acquisition and Integration in Middle Atlantic Catholic Elementary Schools

by

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A DESCRIPTIVE STUDY OF TECHNOLOGY ACQUISITION AND INTEGRATION IN MIDDLE ATLANTIC CATHOLIC ELEMENTARY SCHOOLS

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ABSTRACT

Financing technology is an expensive and ongoing process due to constant upgrades and advancements that make yesterday’s innovations obsolete. How Catholic elementary schools attempt to meet the financial challenge to provide necessary technological tools to their students is a concern expressed throughout the Catholic education community. The questions addressed in this study include: (1) how are Catholic elementary schools in the middle Atlantic states financing technology in their schools? (2) to what extent has technology been integrated into these schools? and (3) what are some of the factors, combined with funding, that have enabled or hindered technology integration within these schools?

This study of middle Atlantic Catholic elementary schools was planned to include a survey of approximately two hundred sixty-four (264) schools within the Dioceses of Charlotte, Raleigh, Richmond, Arlington, Wilmington, and the Archdioceses of Washington, D.C. and Baltimore. However, only superintendents for the Dioceses of Charlotte, Richmond, and Arlington approved of the survey distribution in their systems. As a result, seventy-two (72) schools were surveyed in these three systems.

The survey instrument contained questions designed to identify the methods of funding technology programs; the extent of technology use in the schools; any factors in addition to funding that have enabled technology integration; and any factors that have affected cost of technology in the school. Follow-up telephone interviews were
conducted as needed. Candidates selected for interview were based on any notable survey responses. Descriptive statistics were obtained from the survey and telephone interview data and were placed on the Demographics, Technology Use and Integration, and Budget and Acquisition data collection charts. School demographics, staff development programs, percentage of budget designated for technology, and primary sources of technology funding were a few of the areas investigated.

Although general references are available to Catholic school administrators regarding technology funding, this information is time consuming to read for application to locality and specifically to Catholic education. The data collected from this study will be sent to each school principal who returned a survey and will reveal technology trends and methods of funding that are specific to the middle Atlantic Catholic elementary schools. In addition, conclusions drawn from this study relative to funding methods, extent of technology integration, and factors that have enabled technology programs within the schools, provide the basis for future study.
Dedication

This dissertation is dedicated to my husband, Kenneth, and my sons, Michael and Matthew, whose patience, encouragement, and love have made this accomplishment possible.
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The completion of this study would not have been possible without the support and assistance of many individuals. I am most appreciative of the support and encouragement received from my advisor, Dr. Richard Salmon, throughout the many phases of this study’s progress. I am also grateful to Dr. Stephen Parson, Dr. Christina Dawson, Dr. Joy Colbert, and Dr. John Rohr for their continuing assistance. In addition, I am grateful to Dr. Bob Richards for his early guidance while developing the ideas for this study.

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Fellow doctoral cohort members including a Catholic elementary principal colleague, (soon-to-be-doctor) Maureen Dowling, bolstered my spirits and encouraged completion of this dissertation. Their many hours of friendly feedback were key in the survey development process.

I am also indebted to Ms. Regina Haney of the National Catholic Educational Association for assisting with the early discussion phase and providing the survey mailing labels; the Arlington Catholic Diocese mail room for metering the hundreds of envelopes required for the survey; and to Ms. Diane Bialkowski, Superintendent of the Diocese of Richmond, and Dr. Michael Skube, Superintendent of the Diocese of Charlotte for encouraging their schools’ participation in this study.

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CHAPTER I

STATEMENT OF THE PROBLEM

Financing technology is an expensive and ongoing process due to constant upgrades and advancements, which make yesterday’s innovations, obsolete. How Catholic elementary schools attempt to meet the financial challenge to provide necessary technological tools to their students is a concern expressed throughout the Catholic education community. According to the National Catholic Educational Association (NCEA) (June 1997), “all schools must be able to afford the technologies necessary to prepare all students - not just the privileged few - for work and citizenship in the technological world. Unfortunately, many of these newer and advanced technologies are lacking in most of our Catholic schools” (http://www.ncea.org/PubPol/issues.htm).

DEFINITIONS

Definitions for technical terms are listed in the Glossary.

HISTORY AND BACKGROUND

Since the 1980s, American schools - public, private, and parochial - have been challenged to provide technological integration of hardware and software into school programs and technological infusion into the curricula. This situation has occurred as the result of technological advancements embraced, in part, by the business community. In order to incorporate school-wide technology use that will adequately prepare students for higher education and future employment, educators are experiencing an urgent need for financial resources to underwrite and support school technology programs. This study addresses the challenge of funding technology programs within Catholic elementary schools in order to prepare students for life in the 21st Century. Mario Morino (founder of the Morino Institute, a non-profit organization created to promote availability of technology for all) underscored this need in his quote from the Morino Institute’s policy
statement during his address to The Children’s Defense Fund on March 14, 1997 titled, “The Impact of Technology on Youth in the 21st Century”:

> The real power of interactive communications is people as the ultimate source of knowledge. It is not the computers, the physical mass of wires, the complex of networks or the vast databases of information. Rather, it is people and their knowledge, relationships, insights, and spirit freely passed from one to another that engender the “magic” of this interconnected world that the Internet is making possible.

> Today, the fundamental question is whether we will share this “magic” with everyone, or only a privileged few. The answer depends on the decisions we make and the actions we take from this moment on. We must come to understand that access to the Internet needs to be a reality for all our citizens, that the free and unrestricted flow of information and the ready availability of computers for everyone are not simply matters of “technology.” They are, in fact, one of the vital keys that will either open or lock the doors of opportunity for our children and ourselves.

The cost of acquiring and maintaining state-of-the-art technology within Catholic schools has resulted in the use of a variety of entrepreneurial solutions to solve this dilemma since private schools theoretically cannot depend on tax revenue for support. For the purpose of this study, funding sources were divided into three broad categories: (1) state and federal grants (2) local funding (tuition, parish subsidy, parent organization fundraising, development funds, and annual appeals); and (3) corporate gifts and grants. How Catholic elementary schools in the middle Atlantic states use these sources to finance and develop varying levels of technology integration is described within this study.
Under the reauthorization of the Elementary and Secondary Education Act (ESEA) in October 1994, private schools are eligible to receive money through a “formula grant - a grant of funds to the state local education agency based on a pre-determined formula, such as the number of children enrolled by grade or the number of children from low-income families. Private schools receive no direct aid from these programs. Programs funds are granted to the public authorities (usually a local education agency or public school district) who are in turn responsible for serving eligible students, teachers, and other personnel within their boundaries, whether they attend public or private school.” (USDE Oct. 1996) Although the LEA is required by law to provide services to all qualifying public schools and their students, it is the private school administrator’s responsibility to ensure that their portion of eligible funds is received by contacting the local public school district coordinator of federal education programs. If contact is not made, funds may go unused, undistributed, or used solely for public schools.

Federal funding which is available to aid school technology integration and use is found in Part A of Title I - Helping Disadvantaged Children Meet High Standards, Title II - Dwight D. Eisenhower Professional Development Program, Title III - Technology for Education, and Title VI - Innovative Education Program Strategies. However, these federal grants for public and private education are limited by enrollment for Catholic school students. “Title I computer assisted instruction is available only for those students who qualify for Title I services; Title III Technology Challenge Grants and Technology Literacy grants are to include private schools in the consortia applicants --- but few have been awarded; Title VI does provide the most consistent funding for technology, but the dollars are few. Most of the technology assistance provided to public schools is not available to private schools: state and local government funded technology bond issues or other initiatives specifically exclude expenditures for private school participation” (“NCEA Public Policy: School Issues” October 30, 1997 p. 7). As result, according to Sister Dale McDonald, public policy research associate at the NCEA, “…school personnel must begin to explore new partnerships to advance the mission of their institution…A considerable amount of financial and technical assistance is available
from a variety of government and private sources…[however,] locating such assistance can be difficult and time-consuming” (p.46).

“The Challenge Grants for Technology in Education are awarded to consortia of schools, businesses, libraries, museums and community organizations that use technology in innovative ways to improve student achievement and show teachers, administrators and other school staff how to use computers in the classroom. These grants are funded under Title III of IASA (Improving America’s Schools Act). Under the Uniform Provisions of Title XIV of IASA, such grants are mandated to include non-public school students geographically located in any public school districts awarded these challenge grants” (“NCEA Public Policy: School Issues” October 30, 1997, http://www.ncea.org/PubPol/issues.htm, p 16). The challenge to local Catholic school administrators is to network with the local education agency (LEA) in order to determine eligibility. The U.S. Department of Education website, http://www.ed.gov, regularly updates the information regarding funding to local districts. This information is a useful source for individual Catholic schools seeking funding sources from block grants awarded to local districts since communication between private education and LEAs is not always timely.

