

## **CHAPTER IV**

### **CONCLUSIONS, IMPLICATIONS, AND RECOMMENDATIONS FOR FURTHER STUDY**

Survey results from the participating schools indicated that generally the diocesan systems are providing guidance in the area of technology plans and written technology curriculum guidelines or assessments of student use of technology. The participating three dioceses have provided system-wide plans and guidelines, have assisted with individual school plans, or have used the state provided guidelines. As noted in Chapter III, several schools in the three systems were unaware of the technology plans or guidelines. This is an area of communication that needs to be addressed by the three diocesan systems in order to assure that schools are following an approved logical and sequential technology plan with appropriate student assessments. However, review of various diocesan and school plans and a study of the emphasis within these plans is an area that merits further study.

The three diocesan systems are generally teaching basic computer training in use of hardware, use of software, and word processing. However, the number of schools providing training in other specific applications such as spreadsheets, graphics design, Internet use, e-mail, and student production (research reports, multimedia, etc.) was progressively less for each application listed.

The lower percentage of schools teaching Internet use and e-mail was primarily due to the lack of Internet access to the number of computers required for full classroom instruction. As noted in Chapter III, the types of computers generally located in the classrooms were of a lower grade (Apple II, 386, 486) than those located in the labs (486, Pentium, and Pentium II). As a result, networking and Internet connectivity were rare in the classrooms.

Survey results were quite different for lab computers, however. Apparently, most of the recent funding efforts in the three dioceses have been focused on development of better lab equipment as evidenced by the dominance of 486s and Pentiums. As expected, networking to servers and Internet connectivity were more

common in the labs than in the classrooms where the hardware can support the applications.

However, data regarding classroom and lab computers revealed an area of concern relative to most of the Catholic schools surveyed (as well as those not surveyed) – obsolescence of hardware due to the year 2000 (Y2K). During the review of the data in Chapter III a high percentage of outdated hardware was located in the responding schools. This outdated equipment has been retained in many schools for over ten years or was donated by individuals, businesses, and government when individuals, companies and the government upgraded their hardware. A serious concern for all these schools should be the effect of the year 2000 (Y2K) on this outdated PC equipment and software. **Only the newer Pentium equipment with the four-digit year provision will operate beginning January 1, 2000.** All other outdated PC equipment with internal mechanisms based on a two-digit year will cease to operate. Schools with labs, networks, and classroom computers containing this outdated equipment will face immediate replacement expenses. These schools are advised to begin immediate attention to this inevitable need by having their hardware professionally assessed for the Y2K crash, reassessing planned upgrading versus purchasing new equipment, and appropriately budgeting for these replacement requirements. Since a significant percentage of the equipment identified in this survey will be affected by Y2K, study of the effects of Y2K on these Catholic elementary schools is an area that merits further research.

Forty-seven percent (47%) of the respondents indicated that 75-100% of the students had access to home computers. This compares with thirty-four percent (34%) of the respondents reporting that 75-100% of their teachers had access to home computers. Speculation can be made as to the reasons for this disparity; income level of Catholic elementary school teachers versus ability to purchase home computers, less interest in technology by teachers than by parents in the business community represented by school families, less perceived need at home by teachers than by school families, or teacher use of school computer in lieu of home computer. Discussion about the basis of this disparity requires further study. However, the fact that teachers generally had less access to computers at home than students gives a

reason for teacher reluctance or inability to infuse computer use into daily lessons or for record keeping and lesson plans. If teachers are unfamiliar and uncomfortable with technology, they will not be seen using it as an effective teaching tool.

The use of automated library catalogs was more common in the Arlington Diocese than in the other responding dioceses. Arlington reported that forty-six percent (46%) of their school libraries were automated compared to thirty percent (30%) in Charlotte and six percent (6%) in Richmond. The reason behind this disparity is unknown and would be an area to explore for further study of school technology integration.

Students generally had some computer access during the day. However, the classroom computers were usually a lesser grade than those located in the labs and were also few in numbers (the typical classroom has only one computer). Therefore, the type of technology integration within the curriculum will be dependent upon lessons that can incorporate using the one computer (usually of Apple II, 386, or 486 capacity) or will be dependent upon the availability of the better lab computers for specific scheduled lessons. A few schools indicated the use of the LCD panel or LC projector for one computer classroom teaching in cases where the capacity of the computer was sufficient (486 and Pentium) for running more advanced software applications. However, a far more common and almost useless application, was the one stand-alone computer in the back of the classroom used as a “technology center” for students to access according to their scheduled times. Although the respondents indicated that in eighty-nine percent (89%) of their schools, students had daily access to computers, the quality and success of technology integration within these schools is an area that merits further study.

An area not addressed previously is the use of printers in the schools. Since all respondents indicated that there were sufficient printers to be utilized and shared within their schools, this surveyed area reflected adequate use of printer technology. Although the quality of the printers varied according to the level of computer hardware, schools that reported a large number of Apple II computers appeared to have equal access to printers as did schools with high-end technology.

Although the percentages for principal’s use of computer at school (76%) and at home (92%) are high, it is doubtful that significant improvements will occur in teacher

technology staff development programs, teacher uses of technology, and technology budget allocations until both percentages are closer to one hundred percent (100%). The principal is the figure of leadership in curriculum development and staff development. Until the principal recognizes the importance of technology as an instructional tool and as an integral part of the student's academic and social development, there will be little motivation for teachers to improve their abilities to use and integrate technology in their personal and professional lives.

