The Evolving Roles, Goals, and Effectiveness of Elementary Technology Coordinators

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Abstract

This longitudinal study reports on the evolving roles of elementary technology coordinators in a large urban district. Since 1998, data were gathered via surveys, interviews, and focus groups to document various facets of the technology coordinators' role and analyze emerging trends in their work. Specifically, the study sought to answer how elementary technology coordinators spend their time and how effective they feel in in performing various aspects of their role. Findings indicate that the coordinators spend a good deal of time providing technical support—clearly more than they desire. On the other hand, they report spending less time than they desire on functions related to instructional issues such as professional development and faculty support. Data indicate a clear pattern in which the technical demands of the job are taking an increasingly large percentage of coordinators' time of the job. Overall, only a small percentage of coordinators report having enough time to do their job well. Results further indicate that while mean effectiveness for technical tasks is relatively high and stable over the years, the mean effectiveness for professional development tasks is substantially lower and declining consistently over the reporting period. The implications of these trends are discussed in terms of optimal implementation of the coordinator role.

INTRODUCTION

While much has been written about the potential of information technology to enhance teaching and learning, a wide range of research studies and reports suggest that K-12 schools are not fully realizing that potential. Commonly cited reasons include inadequate computer resources, lack of teacher preparation, lack of planning time, and lack of on-site support (CEO Forum, 1999; National Center for Education Statistics, 2000; Ronnkvist, Dexter, & Anderson, 2000; U.S. Congress. 1995). Several studies (Dexter, Anderson & Ronnkvist, 2002; Dexter, Seashore & Anderson, 2003; Evans-Andris, 1995; Marcovitz, 2000; Moallen & Micallef, 1997; Ronnkvist, Dexter, & Anderson, 2000; Strudler, 1995-96, Strudler & Gall, 1988) have documented ways in which effective technology coordinators and teacher leaders have helped schools to overcome these impediments to technology implementation. Despite evidence supporting the need for such positions, however, school districts have been hard pressed to allocate funds on a large-scale to support released-time technology coordinators (Ronnkvist, Dexter, & Anderson, 2000), especially at the elementary level.

In 1997, the Clark County School District (CCSD) in Las Vegas, NV approved a plan to provide released-time coordinators to facilitate technology integration in all of its K-12 schools. This article documents the implementation of that role at the elementary level, the perceived effectiveness that the coordinators report, and their recommendations for future implementation of the role. It begins with a review of related literature and brief description of the district context, followed by a description of the study, its findings, and a discussion of the findings and their implications for practice.

REVIEW OF RELATED LITERATURE

The role of instructional computer coordinator emerged during the 1980s along with the proliferation of computers in K-12 schools (Barbour, 1986; Moursund, 1985). Electronic Learning's first annual computer coordinator survey (Barbour, 1986), revealed the following:

1. Job descriptions vary greatly.
2. Only 21 percent of the respondents actually held the title "computer coordinator"; the other 79 percent functioned in that role on a *de facto* basis.
3. Eighty percent of school computer coordinators who responded fulfilled their role as an additional responsibility; only 4 percent fulfilled their role on a full-time basis, while 16 percent functioned on a part-time or "released" basis.

Moursund (1985) reported that a typical technology coordinator worked with others to set district and school goals for the instructional use of computers; collaborated with others including teachers and curriculum leaders, to develop plans to implement computer-related goals and objectives; helped teachers develop curriculum materials; provided formal and informal staff development; were responsible for their school's hardware, software, and support; helped students; evaluated the schools instructional computing program; and kept up to date with advancements in the computer field.

National surveys continued to document the growth and challenges of this evolving role (Bruder, 1990; McGinty, 1987; Ronnkvist, Dexter, & Anderson, 2000). The most recent of those surveys (Ronnkvist, Dexter, & Anderson, 2000) found:

1. Eighty-seven percent of schools surveyed have technology coordinators, but less than one of five of them (19%) reported having full-time coordinators.
2. High schools were twice as likely to have full-time coordinators than were middle and elementary schools.
3. Technology coordinators provide more technical support than instructional support to teachers integrating educational technology.
4. Teachers in schools with high quality technical and instructional technology support are more likely to engage in more and varied uses of technology in their school.