During 1994-95, the NCEA conducted a survey of 1,012 elementary and middle schools, which represented 14 percent of all Catholic elementary/ middle schools. A total of 594 questionnaires were returned which represented 8 percent of all Catholic elementary/middle schools in the United States. This survey revealed that “…83 percent of the schools had computer labs. In the Mideast, 89 percent of the schools had computer labs; the Southeast had the lowest percentage, 79 percent. In the average lab were 18 computers, and the students spent an average of 51 minutes per week in the lab. Sixty-eight percent of the classrooms had computers, and the typical classroom had two computers in it” (Balance Sheet for Catholic Elementary Schools: 1995 Income and Expenses p. 29). The most common reply from the respondents was “a call for assistance in financing the Catholic school….Finances was a major concern…and the respondents felt that the continuation of the school depended upon its financial stability” (p. 31).
The NCEA stated in its Public Policy website release dated October 30, 1997: “A great digital divide now exists for students in our Catholic schools. According to a 1997 U.S. Department of Education survey, technology capabilities in the private school sector, which comprises 24 percent of all schools and 11.2 percent of the total school population are at a level that is approximately [one]-half of that of the public schools. The lack of funds is the reason most often cited as responsible for limited technology in our schools” (Advanced Telecommunications in Private Schools, K-12 - 1997). The NCEA references current data contained in this report to illuminate the need for discounted services to close this digital divide:

Internet access: Ratio of student/computer access to Internet:

Schools: 25 percent
  urban schools: 174:1
  rural schools: 280:1
Classrooms: 4 percent
Students: 41 percent

Connectivity capability: 95 percent of those who have Internet access utilize telephone line modems.

High-speed connections are rare:
  SLIP/PPP: 14 percent
  56kb: 2 percent
  T1: 1 percent
  ISDN: 2 percent

When surveyed about future plans for connecting schools to the Internet, private school respondents indicated the extent to which these factors are barriers to the acquisition or use of advanced telecommunications:

Lack of funds: 61 percent
Lack of equipment: 38 percent
Too few access ports in school: 36 percent
Lines not easily accessible: 21 percent

“NCEA Public Policy: School Issues” October 30, 1997, p.8
These data concerning Catholic schools are most meaningful when compared to the results of a survey of “Internet Usage in Public Schools in 1997” conducted by Quality Education Data (QED) during February 1997. QED is a research and database company focused exclusively on education within the U.S. and Canada. Their activities include market research, marketing databases, database design, and annual research reports which track critical educational trends. In this QED survey of 464 selected library/media specialists, access to the Internet was not perceived as a critical issue in public education with 65 percent of the schools surveyed currently connected to the Internet and 22 percent planning connections in 1997-98. In fact, the number of public schools connected to the Internet as surveyed by QED have almost doubled (from 46 percent to 87 percent) in the two-year span between the 1995-96 and 1997-98 school years (Christensen, August 1997).

In addition, according to the 1997-98 Technology Purchasing Forecast from QED, “U.S. school districts will spend an estimated $5.2 billion on educational technology during the 1997-98 school year. This figure is up from $4.3 billion in 1996-97” (Technology Pathfinder for Administrators, Bonus Section, December 1997 p. 1). Jeanne Hayes, QED president stated:

It has been several years since we have seen a projected growth rate this high. This increase is due to a substantial infusion of extraordinary funds for technology from federal, state, and local grants, as well as from bond issues. Programs such as the Technology Literacy Challenge Fund (TLCF) and the FCC Universal Service discounts are also part of the strong focus on technology and connectivity at both the state and federal levels. The 1997-98 school year reflects the healthy interest in technology expressed by both political parties, as well as substantial infrastructure funding in a number of states. We are also seeing [both SEAs and LEAs] focus their efforts on long-range technology planning, including budgeting funds needed for periodic upgrades of equipment (p.1).
Although Catholic schools are limited in the assistance available from federal, state, and local funds previously noted, they may take advantage of a source of technology hardware available to all educational institutions from the federal government made possible through Executive Order 12999 (“Educational Technology: Ensuring Opportunity for All Children in the Next Century”), signed by President Clinton on April 17, 1996. By the authority of this order, the federal government donates educationally useful federal equipment to schools and nonprofit organizations (teachers, administrators, students, or other employees) for permanent or temporary ownership in order to further educational goals. Private as well as public schools, prekindergarten through 12th grade are eligible for this transfer of excess and surplus federal computer equipment (USDE Oct. 1996). By contacting the General Services Administration (GSA) regional office, all schools may inquire about equipment available under this order.

In addition, the National Science Foundation (NSF) publishes a listing of grants for science, mathematics, and technology in its annual Grant Proposal Guide. The individual grant program announcements may be requested from the NSF and the proposals are due to NSF by January 31 or July 31 each year. Some of the most recent programs available through the NSF are Partnerships for Advanced Computational Infrastructure and Connections to the Internet (NSF 95-27 Grant Proposal Guide and Connections to the Internet Program Announcement).

The most recent ruling on May 7, 1997 by the Federal Communication Commission regarding the “E-Rate” for schools and libraries to become connected to advanced telecommunications services could prove to be a much needed gift to educational institutions. How this ruling will actually be implemented and to what extent it will be beneficial to Catholic education will be seen in the coming months. According to an interview, in May 1997, released by the Public Relations Office of the National Catholic Educational Association (NCEA), Msgr. Thomas McDade, Secretary for Education at the U.S. Catholic Conference stated, “The FCC’s decision places America’s school children in the vanguard to our digital future, which is exactly where they should be. The great foresight of the legislation and of the FCC ruling is that they prepare today’s children - regardless of whether they are educated in public or private schools -
for the jobs of the future.” In this interview, Msgr. McDade concluded by stating that Catholic schools are excluded from most local and state funded initiatives for the purchase of technology hardware and are significantly disadvantaged at the onset. Discounted services will provide the assistance necessary to facilitate effective long-range technology and planning (FCC Decision News Release, NCEA May 7, 1997).

Funds from the E-Rate ruling will be made available to schools and libraries on a discounted scale based upon the number of children qualifying for free and reduced lunches within the school or the library jurisdiction. The discount will be 20 percent to 90 percent as determined by this criterion. Although this initiative will not address hardware needs, but only telecommunication services, wiring, and connections, schools and libraries will benefit from cost reductions for these services and therefore will potentially have more funds freed for hardware purchases. The application process for E-rate discounts from the Universal Service Fund began January 1998. Assistance with the application process and the development of technology plans is available on the following websites: NCEA (http://www.ncea.org), U.S. Department of Education (http://www.ed.gov/technology), FCC (http://www.fcc.gov/learnnet).

According to professional sources, difficulties in the communication process between the local public school systems (LEAs) and the Catholic schools sometimes create hindrances locating possible block grant awards and identifying whether schools qualify under one of the USDE title programs. Typical communication difficulties noted by Catholic school administrators include identifying the contact name and telephone number of the proper LEA official, timely receipt of application documents with appropriate instructions, and difficulty networking within the public arena. Due to their nature, block grants designated by enrollment produce little funding for many of the smaller Catholic elementary schools. It is important to note for this study, that within the Commonwealth of Virginia only those federal funds specifically designated for both public and private schools can be passed on to the Catholic schools since the state constitution specifically prohibits funding religious-affiliated schools. Even then, a by-pass provisions must be used.
Limited government funding and donations are available through these block grants and through the GSA surplus equipment provision. However, Catholic elementary schools do not always possess the personnel with grant writing knowledge and expertise necessary to obtain the more substantial awards offered through sources such as the National Science Foundation.

Since Catholic school budgets rarely provide the discretionary funds for technology needs, and the funds received from the government is rarely sufficient, Catholic elementary schools may also seek funding for technology programs through: (1) local funding (tuition, parish subsidy, parent fundraising, development programs, and annual appeals); and (2) partnerships with private industry, including corporate gifts and grants. Since the characteristics and composition of these funding sources vary greatly between localities and schools, each will be defined and investigated later within this study in relationship to the diocese or school.

However, one of the most notable collaborations between business, community, and education are the NetDays, which premiered on March 9, 1996. This national event is a wiring initiative conceptualized and initiated by John Gage of Sun Micosystems and Michael Kaufman of KQED San Francisco. A request for donations and volunteers on the web resulted in 20,000 volunteers and more than six million feet of cable to wire more than three thousand K-12 public schools in California in March 1996. NetDay expanded to a national event during the four Saturdays of October 1996 and was repeated again in April 1997. According to the NCEA, “most of the NetDay activities in the states have not included private schools. Corporate sponsors have made some contributions to Catholic schools, but their efforts are few and not sustained” (“NCEA Public Policy: School Issues” October 30, 1997 p. 8). Catholic schools have been encouraged to inquire about future NetDay plans and to request assistance at http://www.netday97.com.