As noted in Chapter III, diocesan support of technology is an important component in improvements to technology integration and infusion. Richmond principals reported that the technology advocacy position taken by the diocese in providing technology staff development training to all teachers in 1997-98 and mandating that a modest one percent (1%) of all school budgets be allocated to technology needs, has been instrumental in motivating teachers and principals toward a greater emphasis on technology as an educational and professional tool. The Arlington Diocese Office of Catholic Schools reported that in June 1997 they provided a week-long summer workshop for 263 teachers (34% of 766 total elementary/middle school teachers in the diocese). This is the third year this form of teacher technology training has been offered. Although these limited training sessions did not reach all teachers within the diocese, the Arlington Diocese has demonstrated its advocacy of technology by providing this support to the local schools. Both of these diocesan initiatives are modest, however, many dioceses do not mandate or provide any support to their schools.

Current management philosophies advise and recognize lateral and "the inverted pyramid" channels of authority and influence, however, as with any major change, it is critical that the top authorities be advocates of the change, or the reins of progress will be held in place. It is the top authorities - diocese, pastor, and principal - who have the power to influence change. They establish the policies, plans, curricula, and budgets. The lack of participation or lack of interest by principals and Catholic Schools Office leadership in the four non-participating school systems causes this researcher concern over the level of emphasis and priority placed on technology in these systems. Their

data would have provided a more complete study of neighboring Catholic school systems in the middle Atlantic states, which would have been beneficial to all.

For those schools that have established budgets for technology, greater attention needs to be placed on infrastructure costs, replacements, additions, and upgrades. The general rule for technology obsolescence cited in the technology industry has been – upgrade every four years. As technological advances increase at an ever-greater rate, this obsolescence rule is subject to an even shorter term. For those schools currently without budgets for technology needs, some budgetary allocation must be considered for this costly area. Although parental support for technology is critical, dependence on parent organization fundraising for all technology requirements is unwise since fundraising income varies from year to year. **Fundraising should be used as a supplement to the technology budget, not as a substitute for a technology budget.**

As Chapter III revealed, the responding schools have not identified any large grants, consortia networks, or significant business partnerships to support technology acquisitions. These areas accounted for minimal support (in the 0-25% range) when checked by the respondents. After some discussion with several principals, the researcher found that most of the minimal grant funds are received through the government title programs identified in Chapter I. Further study is required in order to identify reasons why consortia networking and business partnerships have not produced more opportunities for the responding schools. The dioceses, pastors, and principals must invest the time to identify businesses and corporations sympathetic to Catholic education. Although *The Catholic Funding Guide* is available for identifying funding and grants within the Catholic community, it is not specific to the area of Catholic education.

Several principals indicated that wiring, school networks, and Internet connectivity progress have been put on hold pending notification regarding their E-Rate grant applications made in spring 1998. Additional study will be useful after the E-Rate applications receive action in order to note any shift in emphasis within technology funding to the grant category.

Demographics did not factor significantly into the success of schools to obtain technology and to integrate technology. Some of the oldest and least affluent schools

were notable in their survey reports. The Arlington Diocese with the greatest average family incomes and newer schools did not lead in overall level of lab or classroom hardware, lab networking and Internet connectivity, staff development, or technology budgets. Further study is required to identify the reasons behind this finding. However, one speculation is that limited cash flow in affluent northern Virginia families caused by large mortgages may be one factor influencing this finding, as well as a more a conservative approach in the Arlington Diocese leadership.

Several articles have been published that support the findings of Chapter III and the conclusions in this final chapter. In *Catholic Education: A Journal of Inquiry and Practice, I(1)*, (1997) Sr. Angela Ann Zukowski states in her article, “New Learning Paradigms for Catholic Education,” that “if the current situation of most of our Catholic schools is any prediction of the future, a significant number of our schools will be in deep trouble” by the year 2015. (p. 52) She expresses concern about inadequate growth in modernizing Catholic school environments to meet the 21<sup>st</sup> century paradigm and identifies administration as a major weakness in this Catholic school technology growth – “if the administration inspires imagination, courage, and commitment, Catholic educators can transcend their doubts and fears to achieve extraordinary levels of personal and professional fulfillment with the new infomedia technologies within their learning environment” (1997, p.52). Sr. Zukowski concludes that it is hesitancy toward technology through resistance to change or fear that currently prohibits Catholic schools from accepting the “new paradigm shift in Catholic education” (p.52).

This view is challenged in *Catholic Education: A Journal of Inquiry and Practice, I(4)* by Sr. Mary Catherine Antczak in her article, “New Paradigms and Unchanging Purposes of Catholic Schools: A Response to Sr. Angela Ann Zukowski” (1998). Sr. Antczak states that it is not “resistance, doubt, and fear of technology, but instead, inadequate funding is the major reason many schools do not have more advanced technology or more extensive and effective technology education for teachers” (1998, p. 459). She agrees with Sr. Zukowski that “there is no question that the presence of technology and the pace and extent of change are slower in some places than others; however funding, and not teacher resistance, is the most significant obstacle to the desired change”

(1998, p, 459).

Both of these views and the findings of this study are supported in another article, “A Sabbatical View of Educational Technology” by Margaret E. Curran in *Catholic Education: A Journal of Inquiry and Practice, I(4)*. Dr. Curran took a three-month sabbatical from her principalship in the Diocese of Orlando to visit twenty-four schools in ten states for the purpose of identifying how to successfully integrate technology into her school program. She states that “limited funding and other priorities had resulted in our school’s being considerably behind in the area of technology” (1998, p. 445).