In another report Dexter, Anderson & Ronnkvist (2002) concluded that "under the direction of a qualified technology coordinator, faculty, staff and students could work together to provide high quality technology support" (p. 279).

Various case studies (Dexter, Seashore & Anderson, 2003; Evans-Andris, 1995; Marcovitz, 2000; Moallen & Micallef, 1997; Strudler, 1995-96, Strudler & Gall, 1988) complement these reports to provide rich descriptions of the work that technology coordinators perform. One longitudinal study, consisting of an initial investigation (Strudler & Gall, 1988) and a follow-up (Strudler, 1995-96) reported on the skills and strategies used and the outcomes effected by three exemplary coordinators over a period of eight-years. Results across those cases suggest that while barriers to increased technology use have been eliminated or minimized due to the work of the coordinators, many obstacles still remained. One finding of particular interest involves the coordinators' plans "to work themselves out of their jobs." Findings suggest that this ambitious goal appears to have underestimated the degree to which educational change with technology is a moving target that requires ongoing maintenance, coordination, and support.

DISTRICT CONTEXT

The Clark County School District (CCSD) in Las Vegas, NV currently the nation's fifth largest school district and its fastest growing urban district with more than 280,000 students. It currently has 186 elementary schools.

In spring 1997, a plan was approved to provide a technology coordinator, later termed Educational Computing Strategist (ECS), to each elementary school in the district. The initial plan involved a three-year phase-in for elementary schools. During the first year of the project in 1997-98, data were gathered on how 24 ECSs were spending their time while performing their role. Commonly cited functions included providing staff development, managing local area networks, providing for their own professional development, and carrying out miscellaneous non-technical duties (Anderson, 1998).

In 1998-99, an additional 45 ECSs were hired to bring the total number in the District's elementary schools to 69. While it was planned that there would be a full-time ECS assigned to each CCSD elementary school, the project never received full funding. As of June 2005 there were 94 ECSs, 20 of which were newly funded during the 2004-05 school year to achieve a ratio of one ECS per two elementary schools.

PURPOSE OF THE STUDY

The purpose of this study is to document various aspects of the elementary technology coordinator's role and how it has evolved over the years. It is hoped that the study will add to our understanding of critical support functions needed for effective technology integration and how the technology coordinator role can be most effectively employed. Specifically, the study seeks to answer the following research questions:

1. How much time do elementary technology coordinators spend performing the various functions of their role? How much time would they like to spend performing these functions?
2. How effective do elementary technology coordinators feel in performing various aspects of their role?
3. What do elementary technology coordinators perceive as their greatest obstacles and rewards in performing their role?
4. What recommendations do elementary technology coordinators technology coordinators have for the effective implementation of their role and how they think their role should evolve in the coming years?

This paper, based on data analysis completed to date, will focus on the first two research questions.

METHODS

Data Collection

Data were gathered from ECSs between1999 and 2004 via questionnaires, interviews, and focus groups to address the research questions. A description of each follows.

Questionnaires. Beginning in 1999, questionnaires were administered on four occasions to the District's elementary ECSs. In spring 1999 and fall 2000, questionnaires were completed at meetings of the elementary ECSs to gather data on various aspects of their role. The five-page survey, administered in April 1999 was adapted from a 17-page questionnaire for technology specialists designed by Becker & Anderson (1998). The return rate for our survey (n=57) was 100% since the surveys were administered and collected during the ECS meeting.