Because funding is primarily a local school responsibility, the amount of funding received for each Catholic elementary school is based on the resourcefulness of the principal, pastor (if parish school), and parents. The NCEA has recognized the need for distributing information about technology funding and released three new publications in late 1997, New Frontiers: Navigational Strategies for Integrating Technology into
the School edited by Regina Haney and Angela Ann Zukowski (1997), From the Chalkboard to the Chatroom…And How to Get There From Here by Marian Stuckey (1997), and Point to the Future: A Principal’s Technology Planning Guide by Jim Brennan (1997). In addition, the University of Dayton released Catholic Education: A Journal of Inquiry and Practice focusing on Technology and Education in June 1998. Each of these newly released sources will provide a Catholic education perspective to developing technology plans, acquiring and funding technology, and infusing technology into the school curriculum.

Since the capacity for acquiring funding varies greatly among local schools and diocesan systems, the potential for and level of technology integration within the schools also varies greatly. This study provides a description of these various funding methods and levels of school technology integration identified through the individual school surveys and follow-up interviews with selected principals.

**NEED FOR STUDY**

Through professional experience in Catholic education, and through informal discussions with Catholic school administrators, the Arlington Diocese Office of Catholic Schools, and the National Catholic Educational Association personnel, four areas were identified that support a need for this study. These four areas are listed as follows:

1. Numerous references are available regarding technology funding in public education; however, some of the information is not applicable to private institutions. Therefore, Catholic schools, and private education in general, will benefit from a customized study that investigates appropriate funding sources for technology.

2. Contacts with informal sources have revealed that due to limitations in staffing, local Catholic administrators do not have the time to research funding, but would use the research data if it were provided in a document that identified possible applications to their individual school settings.

3. The NCEA established a department, “New Frontiers,” in 1992 for the purpose of following technological advances in education. This department would benefit from
research done in this area. Current statistics on technology use in American Catholic elementary education, as well as identification of potential model programs of technology use will be useful data for “New Frontiers” in its advisory role to American Catholic schools.

4. Before this study was initiated, one of the diocesan systems expressed interest in supporting and sponsoring this research for use in its diocesan system. This research will be equally beneficial to the other dioceses as they seek to integrate and infuse technology within their school systems.

RESEARCH QUESTIONS

Three research questions emerged from the four areas identified in the need for this study. The three questions answered in this study are as follows:

1. How are Catholic elementary schools in the middle Atlantic states financing technology in their schools?
2. To what extent has technology been integrated into these schools?
3. What are some of the factors, combined with funding, that have enabled or hindered technology integration and infusion within these schools?

LIMITATIONS

For the purpose of this study, technology programs were investigated on the basis of the financial underwriting, hardware and software integration, infrastructure, demography, and other factors that enable technology integration and infusion. Evaluation of student success was not undertaken in this study.

Also, this study was limited by the dioceses and archdiocese that selected not to participate. Results are limited to data received from the three participating diocesan school systems.
CHAPTER II

METHODOLOGY OF INVESTIGATION

Selecting the Sample and Preparing the Survey

This study involved a survey (Appendix A) of all elementary Catholic schools in the middle Atlantic region. For the purpose of the study, this sample was to include all Catholic elementary schools in North Carolina, Virginia, Maryland, Delaware, and the District of Columbia. This geographical area includes approximately 264 Catholic elementary schools within the following systems: Dioceses of Charlotte (fourteen), Raleigh (seventeen), Richmond (twenty-two), Arlington (thirty-two), Wilmington (twenty-eight), and the Archdioceses of Baltimore (seventy) and Washington, D.C. (eighty-one). As of 1995, the NCEA listed a population of 7,055 elementary/middle schools in the United States (Balance Sheet for Catholic Elementary Schools: 1995 Income and Expenses, p. 1). This study sample represents approximately four percent (4\%) of the total United States Catholic elementary/middle schools.

Elementary school as defined for this study, is a school including any grade levels of first through eighth grades. In some cases these schools include preschool and kindergarten. Schools specifically designated as a middle school (sixth through eighth grades only) were not included in the study. Also, schools identified as only a preschool or kindergarten or designated as early childhood or nursery schools were not included in the study. Schools that included first through twelfth grades were requested to restrict their survey responses through eighth grade. These criteria are consistent with the designation of the term, elementary school, in the NCEA studies.

The survey instrument was prepared with questions designed to identify the methods of funding technology programs; the extent of technology use in the schools; any factors, in addition to funding, that are enabling technology integration; and any factors that are affecting the cost of technology in the school. Both the survey instrument and interview questions were submitted for the required approval from the Institutional
Review Board for Research Involving Human Subject (IRB). All survey and interview questions were field tested for validity and reliability by educators not involved in the study.

Gathering the Data

Administering the survey instrument.

The survey instrument was completed and approved by the Institutional Review Board (IRB) early in 1998. During February and early March 1998, the cover letter which explained the rationale of the study, the letter from the Arlington Diocese superintendent of Catholic schools which introduced and endorsed the project, and the approved survey instrument with attached informed consent were mailed to each of the seven superintendents of the Catholic school systems for review and approval before the mass mailing to the individual school principals. This is the customary approval protocol for many Catholic school systems. The cover letter requested a reply within two weeks in order to expedite mailing and return of the surveys before the end of the 1997-98 school year.

The Arlington Diocese, Richmond Diocese, and Charlotte Diocese approved the project for dissemination in their elementary schools. The superintendents of the Archdioceses of Baltimore and Washington, D.C., and the Diocese of Wilmington did not approve the project for dissemination. The superintendent of the Archdiocese of Baltimore stated in a follow-up telephone conversation that the elementary school principals were asked about participating in the survey at a general meeting and they did not want to complete the survey. The superintendent of the Archdiocese of Washington stated in a follow-up telephone conversation that the school principals were participating in several surveys and they would not be interested in participating in another survey project. The superintendent of the Diocese of Wilmington stated in a follow-up e-mail communication that the principals would not be asked to participate in the survey after considering the small size of the school system, current diocesan participation in a state drug and alcohol survey, and previous commitments made to University of Delaware doctoral students. The advance mailing and three phone communications with the
Catholic Schools Office in Raleigh failed to produce a response directly from the superintendent. As a result of these negative responses, data for this study reflect the responses from the sample of schools (Arlington Diocese, Richmond Diocese, and Charlotte Diocese) that were approved to receive the survey.

The survey was mailed to the three school systems (72 schools) on March 15, 1998. The mailing included the cover letter which explained the study’s rationale, letter of introduction and endorsement from the Arlington Diocese superintendent, the survey, and the informed consent document. The first survey was returned on March 19, 1998. Forty-eight (48) surveys representing sixty-seven percent (67%) of the total were received in the first mailing. Each survey was marked with the date when it was returned to the researcher. For those surveys not returned, a second mailing was conducted containing the survey and cover letters. The second mailing was sent on June 30, 1998. Five additional surveys were received. The last response from the second mailing was received on July 10, 1998. Responses from this second mailing were also marked with the return date when received. The combined responses totaled fifty-three (53) schools and represented seventy-four percent (74%) of all schools surveyed. A telephone follow-up for survey data was not conducted for the non-responding nineteen (19) schools since the return rate from the second mailing exceeded the general target goal of seventy percent (70%) for surveys (Questionnaire Survey Research, Suskie, 1996, p. 80).

Since literature suggests that the late respondents’ results may differ from the earlier returns, by obtaining a greater rate of return, any potential bias of the results was reduced (Suskie p. 81). For those schools that did not respond to the survey, literature suggests that the latest respondents’ results may be used to infer survey results for non-respondents (if needed). Survey researchers have shown through studies that late respondent and non-respondent results have been documented as similar (Suskie p.82). However, the data from this survey indicated that in many instances, the late respondents’ results were similar to those of the earlier respondents, therefore inferring results was not done in this study.
Organizing the survey responses.

As the responses were received, each survey was date stamped and assigned a number chronologically. The return date provided a mechanism for tracking and for identifying patterns in the responses based on late returns. Pattern identification was to be used for the purpose of inferring results for non-respondents, if necessary. However, the review of data did not suggest any pattern of responses in the late respondents or the early respondents. Schools with minimal technology integration and limited funding were in both the early and late responses, as were the schools with more extensive technology integration and higher end funding.

Individual school confidentiality was maintained throughout the study. Each school was assigned a reference number upon receipt of the completed survey. The number assigned to each school provided the necessary confidentiality in the data displays and discussions that follow. In addition, the number was used as a quick reference for tracking responses received and not received.

A spreadsheet was used to create the data recording worksheets for the individual responses. Three separate worksheets were created for each of the survey’s three sections – Technology Use and Integration, Budget and Acquisition, and Demographics. The response data were entered on each worksheet according to the assigned school number within the diocesan subheading. This recording method organized the survey results as a total of all schools and as a subtotal by diocese. Therefore, trends and outlying points both overall and by diocese could be identified.