During her sabbatical throughout the United States, Dr. Curran found many of the same technology concerns and issues that surfaced in this study: “Few schools were engaging in technology education – teaching about technology; how it works; how it can be manipulated; and how it influences our lives. Almost all [schools] were using Apples or Macs as their computer of choice...a few of the schools with the most limited economic resources were still using their Apple IIe’s effectively not only for drill and practice of basic skills and word processing, but also for enhancement of science and social studies curricula” (1998, p. 446). Dr. Curran noted that a number of schools were using the Internet and were utilizing internal networking systems, however she observed that “most of the Catholic schools visited still had their computers centrally located in labs. A few had moved older machines into classrooms and placed banks of more powerful, faster computers in the media center” (1998, p.447). The schools with network wiring had taken advantage of grants, business partnerships, and parents for funding and labor.

As a result of her sabbatical, Dr. Curran identified four “key elements of successful programs” that have also been identified within this study. These key elements were as follows: (1) “The single most important factor was inspired leadership. Often this leader was the principal. In some of the schools that were successful, the principal had limited knowledge of technology but had made it a priority for the school” (1998, p.448). (2) “Having a written technology plan was also of major importance. Technology plans which stressed educational outcomes and pedagogical objectives, rather than the mere purchase of equipment, appeared to be most successful”

(1998, p.449). (3) “Another common denominator of successful programs was appropriate teacher training. Teachers must not be allowed to feel that they have been left helplessly behind in the use of technology” (S. Brooks 1997 as cited in Curran 1998, p.447). As part of this commitment, Dr. Curran recognizes the technology budget allocation to staff development as a critical component to the success of a technology program. She references DeZarn (1997), who suggests that “30% or more of a technology budget should be allocated to staff development” (1998, p.449). (4) Dr. Curran’s last key element observed in her sabbatical, was that “the very best programs I saw had invested a substantial amount of economic resources in technology. In some cases the money had come from the parish community. On the other hand, many schools had funded their technology programs through grants and suffered no losses to other line items” (1998, p. 450).

The basic model technology program formulated by Dr. Curran is supported by this study as evidenced in Chapter III. Dr. Curran’s model program would include the following: (1) A hired technology coordinator, (2) a technology plan, (3) no computer lab or computer classes, but classrooms with a minimum of five computers for technology to be used as part of the daily routine, (4) provision during the day for teacher exploration of hardware and software, (5) instead of a desk, each teacher to have a teacher workstation, (6) internal e-mail system throughout the school, (7) advanced media center with fully automated catalog system connected to the local public library as well as to the state university system, (8) media literacy woven throughout the curricula, (9) video production studio, and (10) distance learning usage (1998, pp. 453-455).

None of the schools surveyed in this study have utilized all these criteria. Although the technology exists, Catholic schools are not advancing into the 21<sup>st</sup> century at the rate necessary in order to provide students with the tools needed for their future. Although some schools with outdated hardware indicate that they are fully utilizing the equipment to its potential, this level of technology is not sufficient. Thrift and resourcefulness are often areas for commendation in Catholic education. When schools cite their thrift and resourcefulness in using outdated hardware at the expense of advancement to current and necessary technology, this commendation becomes a point

of condemnation. This misplaced pride in thrift and resourcefulness, and satisfaction with the *status quo* is clearly stated in Curran's article, "In almost all the schools I visited, the basic philosophy with respect to older, more limited use computers was, 'They will always do what we bought them to do. If money becomes available, we will buy newer machines with different purposes in mind.' In true Catholic-school spirit, they were not frustrated by what they did not have, but were striving to make the best use of what they did have" (1998, p.446). Perhaps admitting frustration is necessary in order to propel Catholic schools into action.

Five major recommendations for Catholic elementary schools have emerged from this study. These recommendations are suited for Catholic education in general, and should not be limited to those schools participating in this study.

The first and most immediate concern for Catholic schools should be the Y2K hardware obsolescence. Much of the equipment currently used in classrooms, labs, and for administrative records will no longer function on January 1, 2000. A planned examination of all school computer hardware by a knowledgeable technology professional is recommended in order to determine if the equipment is Y2K operational. This examination process could be centralized by the diocesan office or initiated by the individual schools. In some cases, only a new Pentium chip may be required. However, this study suggests that there will be many more instances requiring costly new hardware.

This immediate need for new hardware in the year 2000 underlines the second recommendation – collective hardware purchasing by Catholic schools within a diocese or as a member of a local consortia. Catholic schools within this study did not indicate that collective purchasing was conducted either on a diocesan or consortia level. Bulk purchases of hardware will usually lower the hardware cost from the supplier, as well as the shipping cost. A higher-grade product could be purchased for a lower cost if the Catholic schools would initiate organized purchasing in this manner within their diocese, and if they would identify and take advantage of consortia within the business and education community.

In order to improve the hardware in Catholic schools, necessary funding is required. The third recommendation for Catholic elementary schools is to maximize

external funding. This study revealed that the schools generally use parent organization fundraising, operational funds, and grocery store receipt redemption for equipment purchases. Fundraising, operational funds, and grocery store receipts will not provide the adequate funds for major technology purchases and upgrades. External funding must be identified through federal and corporate grants, business contacts and partnerships, and local consortia.

Catholic elementary schools are recommended to utilize the help of a school grant committee comprised of parents or other community members who either have expertise in obtaining grants or who have an interest in working in this area in order to maximize the school's grant-seeking success. In addition, Catholic elementary schools must seek a better understanding of federal funding opportunities and create a better liaison with local federal funding representatives (LEAs) by either appointing this responsibility within the individual schools or centralizing it within the diocesan office.