A second questionnaire was conducted in September 2000. Based on the 1999 instrument, some items deemed less important were eliminated to pare the survey down to four pages. Again, the questionnaire was administered during an ECS meeting for a return rate of 100% (n=63). In September 2002, the questionnaire was modified and administered at a meeting attended by 52 ECSs. Forty-nine completed the survey for a return rate of 94.2%. This iteration of the survey included a provision that asked respondents to add up the total number of actual and desired hours that they listed and stated, "If the totals do not seem accurate, please go back and modify your responses." This was added to increase the accuracy of the hours reported. In addition, respondents were asked to list what they believed to be the three greatest obstacles to performing their ECS role. In the prior surveys, respondents were asked to rate the obstacles from given list. Finally, In May 2004, an identical survey as was used in 2002 was administered online via Zoomerang. Forty-one (41) of the districts' 67 elementary coordinators responded for a return rate of 61.2%.

Interviews. A series of semi-structured interviews were conducted in 2000-01**.** The Elementary District Coordinator, who serves as Co-PI of this project, contacted nine ECSs who had left that role to return to positions as classroom teachers. Of those, seven agreed to participate in an interview. In addition, we sought to interview a selected sample of ECSs who were deemed exemplary by their peers and deemed to be functioning at a high level of satisfaction. Members of the Elementary ECS leadership team were polled to identify people in each of the four regions in the district who they believe meet these criteria. The results were compiled and six people were identified for interviews.

Focus Groups. In spring 2002, a focus group was conducted with five ECS who were identified as being exemplary via a peer nomination process. During the focus group, findings from the study were presented and discussed. The focus group lasted for two hours.

Subsequently, an online forum was conducted in spring 2003. Elementary ECSs were invited to participate and address the ECS' strategies for managing technical support and engaging teachers in the use of technology. Twelve ECS participated in the forum. Finally, a focus group, consisting of the District Coordinator and four elementary school coordinators who serve as leaders for their region of the district, was held in June 2004 to seek feedback on the study's preliminary findings.

Data Analysis

Data from the surveys were entered using Excel and analyzed using SPSSx. Results were compared. In addition, findings were compared against those of Ronnkvist, Dexter, & Anderson (2000), who used the same Technology Specialist's Survey (Becker & Anderson, 1998) that served as a model for our surveys.

To facilitate comparisons between data sets, both estimated and actual hours reported were converted to percentages. As previously mentioned, prior to the 2002 questionnaire, respondents were not asked to add up their total hours and make modifications as needed. The totals prior to that date, therefore, may possibly have been less accurate.

Responses to the questionnaires were completely anonymous so we were not able to tack changes in responses for individual respondents. While respondents were largely the same over the years, variations in the sampling from year to year precluded us from computing the statistical significance of the findings.

All interviews and focus groups were audiotaped and transcribed. Using the constant comparative method (Strauss, 1987), data analysis began as data were first collected and continued throughout the study. We began by reading the transcriptions of the interviews. Guided by the purpose of this study and general categories used in the surveys, we created a series of codes. Two of the researchers then coded sample transcripts, compared results, and modified codes as needed to establish consistency in the coding process.

We then reread hardcopies of the remaining transcriptions, identified illustrative comments, and marked applicable codes for each "chunk" of data. As the analysis progressed, we added a couple of codes to reflect topics that we had not anticipated. Subsequently, we used the ClarisWorks database and word processor components with embedded macros to transfer "chunks" of data from the transcripts into individual records in the database program. This allowed for assigning one or more codes to each "chunk" and subsequent searching and analysis of the data. During later phases of the project, we began using the HyperRESEARCH Qualitative Analysis Tool and Microsoft Word for this process. Wherever possible, data from the interviews and focus groups were used to flesh out the survey data, corroborate our findings, and provide further insights and explanations. This data triangulation served to confirm the trustworthiness (Lincoln and Guba, 1985) of the interview and focus group data.

RESULTS

Results of this study, based on survey, interview, and focus group data are organized by research questions. Some brief demographic information, listed in Table 1, precedes these findings. These data reveal clear trends toward increases in the number of students and teachers served by respondents and the number of years experience of ECSs.