Upon receipt of the surveys, school principals were selected for a follow-up telephone interview (Appendix B). These interviews were based upon notable responses on the surveys that represented outstanding or upper level results in any of the three survey sections. The purpose of the interviews was to elaborate on notable funding methods, technology used in the school, or factors, in addition to funding, that had enabled their outstanding technology integration and infusion. The results of these interviews have been included in the narrative summary with the data collected from the surveys.
Descriptive statistics were produced from the surveys and interviews which provide comparisons of school demography, enrollments, age of building, income level of parents, parish versus non-parish affiliation of the school, and percentage of budget designated for technology. In addition, data were compared for the purpose of revealing trends between demographics, technology use and integration, and budget and acquisitions.

The following narrative describes the data recording and tabulation methods used within each survey section. Refer to the survey instrument, Appendix A, for the text of the questions in each section.

**Data recording and tabulation for Section I “Technology Use and Integration”** (Appendix C)

For questions with “yes” or “no” responses, the numeral “1” was assigned to “yes” responses and the numeral “0” was assigned to “no” responses when entering data on the worksheet. This response identification method was used for Questions 1-3, 6, 7, part of 8, part of 9, 10, 11, 14-16, 18, 19. For questions that requested the respondents to provide a number or percentage response within a blank, actual numbers or percentages were recorded on the worksheet. This method of data recording was used for part of question 8, part of question 9, and 17. For questions 4, 5, 10, 12, and 13, response selections were represented as percentage quartiles (0-25%, 25-50%, 50-75%, 75-100%) and were identified by the respective numerals 0, 1, 2, 3, or 4. Units of time responses (once per month, twice per month, once per week, and daily) were identified by the respective numerals 1, 2, 4, or 20.

After all data were recorded, totals were listed for all “yes” responses both by individual diocese and as a combined total of all dioceses, for each “yes or no” question. Calculations were made to represent these totals as percentages of “yes” responses for each of these “yes or no” survey questions within each diocese and as a grand total of all respondents. Totals for each type of response to quartile and time questions were listed both for the individual diocese and for all dioceses combined. For questions that requested actual numbers or percentages to be written in a blank by the respondents,
charts were created to visually represent the data for the individual diocese and for the combined dioceses.

For survey questions left unanswered by a respondent, a blank space was left in the respective cell on the worksheet to indicate “no response.” If the school was among those later interviewed, the missing information was requested during the interview. If the answers were provided at that time, they were entered on the worksheet and totals or calculations were updated.

Scatter graphs and bar graphs were created to display the data collection for the number of lab computers and total classroom computers within each diocese by school (from questions 8 and 9). This graphical representation reveals the most common range for total number of computers in school labs and in classrooms within each diocese, as well as in the grand total of combined survey respondents.

A bar graph was designed to depict the percentage of students receiving training in the various skills itemized in question 3. The bar graph illustrates these data by diocese for comparative purposes. The most common skills and least common skills taught are readily visible on the graph. Another bar graph was designed to reveal the teacher uses of technology itemized in question 11 as a percentage of total school faculty by diocese. This graph provides comparisons of the types of technology used by the faculties, and reveals the most common use for technology by teachers within the responding dioceses. A third bar graph was created to reflect the percentage of faculty participation in technology staff development opportunities for each school responding and by diocese from questions 16 and 17. This depiction reveals school, diocesan, and overall use of staff development for improving teacher understanding of and use of technology.

**Data recording and tabulation for Section II “Budget and Acquisition.”**
(Appendix D)

Answers to questions 20-24 were recorded on a spreadsheet as the numerals “0” or “1” for “no” or “yes” responses as discussed for Section I. All “yes” responses were totaled for each diocese and for the combined dioceses. Calculations were made to
determine the percentage of “yes” responses for each survey question for each diocese and for the combined diocese. Percentages were determined based on only those schools responding to the question.

Frequency distribution charts for each diocese and for the combined dioceses were created for all responses to question 25. The mode and mean for the amount of funding allocated within school budgets were found for the individual dioceses and the combined dioceses.

Answers to question 26 were represented with the numerals “0,1,2,3,4 respectively for “no response,” and for each quartile category response. Totals for each level of response to each question for each diocese and for the combined dioceses were made in order to reveal the most common sources of technology acquisitions. Calculations were made to reflect the percentage of “yes” responses for each type of technology acquisition source.

Data recording and tabulation for Section III “Demographics.”
(Appendix E)

Answers to question 27 were placed on a graph and categorized by decade. The individual responses were then cross-referenced to budget question 25 and technology integration questions 8 and 9. This cross-reference revealed trends school building age and renovations as a factor of budget allocations to technology and use of computer labs and classroom computers.

Answers to questions 28-30 were coded with the numerals “0” or”1” to reflect the respondents’ choices. An affirmative choice was noted as “1” and responses not selected were noted with “0.” Selections for each category were totaled for each diocese and for the combined dioceses.

Also, two bar graphs were created to reflect income levels for the schools by diocese and for the total respondents. The most common income range for the respondents within the sample was displayed.
The graphs and collection of worksheets with totals and percentages provided a means for cross-referencing between the respondents’ income levels, types of budgetary consideration for technology, types of acquisition means for technology, and numbers of computers and levels of technology integration within the schools. Conclusions were drawn about the ability of schools to acquire technology and of faculty to integrate technology into the school program based upon the cross-references of data in the three sections.

A narrative of conclusions relative to funding methods, extent of technology integration, and other factors, that have enabled technology programs within the schools follow in Chapters III and IV. These conclusions provide the basis for recommendations for future study and highlight study implications.
Results of Technology Use and Integration Survey Questions, Section I

For the fifty-three (53) schools responding to the survey, seventy-nine percent (79%) indicated that they had a written technology plan and eighty-three percent (83%) had written technology curriculum guidelines or assessments for student use of technology. These schools indicated that the diocese or state provides their technology plans, curriculum guidelines, and assessments either entirely or in part. However, although these schools within the three diocesan systems responded positively to these two questions, the remaining schools responded that they did not have a written technology plan, or curriculum guidelines, or assessments for student use of technology. There was no known reason for this apparent lack of knowledge of a diocesan technology plan, curriculum guidelines, or assessments by approximately twenty percent (20%) of the responding schools.

Students have generally received some form of computer technology training in the responding schools. Figure 1 presents a graphical picture of
Comparison of Skills Taught by Diocese

Figure 1
each type of computer training and the percentage of schools that provided this training within each diocese. The three most common areas of training were use of hardware, use of CD-ROM, and use of software. All respondents answered this question therefore the only error existing for this survey item is human error made in the process of answering the question. Student training in the use of e-mail was the least addressed skill within all three diocesan systems. This is not a surprising result since overall, only fifteen percent (15%) of the respondents indicated that students have daily access to information technology. Table 1 illustrates the amount of time the students use information technology (Internet, e-mail, etc.) within each diocese based on percentage of respondents. These percentages are consistent with the responses reflected in Figure 1.

Seven schools indicated “other” training offered to students by writing a description of other skills in the blank area on the survey. These “other” skills are as follows: intensive preparation for the North Carolina Computer Computing Test for eighth graders, use of databases, history of the computer, societal impact of computers, ethical use of computers, use of computers in journalism, hyperstudio lessons, and programming – PC logo.

Table 1
Time Students Have Access To Information Technology Illustrated As Percentage Of Schools

<table>
<thead>
<tr>
<th>TIME WITH ACCESS</th>
<th>CHARLOTTE</th>
<th>RICHMOND</th>
<th>ARLINGTON</th>
</tr>
</thead>
<tbody>
<tr>
<td>Once per month</td>
<td>60%</td>
<td>29%</td>
<td>46%</td>
</tr>
<tr>
<td>Twice per month</td>
<td>0%</td>
<td>29%</td>
<td>15%</td>
</tr>
<tr>
<td>At least once per week</td>
<td>40%</td>
<td>6%</td>
<td>31%</td>
</tr>
<tr>
<td>Daily</td>
<td>0%</td>
<td>35%</td>
<td>8%</td>
</tr>
</tbody>
</table>
Student training in the surveyed skills spanned all the elementary grade levels of kindergarten through eighth grade. The survey responses reflected that generally, use of hardware (keyboard, mouse, printer), CD-ROM, and software was taught across all the schools’ grade levels. Training in spreadsheets, graphics design, Internet use, e-mail, and student production were skills that, if limited, tended to be limited to the intermediate and middle school levels (grades five through eight). Word processing training, in limited offerings was provided to children at the youngest grade levels, generally beginning by grade two and in some instances, was taught to children young as kindergarten age.