Additionally, schools are recommended to make better use of contacts with corporations and local businesses that support Catholic education. Either the pastor, principal, assistant principal, or other designated person should be responsible for identifying and developing potential friends of Catholic education within the corporate and business community.

Local consortia must be identified or initiated. Contact with adjacent local public and private elementary, middle schools, high schools, universities, libraries, and businesses may reveal technology purchasing or grant opportunities. Responsibility for identifying or initiating consortia may be that of the local school or diocesan office.

The fourth recommendation for Catholic elementary schools is to improve opportunities for quality technology staff development. Funds should be placed in the budget for this need. The teachers' educational process must be ongoing. Scheduled follow-up throughout the school year must be provided to ensure that teachers are able to put into practice what they learn. A single workshop or seminar will not be adequate training to encourage teachers to use technology in the classroom.

The final recommendation is an outgrowth from the previous staff development recommendation. Catholic elementary schools must move from placing primary responsibility for technology use and instruction from the computer lab teacher to a

shared responsibility with all teachers. While the computer lab has an important place in the school for specific classroom volume projects, classrooms must be equipped with at least five computers that will be regularly used by both students and teachers. These classroom computers will provide daily instructional opportunities rather than the limited use of a scheduled computer lab shared with the entire school. However, as previously noted, teachers must be appropriately educated in the use of technology as a classroom instructional tool before they will comfortably accept this role.

Many of the topics of inquiry within this study need to be extended to Catholic elementary schools throughout the United States in order to gain a better perspective on how American Catholic elementary schools are progressing in the acquisition and integration of technology. This study was originally intended to illuminate seven Catholic school systems in the middle Atlantic states, however the final survey included only three systems within Virginia and North Carolina. Despite its limited view of Catholic elementary schools, this study is useful for comparative purposes for each of the three participating dioceses, for the NCEA, and for other elementary Catholic schools in the United States. Hopefully this study will stimulate interest for replication of similar studies elsewhere. A compilation of data from this study of fifty-three Virginia and North Carolina Catholic elementary schools, Dr. Curran's visit of twenty-four schools within the nation, and additional studies of technology use within other elementary Catholic schools in the United States would provide a more accurate baseline of Catholic elementary school technology use and more exemplary models of technology funding and integration. Catholic elementary schools must collaborate to seek this information and prepare to become an important educational part of the next century. The alternative is to be left behind as an obsolescent relic surrounded by outdated computer equipment and instructional methods of the past.

## REFERENCES

Antczak, M. C. (1998, June). New paradigms and unchanging purposes of Catholic schools: A response to Sr. Angela Ann Zukowski. Catholic education: A journal of inquiry and practice, I(4), 457-463.

Balance sheet for Catholic elementary schools: 1995 income and expenses.  
National Catholic Educational Association, 29.

Balance sheet for Catholic elementary schools: 1997 income and expenses.  
National Catholic Educational Association, 29.

Bosco, A.G. (1994, February/March). Pastoring the school in the electronic global village. Momentum, 14-16.

Brennan, J. (1997). Point to the future: a principal's technology planning guide.  
Washington, DC: National Catholic Educational Association.

Brennan, J. (1997, April 5). The principal's role in technology. Tomorrow's schools today: integration technology into Catholic elementary schools, Vol. 1, No. 1. [http://www.ncea.org/Elem/tech\\_new.htm](http://www.ncea.org/Elem/tech_new.htm)

Christensen, L. (1997, August). Internet usage in public schools in 1997. Technology pathfinder for administrators, 4.

Connections to the Internet, program announcement. (1995). Arlington, Va.: Directorate for Computer Information, Science and Engineering - National Science Foundation.

Curran, M. E. (1998). A sabbatical view of educational technology. Catholic education: A journal of practice and inquiry, I(4), 445-456.

Federal Communications Commission. (1997, July 2). Frequently asked questions on Universal Service and the Snow-Rockefeller Amendment.  
[http://www.fcc.gov/Bureaus/Common\\_Carrier/Public\\_Notices/1977/da971374.html](http://www.fcc.gov/Bureaus/Common_Carrier/Public_Notices/1977/da971374.html).

Fitzpatrick, K. A. (dir.) & Pershing, J. A. (asst. dir.). (1996). Technology: indicators of quality information systems in K-12 schools. Schaumburg, IL: National Study of School Evaluation.

Frick, T. W. (1996, December 17). Criteria for evaluating use of information technology in K-12 education. Keynote address to the International Symposium on New Technologies of Instruction , National Taipei Teachers' College, Taipei, Taiwan. <http://education.indiana.edu/keyfrick.html>.

Gonzalez, E. (1995). Connecting the nation: classrooms, libraries, and health care organizations in the information age. Washington, DC : National Telecommunications and Information Administration Office of Telecommunications and Information Applications - U. S. Department of Commerce.

Grant proposal guide, NSF 95-27. (1995). Arlington, VA: National Science Foundation.

Haney, R. & A. A. Zukowski (eds). (1997). New frontiers: navigational strategies for integrating technology into the school. Washington, DC: National Catholic Educational Association.

Heaviside, S., Farris, E., Malitz, G., & Carpenter, J. (1996). Advanced telecommunications in U.S. public elementary and secondary schools, 1995 (NCES-95-854). Washington, DC: U. S. Government Printing Office. (ERIC Document Reproduction Service No. ED 392 442)

Jones, R. T. (1996). Prediction of educational technology to be found in the public schools of the year 2000: an international delphi study. Unpublished doctoral dissertation, Virginia Polytechnic Institute and State University, Blacksburg.