Although almost one hundred percent (100%) of responding schools indicated some form of student computer skills training, student use of automated catalogs in the school library accounted for only sixteen schools (30%) for all of the respondents. For the individual dioceses, percentages of schools using automated library catalogues varied as follows: Charlotte thirty percent (30%), Richmond six percent (6%), and Arlington forty-six percent (46%).

The manner in which students have access to computers varied greatly among the respondents. In eighty-nine percent (89%) of the responding schools, students had daily access to computers. The type of access varied throughout the schools in the form of schools with computer labs or classroom computers to schools with both labs and classroom computers. Figures 2 and 3 illustrate the responding schools individually and by diocese as noted in the legends. The end points for number of lab computers are 0 and 65. Two Arlington schools and one Richmond school reported no lab computers, and one Arlington school reported sixty-five (65) lab computers. The most common charted range on Figure 2 reveals that twenty-three schools (43%) indicated use of between ten and twenty lab computers in their schools. Thirteen schools (25%) indicated use of between twenty-one and thirty lab computers, eleven schools (21%) had more than thirty lab computers and four schools (8%) had less than ten lab computers. Two responding schools failed to provide the number of computers in their labs. This lack of data resulted in a four percent (4%) error overall in the results for number of computers in labs.
The types of computers, use of file servers, and connectivity to the Internet varied among the diocesan computer labs. Figure 3 illustrates the types of computers used in the school labs as a percentage of all lab
Figure 3
computers within each diocese. In the Charlotte Diocese, an almost equal distribution between the 486, Macintosh, and Power Mac existed with twenty-nine percent (29%), twenty-five percent (25%), and twenty-four percent (24%) of total lab computers respectively. While in the Richmond Diocese, forty-one percent (41%) of lab computers were Pentiums; and in the Arlington Diocese, thirty-two percent (32%) of lab computers were Pentiums and twenty-five percent (25%) were from the Apple II series. Figure 4 reveals that the Pentium computer was the most common type of computer hardware as a percentage of the combined three dioceses (29%) while the Pentium II was the least common (3%) overall. The remaining types of hardware were almost equally common.

Figure 5 illustrates the percentage of labs within each diocese networked to a file server and connected to the Internet. Within the Charlotte Diocese, sixty percent (60%) of the responding schools indicated use of labs networked to file servers and sixty-five percent (65%) of Richmond Diocesan schools reported connectivity to the Internet in their school labs.

The number and type of classroom computers used within the three diocesan school systems varied. As Figure 6 illustrates, the Charlotte Diocese had the greatest percentage (53%) of their classroom computers in the Apple II series. The Richmond Diocesan classroom computers were rather evenly distributed among the 486, 386, Apple II series, and Macintosh computers as twenty-four percent (24%), eighteen percent (18%), fourteen percent (14%), and fourteen percent (14%) respectively. In the Arlington Diocese, use of the Apple II series and 386 were most common within the classrooms and were distributed at twenty-five percent (25%) and twenty-two percent (22%) respectively. The category of “Other” on Figure 6 includes 286 and 8088 computers. Figure 7 illustrates that for the combined dioceses, the use of Apple II series computers was the most common classroom computer (46%) with the 386 as the next most common computer hardware (21%). The least common computer hardware found in classrooms was the Pentium II (1%). It is notable that the use of high-end computers was more common in computer labs than in classrooms.
Figure 4

Types of Lab Computers as Percentages of Combined Dioceses
Figure 5
Since the classroom hardware was significantly less advanced than that found within the computer labs, it not surprising that the use of file servers and the Internet within classrooms was also significantly less than within computer labs. One Charlotte school and one Richmond school used a file server for classroom computers, and five Arlington schools used a file server for classroom computers.

**Figure 6**

Types of Classroom Computers as Percentages of Total Within Each Diocese
Figure 7

Types of Classroom Computers as Percentages of Combined Dioceses

[Bar chart showing percentages of different types of computers, with Apple IIe having the highest percentage.]
These seven schools represented thirteen percent (13%) of the responding schools. Classroom Internet connectivity was found in one Charlotte school and four Arlington schools. These five schools represented two percent (2%) of the respondents.

Of these responding schools, sixty percent (60%) reported to have computers in one hundred percent (100%) of their classrooms. Fifty-seven percent (57%) had at least one computer per classroom and thirty percent (30%) had at least two computers per classroom. One Arlington school reported an average of 3.5 computers per classroom. Of the fifty-three responding schools, two schools did not respond to the question about the percent of classrooms with computers and one school did not respond to the average number of computers per classroom. This non-response represented an error of approximately three percent (3%).

In general, survey results indicated that the fifty-three responding schools provided staff development programs in technology. Forty-four (44) schools indicated that some staff development in technology was provided for teachers. This represented eighty-three percent (83%) of the respondents. However, Figure 8 illustrates a variety in the percentage of teachers who actually received staff development in technology within the schools of the three dioceses during the 1997-1998.
Comparison by Diocese of Percentages of Teachers Within Individual Schools Receiving Staff Development in Technology

Figure 8
Most teachers were reported to use computer technology for recording grades and preparing classroom materials. As Figure 9 illustrates, electronic bulletin boards were not used at all and classroom overhead presentations with LCD or LC projector computer features were used minimally. The category of “Other” represents faculty use of technology for personal use and for other forms of classroom instruction.

Ninety-two percent (92%) of all teachers in the responding schools had daily access to a computer during the school day. In addition, the schools reported that most of their teachers had access to home computers as follows: thirty-four percent (34%) of the schools reported that 75-100% of their teachers had a computer at home, thirty-two percent (32%) of the schools report 50-75% of the teachers have a computer at home, and twenty-eight percent (28%) of the schools report that 25-50% of the teachers have a computer at home. Interestingly, as illustrated in Figure 10, the respondents indicated that generally, the students had a higher percentage of home PC access than teachers.

Ninety-four percent (94%) of the respondents indicated that there was a teacher designated as a computer or technology instructor within the school. This support was present in the form of a person hired for the
Teacher Uses of Technology by Diocese

Figure 9
Figure 10
sole purpose of “technology instructor” or in the form of a classroom teacher designated as part-time support personnel for technology education. In addition to this faculty support, the respondents reported that seventy-six percent (76%) of all principals used a computer at their desk and ninety-two percent (92%) reported that they had access to a computer at home. This use of and appreciation for technology by the school principal is an important factor in the overall success of a school technology program.

Only eight schools (15%) of the total respondents reported that technology was available to parish or community members during non-school hours. Adult education for senior citizens and computer use by the parish religious education department was the primary non-school hour use by these eight schools.

Results of Budget and Acquisition Survey Questions, Section II

Ten out of fifteen Charlotte Diocesan schools responded to the survey. This represented a sixty-seven percent (67%) rate of return. Among the ten (10) responding schools, six sources for technology acquisitions listed on the survey were selected as the source used for more than twenty-five percent (25%) of acquisitions. These sources are represented in Table 2. Purchases with donated funds from parent organization fundraising represented the most common source of technology acquisitions in the Charlotte Diocese followed by technology purchases with development funds. Other sources listed in Table 2 are donations of equipment from businesses, purchases with donated funds from individuals, purchases with donated funds from annual appeals, and technology funding through school operational funds.

Within the Richmond Diocese, seventeen out of twenty-three (23) schools responded to the survey. This represented a seventy-four percent (74%) rate of return. Among the seventeen (17) responding schools of the Richmond Diocese, thirteen (13) sources of technology acquisitions represented more than twenty-five percent (25%) of the school technology acquisitions. These sources are represented on Table 3. Purchases made with school operational funds represented the funding source most commonly used for more than twenty-five percent (25%) of technology acquisitions within the Richmond Diocese. Parent organization fundraising proved the second most common means of
acquiring technology and represented more than twenty-five percent (25%) of total acquisitions in the school.

Table 2
Technology Acquisition Sources Representing Greater Than 25% of Total Acquisitions for Schools within the Charlotte Diocese

<table>
<thead>
<tr>
<th>ACQUISITION SOURCE</th>
<th>SOURCE REPRESENTED AS PERCENTAGE OF TOTAL ACQUISITIONS</th>
<th>CHARLOTTE SCHOOLS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Purchases with donated funds from parent organization fundraising</td>
<td>50-75% 75-100%</td>
<td>2</td>
</tr>
<tr>
<td>Purchases with donated funds from development funds</td>
<td>25-50% 50-75% 75-100%</td>
<td>2 1 1</td>
</tr>
<tr>
<td>Donations from businesses</td>
<td>25-50%</td>
<td>3</td>
</tr>
<tr>
<td>Purchases with donated funds from individuals</td>
<td>75-100%</td>
<td>1</td>
</tr>
<tr>
<td>Purchases with donated funds from annual appeals</td>
<td>50-75%</td>
<td>1</td>
</tr>
<tr>
<td>Purchases with school operational funds</td>
<td>25-50%</td>
<td>1</td>
</tr>
</tbody>
</table>
Table 3
Technology Acquisition Sources Representing Greater Than 25% of Total Acquisition of Schools Within the Richmond Diocese

<table>
<thead>
<tr>
<th>ACQUISITION SOURCE</th>
<th>SOURCE REPRESENTED AS PERCENTAGE OF TOTAL ACQUISITIONS</th>
<th>RICHMOND SCHOOLS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Purchases with school operational funds</td>
<td>25-50% 50-75% 75-100%</td>
<td>2 5</td>
</tr>
<tr>
<td>Purchases with donated funds from parent organization fundraising</td>
<td>25-50%</td>
<td>6</td>
</tr>
<tr>
<td>Donations of equipment from individuals</td>
<td>25-50% 50-75%</td>
<td>3 2</td>
</tr>
<tr>
<td>Donations of equipment from business</td>
<td>25-50% 50-75%</td>
<td>3 1</td>
</tr>
<tr>
<td>Purchases with donated funds from individuals</td>
<td>25-50% 50-75%</td>
<td>2 1</td>
</tr>
<tr>
<td>Purchases with donated funds from development funds</td>
<td>25-50% 50-75%</td>
<td>2 1</td>
</tr>
<tr>
<td>Donations of equipment from government</td>
<td>25-50% 50-75%</td>
<td>1 1</td>
</tr>
<tr>
<td>Purchases with donated funds from annual appeals</td>
<td>25-50% 50-75%</td>
<td>1 1</td>
</tr>
<tr>
<td>Other-non specific -technology fee</td>
<td>25-50% 75-100%</td>
<td>1 1</td>
</tr>
<tr>
<td>Donations of equipment through grocery store receipt programs</td>
<td>75-100%</td>
<td>1</td>
</tr>
<tr>
<td>Donations of equipment through business partnerships</td>
<td>25-50%</td>
<td>1</td>
</tr>
<tr>
<td>Purchases with donated funds from business</td>
<td>25-50%</td>
<td>1</td>
</tr>
<tr>
<td>Purchases with grants awarded only to the school</td>
<td>75-100%</td>
<td>1</td>
</tr>
</tbody>
</table>
The Arlington Diocesan schools returned twenty-six (26) surveys of the thirty-four (34) sent. This represented a seventy-six percent (76%) rate of return. Eleven sources of technology acquisitions represented more than twenty-five percent (25%) of acquisitions within these schools. These sources of technology acquisitions are represented on Table 4. The most common sources of technology acquisitions were identified as donations of equipment through receipt programs, followed by purchases made with funds from parent organization fundraising and donations of equipment from government sources.

The survey indicated that the most common source of technology acquisitions for the combined dioceses was purchases made with donated funds from parent organization fundraising. Twenty-five (25) schools (47% of respondents) revealed that utilizing this funding method constituted more than twenty-five percent (25%) of their total technology acquisitions. Fourteen (14) schools (26% of respondents) identified school operational funds and receipt programs as the means for acquiring more than twenty-five percent (25%) of their technology purchases. However, none of the Charlotte schools selected the receipt program category.
Table 4
Technology Acquisition Sources Representing Greater Than 25% of Total Acquisitions Within the Arlington Diocese

<table>
<thead>
<tr>
<th>ACQUISITION SOURCE</th>
<th>SOURCE REPRESENTED AS PERCENTAGE OF TOTAL ACQUISITIONS</th>
<th>ARLINGTON SCHOOLS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Donations of equipment through grocery store receipt programs</td>
<td>25-50% 50-75% 75-100%</td>
<td>6 5 2</td>
</tr>
<tr>
<td>Purchases with donated funds from parent organization fundraising</td>
<td>25-50% 50-75% 75-100%</td>
<td>5 1 6</td>
</tr>
<tr>
<td>Donations of equipment from government source</td>
<td>25-50% 50-75%</td>
<td>6 1</td>
</tr>
<tr>
<td>Donations of equipment from individuals</td>
<td>25-50% 50-75%</td>
<td>4 1</td>
</tr>
<tr>
<td>Donations of equipment from business</td>
<td>25-50% 50-75%</td>
<td>4 1</td>
</tr>
<tr>
<td>Purchases with school operational funds</td>
<td>25-50% 75-100%</td>
<td>1 3</td>
</tr>
<tr>
<td>Other – Parish subsidy -Insurance claim payment</td>
<td>25-50% 50-75%</td>
<td>1 1</td>
</tr>
<tr>
<td>Purchases with donated funds from businesses</td>
<td>25-50%</td>
<td>2</td>
</tr>
<tr>
<td>Purchases with donated funds from individuals</td>
<td>50-75%</td>
<td>1</td>
</tr>
<tr>
<td>Purchases with donated funds from development funds</td>
<td>25-50%</td>
<td>1</td>
</tr>
</tbody>
</table>
Sources of technology such as consortia networking, business partnerships, and grant awards were untapped resources by all three diocesan systems.

Although the responding schools generally relied upon donated equipment and donated funds for technology acquisitions, most schools have made some provisions within their budgets for technology needs. When asked to identify the percentage of funds allocated for technology in the school budget, many schools selected not to answer the question. Only seventy-seven percent (77%) of Arlington schools, sixty percent (60%) of Charlotte schools, and eighty-two percent (82%) of Richmond schools chose to respond to this item. The percentage range that represents technology funding provided within the total school budgets within each diocese is as follows:

<table>
<thead>
<tr>
<th>Diocese</th>
<th>Number of Schools Reporting</th>
<th>Percentage Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Charlotte</td>
<td>6 schools reporting</td>
<td>0 – 3% of school budget</td>
</tr>
<tr>
<td>Richmond</td>
<td>14 schools reporting</td>
<td>.03 – 5% of school budget</td>
</tr>
<tr>
<td>Arlington</td>
<td>20 schools reporting</td>
<td>0 – 5.5% of school budget</td>
</tr>
</tbody>
</table>

In all dioceses, the upper range shown above represents an outer end point. One Charlotte school reported the 3% allocation, one Richmond school the 5% allocation, and one Arlington school the 5.5% allocation to technology in their school budgets. The most common response (mode) for this survey item was one percent (1%). The mean response for the responding schools combined was two percent (2%).

As represented in Table 5, “computer repairs” was the most common technology budget item and “ongoing cost provisions for the technology infrastructure” was the least common technology budget item for the combined respondents. Figure 11 graphically illustrates the individual diocesan budget allocations to the various technology needs. Richmond schools led in all technology budget categories with the exception of “allocation for staff development.” Information provided by respondents revealed that the Diocese of Richmond provided staff development in technology to teachers in all schools during the 1997-98 school year. Because this budget item had significant diocesan support, individual schools did not need to budget for staff development in technology. This is consistent with the survey item in section one, “Technology and Use,”
that indicated that sixty-five percent (65%) of the Richmond schools provided staff
development in technology to one hundred percent (100%) of their teachers (see Figure 8).

Table 5
Percentage of Schools within Each Diocese that Provide Budgets for Specific Technology Needs

<table>
<thead>
<tr>
<th>BUDGET ITEM</th>
<th>CHARLOTTE</th>
<th>RICHMOND</th>
<th>ARLINGTON</th>
<th>OVERALL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Computer support personnel</td>
<td>70%</td>
<td>76%</td>
<td>65%</td>
<td>70%</td>
</tr>
<tr>
<td>Computer repairs</td>
<td>80%</td>
<td>88%</td>
<td>81%</td>
<td>83%</td>
</tr>
<tr>
<td>Replacement, additions, and upgrades</td>
<td>40%</td>
<td>88%</td>
<td>58%</td>
<td>64%</td>
</tr>
<tr>
<td>Ongoing infrastructure costs</td>
<td>20%</td>
<td>76%</td>
<td>38%</td>
<td>25%</td>
</tr>
<tr>
<td>Staff development</td>
<td>90%</td>
<td>82%</td>
<td>62%</td>
<td>74%</td>
</tr>
</tbody>
</table>
Figure 11

Percentage of Schools Within Each Diocese to Provide Budgets for Specific Technology Needs

- Support Personnel
- Repairs
- Replacement, Additions, Upgrades
- Infrastructure
- Staff Development

[Bar chart showing the percentage of schools within each diocese for different categories of technology needs]

Figure 11
Results of Demographics Survey Questions, Section III

Survey responses indicated that the ages of the school buildings varied among the dioceses. In the Charlotte Diocese, the average age of the school building was thirty-eight (38) years; in Richmond the average age was forty-seven (47) years; and in the Arlington Diocese, twenty-eight (28) years. As could be expected, greatest number of combined schools for the study were built in the 1950s during the baby-boom era when both the Charlotte and Arlington Diocesan areas were expanding. Although the building ages varied among these fifty-three schools, as Figure 12 illustrates, the bulk of renovations have occurred throughout the three dioceses within the 1990s.