McDonald, D. (1997, October/November). Educational technology funding. Momentum, 46-47.

McKenzie, J. (1991, September). The art of the deal - no trump. From now on, a monthly electronic commentary on educational technology issues, Vol. 1, No. 7. <http://fromnowon.org/fnosept91.html>.

McKinsey & Co., Inc. (1995). Connecting K-12 schools to the information superhighway. Washington, DC. (ERIC Document Reproduction Service No. ED 393397)

McLaughlin, T. H., O'Keefe, J. & O'Keefe, B. (eds). (1996). The contemporary Catholic school: context, identity and diversity. Washington, DC: The Falmer Press.

Maricle, C. (1997, June 5). Jumping the hurdles of learning and technology, part 3. Tomorrow's schools today: integrating technology into Catholic elementary/middle schools, I (3). [http://www.ncea.org/Elem/tech\\_new.htm](http://www.ncea.org/Elem/tech_new.htm).

Malarkey-Taylor Associates, Inc. (1995). Education technology survey, 1995. Washington, DC. (ERIC Document Reproduction Service No. 387 124)

Mehlinger, H. D. (1995). School reform in the information age. Bloomington, IN: Center for Excellence in Education, Indiana University.

Morino, M. (1997, March). The impact of technology on youth in the 21<sup>st</sup> century. An address to the Children's Defense Fund.

National Catholic Educational Association. (1996). Directory for United States Catholic schools.

National Catholic Educational Association. (1997, June 28 and October 30). Public policy: school issues. <http://www.ncea.org/PubPol/issues.htm>.

Ross, T W., Jr. & Bailey, G. D. (1995). Technology-based learning: a handbook for principals and technology leaders. New York: Scholastic Inc.

S., M. E. (ed). (1996, Spring). Scenarios for the technology standard. Journal of technology education, VII(2). <http://scholar.lib.vt.edu/ejournals/jte/jte-v7n2/editor.jte-v7n2.html>.

Scholz, C. B. (1996). Information technology policy in K-12 educational institutions: A comparison of public, private and parochial school systems in New Castle County, Delaware. Dissertation Abstracts International, 58(01A), 139. (University Microfilms No. AAG9718774)

Schwartz, D. (1992, February). From wonder to work. Momentum, 18-22.

Serving private school students with federal education programs – a handbook for public and private school educators. (1996). Washington, DC: Office of Non-Public Education - U. S. Department of Education.

Stewart, C. J. & Cash, W. B., Jr. (1985). Interviewing: principles and practices. Dubuque, Iowa: Wm. C. Brown.

Stuckey, M. (1997). From the chalkboard to the chatroom and how to get there from here: A model for developing and using a diocesan and school site educational technology plan. Washington, DC: National Catholic Educational Association.

- Suskie, L. A. (1996). Questionnaire survey research: what works. (2<sup>nd</sup> ed.). Tallahassee, Fl.: Association for Institutional Research, Florida State University.
- U.S. school districts to spend \$5.2 billion on technology in 1997-98. (1997, December ). Technology pathfinder for administrators, bonus section.
- Valovich, D. E. (1996, August). Strategic planning for the successful integration of technology in a private school. Nova Southeastern University. (ERIC Document Reproduction Services ED 400 786)
- Walch, T. (1996). Parish school, American Catholic parochial education from colonial times to the present. New York: The Crossroad Publishing Company.
- Zukowski, A. A. (1993, September/October). New initiatives for a new year. Momentum, 71.
- Zukowski, A. A. (1997). New learning paradigms for Catholic education. Catholic education: A journal of inquiry and practice, I(1), 51-66.
- Zukowski, A. A. (1992, September/October). Racing towards the 21<sup>st</sup> century. Momentum, 57-60.
- Zukowski, A. A. (1993, April/May). The systems blueprint. Momentum, 77.
- Zukowski, A. A. (1994, August/September). Tips for educational technology grant seekers. Momentum, 78-79.

## GLOSSARY

**Connectivity:** System of linking computers with Local area networks (LAN), wide area networks (WAN), and the Internet by means of wire or wireless connections.

**File server:** A specially equipped computer with specially designed software that manages files and data to be used by all computers connected to the network.

**ISDN (Integrated Services Digital Network):** A digital connection, offered through regular phone lines, that offers connectivity at either 64 kilobytes/sec or 128 kilobytes/sec.

**Network:** A group of interconnected computers that can communicate with one another.

**LAN (local area network)** – A linkage of computers in the same building or on the same floor that are directly connected to the file server.

**WAN (wide area network)** – Computers linked over a greater distance by wiring or by remote dial-up access.

**PPP (point to point protocol):** The software language which a modem uses to talk to the Internet Service Provider (ISP).

**SLIP (Serial Line Internet Protocol):** A software method for connecting a computer to the Internet over a serial or modem line.

**Technology infusion:** Refers to the use of technology by teachers and students within the classroom curricula. Examples include student production for reports, spreadsheets in science labs, and research projects.

**Technology integration:** Refers to the use of hardware and software in the school.

**Universal service:** Social policy designed to make affordable voice telephone service easily available to all consumers, regardless of geographic area or income. Basic elements include low residential service rates, subsidies to keep rates affordable in rural areas, and lifeline services for low income residents.