The types of areas served by the three participating dioceses were consistent with the ages of the buildings. The Charlotte Diocese respondents classified their schools as fifty percent (50%) urban and fifty percent (50%) suburban. The slightly older buildings of the Richmond Diocese were reflected in a higher percent (53%) of urban classified schools. In addition, the Richmond respondents reported forty-one percent (41%) and six percent (6%) of their schools as suburban and rural respectively. The newer buildings of the Arlington Diocese were reflected
Comparison of School Building Dates and Last Renovations Within the Dioceses

Figure 12
in their higher percentage (65%) of suburban classified schools, while the percent of urban classification schools was much lower (19%). Fifteen percent (15%) of the Arlington Diocesan schools classified themselves as rural. The overall area classification of the study resulted in thirty-six percent (36%) urban, fifty-five percent (55%) suburban, and six percent (6%) rural (note: the Arlington Diocese geographical area incorporates the Northern Virginia area south to the Colonial Beach vicinity and west to the Luray/Strasburg vicinity. Schools are located south to Fredericksburg and west to Culpeper and Winchester).

The greatest percent (74%) of respondents indicated that their school was parish-affiliated. Only nineteen percent (19%) were inter-parish and six percent (6%) were independent. This concentration of parish schools was common in all three dioceses within the study.

The most common average family annual income ranges for the three dioceses were similar. Both the Charlotte and Arlington Dioceses reported that fifty percent (50%) of their schools’ average family annual incomes were $50,000-$75,000. The Richmond Diocese respondents indicated that forty-seven percent (47%) of the schools’ average family annual incomes were $25,000-$50,000 and forty-one percent (41%) were $50,000-$75,000. Figure 13 illustrates this income distribution within the study.
Figure 13

Family Average Income Levels of Schools Within Each Diocese
Outstanding Examples Revealed by Survey Results

Nineteen of the fifty-three responding schools were selected as notable examples. Selection of these notable schools was based upon comparison of the schools within their own diocesan systems. Notable schools were identified as follows: (1) by having one or more superior characteristics of technology infusion, integration, or funding in comparison to its diocesan counterparts when the data were reviewed on the spreadsheets, or (2) the number and use of lab and/or classroom computers was above the diocesan average, or (3) the integration of technology was high in relationship to the school’s average family income level.

Within the Charlotte Diocese, five schools were particularly outstanding among Charlotte respondents for their level of technology integration or infusion as compared to their counterparts in the Charlotte Diocese. Three schools emerged as leaders in the use of both lab and classroom computers, one school was particularly notable in its student, faculty, and community use of technology, and one other school was notable in its overall success with technology use in spite of modest financial resources and facility.

School 16 indicated that students have daily access to computers. Currently seventy-five percent (75%) of the total classrooms were reported to have 386 or 486 computers and by next year every class will have at least one computer connected to a file server. In addition, the lab contained thirty-one (31) networked 486 computers with Internet connectivity expected by fall 1998. All students in this middle school were receiving routine computer training in all surveyed areas with the exception of graphics design, e-mail, and student production, and the library uses automated catalogs. School 16 is an independent school built in 1954 and was last renovated in 1998. It is located in an urban area with modest average family incomes of $25,000-$50,000 and generally relied on business equipment donations, development funds, and school operational funds for technology acquisitions. Staff development, computer repairs, and upgrades were provided within the school budget. At the time of the survey, the teachers were primarily using computers for recording grades and only 25-50% of faculty had access to home PCs. However, ninety-five percent (95%) of the school’s teachers received staff
development training in technology in 1997-98. The principal identified these programs for faculty and indicated regular use of computer at school and home.

School 39 located in the Charlotte Diocese serves students from kindergarten through fifth grade. Students were reported to have daily access to the computers. Currently one hundred percent (100%) of the classrooms have at least one Pentium computer networked to a file server, and a computer lab with twenty-seven (27) 486 computers and three (3) Pentium computers networked to a file server with Internet connectivity expected in 1998-99. The students were routinely receiving training in all surveyed areas with the exception of e-mail. School 39 is an urban inter-parish school built in 1932 and did not report any major renovations. The school’s average family income level was indicated as $75,000-$100,000, and may be its reason for relying heavily upon parent organization fundraising and annual appeals for acquiring technology. However, the school budget did provide for computer repairs, upgrades, and staff development. Although only 25-50% of teachers had computers at home, they regularly used computers for recording grades and preparing classroom materials. This faculty comfort with technology was hastened by technology staff development training to 100% of the teachers in 1997-98. The principal indicated regular use of computer at school and at home, and held himself/herself responsible for identifying and providing staff development programs in technology for the teachers.

School 42 located in the Charlotte Diocese provided daily computer access to students in kindergarten through eighth grade. A dual platform approach to technology was evident in this school. All classrooms had at least one computer. Sixty-seven percent (67%) of classroom computers were Pentiums and the remaining thirty-three percent (33%) were in the Apple II series. The lab was comprised of seventeen (17) Macintosh and ten (10) Power Mac computers. The lab computers were being networked and will be connected to the Internet in 1998-99. In addition, the school library was automated. All students received computer training in use of hardware, CD-ROM, use of software, and word processing. Currently only students in grades four through eight receive training in use of spreadsheets and student production. When the Internet connectivity is completed in 1998-99, Internet and e-mail use will be introduced. This suburban parish-affiliated
school was built in 1953 and was last renovated in 1996. The average family incomes were $50,000-$75,000, and 75-100% of technology acquisitions were made with parent organization fundraising, with the remaining needs provided by equipment donations from several business organizations. The school budget provided for support personnel, computer repairs, and staff development in technology. The principal acknowledged the slow process of the teachers’ familiarity with technology, however one hundred percent (100%) of the teachers have received staff development training in technology in 1997-98, they have daily school access to computers, and 75-100% of the teachers have personal PCs located in their homes. The school principal regularly used a computer both at school and home, and identified technology staff development opportunities for teachers.

School 45 had notable use of technology in the Charlotte Diocese for its widespread infusion of technology throughout the curriculum and regular use of computers by faculty. Although the classrooms only contained Apple II computers, this school has facilitated greater technology integration by using eight (8) Powerbook laptops from the lab on rolling carts. The computer lab contained twenty-three (23) Macintosh and three (3) Power Macs in addition to the eight (8) Powerbook laptops. The lab has Internet connectivity and the entire school was wired for future networking. Students in kindergarten through eighth grade received computer training in all the surveyed areas including additional instruction in the history of computers, societal impact of computers, and ethical use of technology. Teachers used technology for recording grades, preparing classroom materials, accessing the Internet for instructional materials, overhead presentations, and as a general instructional tool. For those teachers without computer access at home, the principal permitted the teachers to take laptop PCs home on an overnight basis. The principal indicated regular use of computer at school and home, and has provided staff development in technology to 100% of the faculty in 1997-98. This urban parish-affiliated school was built in 1954 and last renovated in 1997. It has average family incomes ranging from $50,000-$100,000 and has relied on parent organization fundraising (50-75%) and donations of equipment from businesses (less than 25%) for most of the technology acquisitions, upgrades, ongoing costs of the infrastructure, and
staff development. The school budget provided for computer support personnel and repairs. The principal indicated that as requested, parish and community groups were permitted to use the school computers.

School 28 is a parish-affiliated school built in 1942 and had no major renovations. It was notable for its infusion of technology into the curriculum and use of technology by faculty in view of a modest average family income base of $25,000-$50,000. Students had daily access to computers through a computer lab of seven (7) 486 and four (4) Pentium computers. The lab computers were networked and had Internet connectivity. In addition 100% of the classrooms had at least one computer. Students in kindergarten through eighth grade routinely received computer training in all surveyed areas with the exception of e-mail. The teachers regularly used the computers for recording grades, preparing classroom materials, and accessing the Internet for instructional materials. Although only 25-50% of the faculty members had computers in their homes, one hundred percent (100%) of the teachers received staff development in technology and had daily access to computers at school. As with the previous examples, the principal regularly used a computer both at school and home, and identified training programs for the teachers. All technology acquisitions, repairs, and upgrades were made through parent organization fundraising, and the school budget only provided for computer support personnel and staff development.

Within the Richmond Diocese, seven (7) schools reported notable accomplishments through their surveys and interviews. The following notable features within these schools were the number of lab and classroom computers with high levels of technology integration/infusion, involvement of parish or community groups with technology during non-school hours, and sources of technology funding. As noted in the data reporting section, staff development of teachers within the schools was at a high level in the Richmond Diocese since opportunities were provided from the diocesan office for everyone. In addition, an interview with a Richmond Diocese principal revealed that the diocese also mandated at least one percent (1%) of school budgets to be designated for technology. Since these two areas are generally common for all Richmond
Schools, they will not be addressed for the examples to follow unless particularly outstanding above the diocesan norm.

School 7, built in 1949 and last renovated in 1990, is a parish-affiliated suburban school with average family annual incomes of $50,000-$75,000. It was notable for several areas on the survey. Although this school had an average number of computers [twelve (12) 486s in the lab connected to the Internet, and twelve (12) various models in the classrooms] in the school, the music room had five (5) 486s with midi sound capability and piano keyboards for music class instruction. Although the level and number of computers was modest, School 7 routinely integrated all the surveyed student training areas into the curriculum, and teachers used computers for preparing classroom materials, accessing the Internet for instructional materials, research, and personal work. In addition, parish or community members made use of the computer lab during after-school hours.

School 10, built in 1964 and last renovated in 1998, is a suburban parish-affiliated school with average family incomes of $25,000-$50,000. This school was notable for its numerous computers in the school and the funding source of its technology acquisitions. School 10 has fifty-eight (58) Pentium computers in its networked lab and 100% of the classrooms have an average of two computers (26% 486s, 24% Pentium, 42% Macintosh, and 8% other). However, Internet connectivity was not in the school at this time. All other areas, other than Internet related activities, were taught routinely to students in kindergarten through eighth grade. Their greatest funding source for technology acquisitions was from parish financial support.

School 13, built in 1966 and last renovated in 1996 is an urban parish-affiliated school with average family incomes of $25,000-$50,000. This school provided training to students in all the surveyed areas in addition to applications technology in journalism. This school’s lab had fourteen (14) Internet connected Pentium computers. Networking was expected by May 1998. School 13 also offered senior citizens training workshops during non-school hours in the computer lab. The major sources of technology acquisitions were purchases with donated funds from individuals and development funds.
School 24, built in 1923 and last renovated in 1995 is an urban parish-affiliated school with average family incomes of $50,000-$75,000. This school trained students in all technology applications with the exception of the Internet. The lab was most notable with fourteen (14) Pentiums, eleven (11) 486s, and seven (7) other models. In a telephone contact, the technology coordinator stated that “seventy-five (75%) of the school’s matching grants were received from the IBM Corporation.” This grant also represented seventy-five percent (75%) of all computer hardware funding for School 24.

School 33, built in 1956 and last renovated in 1995, is a suburban parish-affiliated school with average family incomes of $25,000-$50,000. This school had thirty (30) Pentium computers in the lab with fifteen networked and connected to the Internet. In addition, all classrooms had at least one computer (although this inventory ranged from Apple II to Pentium). Student training varied according to grade level. This school was notable primarily for its source of technology acquisitions from capital improvement fund money in the school budget. Each school family pays a $75 technology fee that is used to replenish the capital improvement fund. The principal stated that the computer lab equipment was purchased with this CIF money.

School 34, built in 1890 and last renovated in 1960, is a suburban inter-parish school with average family incomes of $50,000-$75,000. This school was notable for similar reasons as School 33. At present, School 34 does not have networking or Internet connectivity in its lab or classrooms. However, the lab does contain eighteen (18) Pentium IIs, one (1) Pentium, two (2) 486s, and ten (10) 386s. All classrooms had at least one computer of 386 capability or above, and the school library was automated. This was the only automated school library among the Richmond respondents. School 34 paid for its technology acquisitions through technology fees as did School 33.

School 50, built in 1916 and last renovated in 1998, is a parish-affiliated school with average family incomes of $50,000-$75,000. Although this school did not have any Pentium computers, the lab contained twenty-five (25) Internet connected and networked 486s. In addition, all classrooms had at least two 486s. All student technology training was provided with the exception of e-mail. In addition, students received hyperstudio lessons. The lab was made available to parish or community members upon request.
Within the Arlington Diocese, seven (7) schools were notable when compared to all Arlington respondents for the number and quality of lab computers or classroom computers, level of technology integration/infusion, non-school hour use of the computers, or source of technology acquisition. Forty-six percent (46%) of Arlington Diocese respondents had automated libraries, however not all of the following notable schools had automated libraries.

School 6, built in 1954 and last renovated in 1964, is an urban inter-parish school with average family incomes of $50,000-$75,000. This school had twenty (20) Internet connected networked Pentium computers in its lab. Students were trained in all uses of the computer with the exception of e-mail. In addition, students in sixth through eighth grades learned to use databases. During non-school hours, free evening classes in word processing were offered to parish and community members. In a telephone interview that principal stated that “the technology committee agreed that parish and community use of the lab equipment would be a condition of dispersing the fundraising and development funds necessary for purchasing the twenty Pentium lab computers.” Three to five percent of the school budget was allocated to technology, however technology acquisitions were made primarily with grocery receipt programs, parent organization fundraising, and development funds.

School 15, built in 1969 and last renovated in 1995, is a suburban parish-affiliated school with average family incomes greater than $100,000. This school was notable for the thirty-five (35) networked Pentium computers in its lab. The school library was automated, but Internet was not present in the school at the time of the survey. No funds were allocated for technology in the school budget, however the lab was acquired with parent organization fundraising, software was acquired through receipt programs, and the various capacity classroom computers (Apple II- Pentium) were equipment donations from businesses and government.

School 22, built in 1957 and last renovated in 1997, is a rural parish- affiliated school with average family incomes of $25,000-$50,000. This school was notable for its full training program across grade levels through its lab and classroom computers. The lab contained twenty-six (26) Pentium and fourteen (14) 486 computers all networked
and connected to the Internet. All classrooms had at least two 486 computers. In addition, one hundred percent (100%) of teachers received staff development training in technology and the lab computers were available to parish or community members during non-school hours for classes in basic computer operation, word processing, and spreadsheets. In a telephone interview, the principal stated that “the twenty-six (26) Pentium computers were acquired with funds from a water damage insurance claim filed on the loss of the Apple IIE lab computers due to flooding.” The remaining technology was acquired primarily through equipment donations from a local government source.

School 26, built in 1981 and last renovated in 1996, is a suburban parish-affiliated school with average family incomes of $25,000-$50,000. This school was notable for its lab and classroom computers, and student training in technology. The lab contained twenty-one (21) Power Macs, nine (9) Macintosh, and thirty-five (35) Apple II computers. Some of the computers were networked and connected to the Internet. The classrooms had at least one computer (30% Power Macs, 13% Macintosh, 49% Apple II, and 8% 386s), and the school library was automated. School 26 indicated that up to seventy-five percent (75%) of its technology acquisitions came from grocery receipt programs.

School 32, built in 1951 and last renovated in 1997, is a parish-affiliated school with average family incomes of $50,000-$75,000. This school was notable, primarily for both lab and classroom computers networked and connected to the Internet. The lab contained fourteen (14) 486s and ten (10) Pentiums. All classrooms had at least one computer (386-Pentium). Students received training in all surveyed areas with the exception of graphics design. School 32 has relied on equipment donations from businesses and government, funds from the parent organization fundraising, and a local block grant entitlement for its technology acquisitions.

School 48, built in 1945 and last renovated in 1960, is an urban parish-affiliated school with average family incomes of $25,000-$50,000. This school was notable for the computer lab of twenty-four (24) Pentiums networked and connected to the Internet. The survey indicated that the lab was acquired in 1998 through funds provided entirely from a parish subsidy.
School 53, built in 1958 and last renovated in 1985, is a suburban parish-affiliated school with average family incomes of $50,000-$75,000. This school was most notable for the quality of computers in its classrooms. Seventy-eight percent (78%) of the classrooms had at least one Pentium computer. Technology acquisitions were made primarily through receipt programs, followed by parent organization fundraising.

These nineteen notable schools represent a cross-section of parish, inter-parish, and independent schools consistent with the representative percentages in the overall survey respondents. Total respondents represent seventy-five percent (75%) parish, nineteen percent (19%) inter-parish, and six percent (6%) independent schools. The notable schools are seventy-eight percent (78%) parish, sixteen percent (16%) inter-parish, and five percent (5%) independent. Generally, all types of schools have made equal commitments to technology acquisition and integration, however one advantage in the notable schools was a generous parish subsidy for School 48. This one school appeared to the only case of a noted advantage to being a parish-affiliated school.

Conclusions and suggestions for future research that are based on the data and notable examples provided in this section, are discussed in Chapter IV. Although some variety in type and number of computers, integration of technology with students, faculty staff development programs in technology, and sources of technology acquisitions exists in the examples previously discussed, one area remained relatively constant throughout the examples – the principal’s personal use of technology. In only two of the above examples did the principal indicate lack of involvement with technology both at home and at school; in both of these cases, another assertive force for technology acquisitions – pastor and technology teacher – provided the catalyst for action. However, in both of these examples, the response for teachers receiving staff development in technology was the least for any of the eighteen examples discussed (50% and unknown were the two responses provided). Conclusions and implications of these findings, as well as recommendations for Catholic elementary schools, continue in Chapter IV.