**APPENDIX A**

**COVER LETTER  
LETTER FROM ARLINGTON DIOCESE  
SURVEY  
INFORMED CONSENT**

ST. ANDREW THE APOSTLE SCHOOL  
6720 UNION MILL ROAD  
CLIFTON, VIRGINIA 20124

March 6, 1998

Dear Principal,

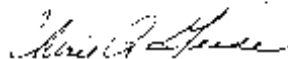
During the past year, I have been conducting my dissertation research at Virginia Polytechnic Institute and State University in the area of technology funding and integration within middle Atlantic Catholic elementary schools. As a fellow Catholic elementary school principal at St. Andrew the Apostle School in Clifton, Virginia, I understand the difficulties associated with keeping a Catholic elementary school technologically current. According to the National Catholic Educational Association, the most common lament among Catholic administrators is "lack of funding."

As part of this research study, I have developed the attached survey designed to provide insights into some of the funding solutions and levels of technology integration achieved by schools in this local region. My goal is to identify some successful solutions used by our schools in this region, and to forward the final results of this study to all schools that participate by returning the completed survey form. Both Virginia Polytechnic Institute and State University and the Arlington Diocese Office of Catholic Schools have endorsed this study. Attached is a copy of the letter sent to your superintendent by Timothy J. McNiff Ed.D., Superintendent of the Arlington Diocese Office of Catholic Schools. The survey will take approximately ten minutes to complete by the school principal.

The individual school responses to this survey will be kept confidential and will be used to provide statistical data. Your name and school name will not be used in the published data or report. If specific examples of funding methods or technology integration are used, the schools' names will be kept confidential. If follow-up telephone interviews are conducted, data obtained from these interviews will also be kept confidential. Please note, included is a statement of informed consent. This serves to guarantee your privacy/anonymity. Please read this form and if you are willing to proceed as a participant in this study, please sign the form and include it with the survey when you return it.

I thank you in advance for your assistance with this survey. Since only 264 schools are receiving this mailing, your responses are most important to the integrity of this study. Through our collaborative efforts, I expect to provide useful data about how we fund and integrate technology in the middle Atlantic states and to share funding ideas for the participating schools. If you have any questions about this study or the survey instrument, please call me at (703)817-1774 or E-mail at saas@erols.com. Please return the completed survey and signed statement of informed consent in the enclosed self-addressed stamped envelope to Mrs. Cherie A. Geide, c/o St. Andrew the Apostle School, 6720 Union Mill Road, Clifton, Virginia 20124 or fax responses to (703)817-0928 by March 30, 1998.

Sincerely,



Cherie A. Geide  
Principal



**Diocese of Arlington**

**The Chancery**

SUITE 704  
700 NORTH G. FUL ROAD  
ARLINGTON, VA, DC 22201  
TEL: (703) 841-2500 FAX: (703) 841-5028

**OFFICE OF CATHOLIC SCHOOLS**

Suite 703 - (703) 841-2510  
arincs@msnsno.com

January 9, 1998

Dear Superintendent,

The attached "Survey of Catholic Elementary School Technology" has been compiled by Cherie Geide, an Arlington Catholic Diocese elementary school principal who is presently conducting her doctoral research through the Department of Education at Virginia Tech. The enclosed instrument is designed to collect data from your elementary schools which will be used to identify technology integration and funding sources for the Dioceses of Wilmington, Baltimore, Arlington, Richmond, Charlotte, Raleigh and the Archdiocese of Washington, D.C.

I am sure you will agree that the significant cost of maintaining and advancing technology in our schools can be daunting at times. Yet, even when our schools are successful with hardware procurement, realizing maximum utilization/integration of that technology produces even greater cost. This study is expected to address such challenges by illustrating methods of program integration and then revealing a variety of funding sources which will benefit our schools.

I support Mrs. Geide's research as a worthwhile means of collecting useful data for each of our school systems. With your approval, Mrs. Geide will mail a survey to each of your elementary school principals for completion. When all surveys are received and compiled, each school submitting a survey will be sent the final results. In advance, thank you for your support and assistance with this research.

Sincerely,

Timothy J. McNiff, Ed.D.  
Superintendent of Schools

TJM/mc

105

**SURVEY OF CATHOLIC ELEMENTARY SCHOOL TECHNOLOGY**

NAME OF SCHOOL \_\_\_\_\_

PRINCIPAL \_\_\_\_\_

Please answer each question about your school and offer any additional information you feel may be helpful to this study of Catholic elementary school technology funding and acquisitions. A follow-up telephone interview may be requested upon receipt of your completed survey. All participants who return a completed copy of this survey will receive the final compilation of results. Virginia Polytechnic Institute and State University and the Office of Catholic Schools in the Diocese of Arlington endorse this survey.

**SECTION I  
TECHNOLOGY USE AND INTEGRATION**

1. Do you have a written technology plan?

Yes  
 No

If the answer is yes, what entity (faculty, parent committee, parish, diocese, or various group collaboration) developed the plan and how often is it reviewed? \_\_\_\_\_

2. Do you have written technology curriculum guidelines or assessments of student use of technology?

Yes  
 No

3. Do students routinely receive computer training? Check those skills applicable by grade level:

	YES	NO	GRADE LEVEL
use of hardware (keyboard, mouse, printer)	___	___	___
CD-ROM	___	___	___
use of software	___	___	___
word processing	___	___	___
spreadsheets	___	___	___
graphics design	___	___	___
Internet use	___	___	___
e-mail	___	___	___
student production (research reports, multimedia, etc.)	___	___	___
other (please specify) _____	___	___	___

4. Students have school access to information technology (Internet, e-mail, etc.):

Once per month or less  
 Twice per month  
 At least once per week  
 Daily

5. Approximately what percentage of your students has access to a computer at home?

0-25%  
 25-50%  
 50-75%  
 75-100%  
 I don't know

6. Do students use automated catalogs in the school library?  
 Yes  
 No
7. Do students have daily access to computers within the school?  
 Yes  
 No
8. Do you have a centralized computer lab within the school? (If available, please attach inventory)  
 Yes  
 No  
 If yes, how many of each of the following:  
 386  
 486  
 Pentium  
 Pentium II  
 Apple II series  
 Macintosh  
 Power Macs  
 Other (please describe) \_\_\_\_\_  
 Are lab computers networked to file server?  
 Yes  
 No  
 Are lab computers connected to the Internet?  
 Yes  
 No  
 How many printers are in the lab? \_\_\_\_\_  
 If networked, how many? \_\_\_\_\_
9. Do you have computers in the classrooms? (if available, please attach inventory)  
 Yes  
 No  
 If yes, \_\_\_\_\_ out of \_\_\_\_\_ total classrooms have computers.  
 Average number of computers per classroom: \_\_\_\_\_  
 How many of each of the following:  
 386  
 486  
 Pentium  
 Pentium II  
 Apple II series  
 Macintosh  
 Power Macs  
 Other (please describe) \_\_\_\_\_  
 Are school computers networked to file server?  
 Yes  
 No  
 Are classroom computers connected to the Internet?  
 Yes  
 No  
 Average number of printers per classroom: \_\_\_\_\_

10. Are classroom computers connected to a file server?
- Yes
  - No
- If yes, please select the closest percentage range of computers connected to a server.
- 100%
  - 75-99%
  - 50-75%
  - 25-50%
  - <25%
11. Teachers regularly use the computer for (check all those which apply):
- recording grades
  - preparing classroom materials
  - accessing the Internet for instructional materials
  - classroom overhead presentations (LCD or LCP)
  - electronic bulletin board
  - other (please describe) \_\_\_\_\_
12. How often does each teacher have access to a computer when students are not in the classroom?
- Once per month or less
  - Twice per month
  - At least once per month
  - Daily
13. What percentage of your teachers has access to a computer at home?
- 0-25%
  - 25-50%
  - 50-75%
  - 75-100%
14. Do you use a computer at your desk?
- Yes
  - No
15. Do you have access to a computer at home?
- Yes
  - No
16. Do you identify and provide staff development programs in technology for teachers?
- Yes
  - No
17. \_\_\_\_% of teachers received staff development training in technology last year.
18. Do you have a teacher designated as a computer or technology instructor?
- Yes
  - No
19. Are school computers and technology available to parish or community members during non-school hours?
- Yes
  - No
- If yes, please specify use, programs, or activities: \_\_\_\_\_
-

**SECTION II  
BUDGET AND ACQUISITION**

20. Does your school budget provide funds for computer support personnel?  
 Yes  
 No
21. Does your school budget provide funds for computer repairs?  
 Yes  
 No
22. Does your school budget provide funds for replacement, additions, and upgrades to the technology inventory?  
 Yes  
 No
23. Does your school budget provide for ongoing costs of a technology infrastructure?  
 Yes  
 No
24. Does your school budget provide funds for staff development in technology?  
 Yes  
 No
25. The amount of funds allocated for technology in our school budget is \_\_\_\_ per cent of the total budget.

26. Select the range that best represents each source of technology acquisitions in your school:

	0-25%	25-50%	50-75%	75-100%
<b>a. Donations of equipment through</b>				
Grocery or other receipt programs	___	___	___	___
Donations from individuals	___	___	___	___
Donations from business	___	___	___	___
Donations from government source	___	___	___	___
Consortia networking	___	___	___	___
Business partnerships	___	___	___	___
<b>b. Purchases with donated funds from:</b>				
Individuals	___	___	___	___
Businesses	___	___	___	___
Parent organization fundraising	___	___	___	___
Annual appeals	___	___	___	___
Development funds	___	___	___	___
<b>c. Purchases through grants:</b>				
Awarded only to your school	___	___	___	___
Awarded with other Catholic schools in diocese	___	___	___	___
Awarded with public schools	___	___	___	___
Awarded to a consortia	___	___	___	___
<b>d. School operational funds</b>				
School operational funds	___	___	___	___
<b>e. Other (please specify)</b>				
_____	___	___	___	___
_____	___	___	___	___

SECTION III  
DEMOGRAPHICS

27. Date school was built: \_\_\_\_\_  
Date of last renovation: \_\_\_\_\_
28. How would you best describe the area served by your school?  
 Urban  
 Suburban  
 Rural
29. Is your school:  
 parish affiliated  
 inter-parish  
 independent
30. What best describes your school's average family annual income level?  
 less than \$25,000  
 \$25,000-\$50,000  
 \$50,000-\$75,000  
 \$75,000-\$100,000  
 greater than \$100,000  
 mixed income community, please explain \_\_\_\_\_

Please provide additional comments you feel would be helpful for this survey. A self-addressed stamped envelope is enclosed for your response by March 30 to Mrs. Charie A. Geide, c/o St. Andrew the Apostle School, 6720 Union Mill Road, Clifton, Virginia 20124. Thank you very much for your assistance with this research which will benefit Catholic education.

**VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY**

**Informed Consent for Participants of Investigative Projects**

**Title of Project: Description of Funding Sources and Technology Integration in Middle Atlantic Catholic Elementary Schools**

**Investigator: Cherie A. Geide**

**PURPOSE OF STUDY:** To investigate how Catholic elementary schools in the middle Atlantic states are financing technology in their schools, to investigate to what extent technology has been integrated into these schools, and to investigate what some of the factors, combined with funding, that have enabled or hindered technology integration within these schools.

**PROCEDURES:** To survey all middle Atlantic Catholic elementary schools, to conduct follow-up taped interviews of selected survey respondents, and to report on data collected.

**RISKS:** There are no risks to survey participants.

**BENEFITS TO SUBJECTS:** All survey respondents will receive copies of survey results and many contact the investigator at a later time for more information about the data collected.

**EXTENT OF ANONYMITY AND CONFIDENTIALITY:** Individual school confidentiality will be maintained within the study. Each school will be assigned a number upon receipt of the completed survey. The school name on the survey will be used by the investigator for tracking purposes and determining later personal/telephone interviews only. Schools will be assigned a reference number for the publication of the study results and conclusions. The investigator will maintain the confidential surveys and interview texts and tapes in file for only as long as needed for this study. After this time, these supporting materials will be destroyed.

**COMPENSATION:** There is no monetary compensation for participating in this survey. However, all schools returning a survey will receive a copy of the results of this study.

**FREEDOM TO WITHDRAW:** Completion of the survey is voluntary as is any participation in follow-up interviews to be determined from survey responses.

**APPROVAL OF RESEARCH:** This research has been approved, as required, by the Institutional Review Board for Research Involving Human Subjects at Virginia Polytechnic Institute and State University, by the Department of Education and Human Resources, the National Catholic Educational Association, and the Office of Catholic Schools in the Arlington Diocese.

**SUBJECT'S RESPONSIBILITIES:** I voluntarily agree to participate in this study. As a volunteer, I will complete the survey and understand that I may be selected for a brief follow-up taped interview with the investigator at a later time.

**SUBJECT'S PERMISSION:** I have read and understand the Informed Consent and conditions of this project. I have had all my questions answered. I hereby acknowledge the above and give my voluntary consent for participation in this project.

If I participate, I may withdraw at any time without penalty. I agree to abide by the rules of this project.

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date

Should I have any questions about this research or its conduct, I may contact:

Richard B. Spencer      (703) 817-1774  
Investigator                      Phone

**APPENDIX B**  
**FOLLOW-UP INTERVIEW QUESTIONS FOR PRINCIPALS**

## **FOLLOW-UP INTERVIEW QUESTIONS FOR PRINCIPALS**

1. When did you first develop a technology plan?
2. In your opinion, what are some of the key elements of your technology plan?
3. In your opinion, what are the most notable uses of technology by students, teachers, and administration in your school?
4. How is the Internet utilized by students, teachers, and administration?
5. In your opinion, what are the most significant factors that contribute to the integration of technology into your school curriculum?
6. What is the primary use of the computer lab?
7. Do you have a teacher designated as a computer or technology instructor?
8. How is this person utilized?
9. Do you have a systems expert or manager?
10. Is this person a paid employee, volunteer, provided by contract with a technology company, etc?
11. What are some of the factors that have contributed to the outstanding level of financial contributions toward technology in your school?
12. What were some of the initial obstacles you had to overcome in planning, funding, and integrating technology?
13. What are some of the challenges you are currently experiencing in your technology program?
14. What are some of the demographic factors that you feel contribute to the level of technology used in your school?
15. Expand on how you obtain technology financing.
16. Expand on any other significant areas of technology not discussed.

**APPENDIX C**  
**TECHNOLOGY USE AND INTEGRATION SPREADSHEET**

[AppendixC-Technology&Integration.htm](#)

**APPENDIX D**  
**BUDGET AND ACQUISITION SPREADSHEET**

[AppendD-Budget.htm](#)

**APPENDIX E**  
**DEMOGRAPHICS SPREADSHEET**

[AppendE-Demographics.htm](#)

## VITA

[cgeide@vt.edu](mailto:cgeide@vt.edu)

Cherie A. Geide has been employed in Catholic education since 1985 and holds a BA from Rutgers University, a M.Ed. from Marymount University, and the Ed.D. from Virginia Polytechnic and State University. She possesses a Virginia Postgraduate Professional License with NK-8 teaching and elementary/middle school principal endorsements. Cherie has held both elementary/middle school teaching and administration positions in the Arlington Catholic Diocese (St. Ann School, St. Andrew the Apostle School, and St. Thomas More Cathedral School). She was the founding principal for St. Andrew the Apostle School in Clifton, Virginia in 1993. During her tenure at St. Andrew, the school received accreditation, enrollment increased 33 per cent, and she created a long-range technology plan and staff development program for infusing technology into the curriculum. Cherie assumed the position as the first lay principal at St. Thomas More Cathedral School in 1998 upon the withdrawal of the Sisters of the Immaculate Heart of Mary (IHM).

Recent professional accomplishments include attendance at the Educational Leadership Conference at Oxford University sponsored by Virginia Tech and Oxford University in Spring 1997, three-week Fulbright Memorial Fund study in Japan in October 1997, invitation as guest speaker on Japanese education reform at Virginia Tech doctorate class (Richmond) in November 1997, conference session speaker at "Teaching Inquiry with the Latest Technology" conference (Roanoke) on February 24, 1998, and technology poster session presenter for faculty at Johns Hopkins University in 1998. Cherie has also served as a Blue Ribbon School reviewer at the Council on American Private Education (CAPE), *Washington Post Newspaper* grant application reviewer, and Fulbright Memorial Fund application reviewer.