Table 1: ECS Demographic Data: 1999-2004

	1999	2000	2002	2004
# Respondents (N=)	57	62	49	41
Return Rate (%)	100	100	94.2	61.2
# Schools Served	*NA	*NA	2.57	2.63
# Students Served	1149	1474	1941	2030
# Teachers Served	66	89	121	121
Yrs. Classroom Computer Experience	8.4	9.0	10.7	13.2
# Yrs Teaching	11.75	13.65	15.78	16.5
Gender (% Female)	45.61%	43.55%	51.02%	56.10%
Years ECS	*NA	1.89	3.87	4.5

*Note: NA denotes data not available from questionnaire that year.

1. **How much time do ECSs spend performing the various functions of their role? How much time would they like to spend performing these functions?**

Table 2 shows the actual time that ECSs reported spending on various tasks. The hours are reported as a percentage; assuming a 40-hour week, a listing of 25 is equivalent to approximately 10 hours. Of particular note is the trend for increased time spent on installing, troubleshooting and maintaining technology, which more than doubled between 1999 and 2004. The most striking decrease in hours reported was for supervising and assisting classes of other teachers, and planning and running staff development workshops.

Table 2: Percentage of Actual Hours Reported Spent on Various ECS Functions

ECS Functions	**5/99**	**9/00**	**9/02**	**5/04**
Supervising and assisting classes of other teachers	25.5	18.2	13.7	9.3
Supporting or training individual teachers	14.8	18.9	18.1	13.7
Planning and running staff development workshops	8.7	7.9	6.4	3.1
Writing lesson plans and units with other teachers	7.1	4.8	4.3	4.4
Installing, troubleshooting & maintaining technology	29.6	40.1	48.0	60.0
Selecting and acquiring computer-related resources	6.6	4.5	4.3	4.2
Other coordination and support	7.7	5.5	5.2	5.4
Total	100.0	100.0	100.0	100.0

Figure 1 shows the actual time spent on technical vs. professional development/support tasks. The technical tasks are based on the fifth item in Table 2 (installing, troubleshooting & maintaining technology), while the professional development/support tasks were computed by combining the first four items listed. The final two items, a relatively small percentage of the total, were not included in this comparison as they were not distinctly in one category or the other.

Figure 1: Actual Time Spent on Technical vs. Professional Development/Support Tasks

While time spent performing particular functions changed markedly over time, the time that ECSs desired to spend on various tasks has remained relatively constant. Table 3 shows the percentage of hours that ECS reported wanting to spend on various functions.

Table 3: Percentage of Desired Hours Reported Spent on Various ECS Functions

ECS Functions	**5/99**	**9/00**	**9/02**	**5/04**
Supervising and assisting classes of other teachers	24.1	26.9	25.3	23.8
Supporting or training individual teachers	20.9	20.8	23.8	23.8
Planning and running staff development workshops	12.8	16.6	14.9	11.7
Writing lesson plans and units with other teachers	14.9	13.1	14.4	11.4
Installing, troubleshooting & maintaining technology	18.1	14.9	14.1	20.5
Selecting and acquiring computer-related resources	6.2	4.6	5.5	5.4
Other coordination and support	3.0	3.1	2.1	3.4
Total	100.0	100.0	100.0	100.0

Overall, survey data indicate that the coordinators spend a good deal of time providing technical support—clearly more than they desire. On the other hand, they report spending less time than they desire on functions related to instructional issues (e.g., staff development workshops and writing lesson plans and units with other teachers). These results are consistent with Ronnkvist, Dexter, & Anderson's (2000) findings that technology coordinators provide more technical support than instructional support to teachers integrating educational technology.

Interview data further confirm the technical demands of the job and the difficulty that the technology coordinators find in fulfilling their desired roles as onsite staff developers and curriculum consultants.

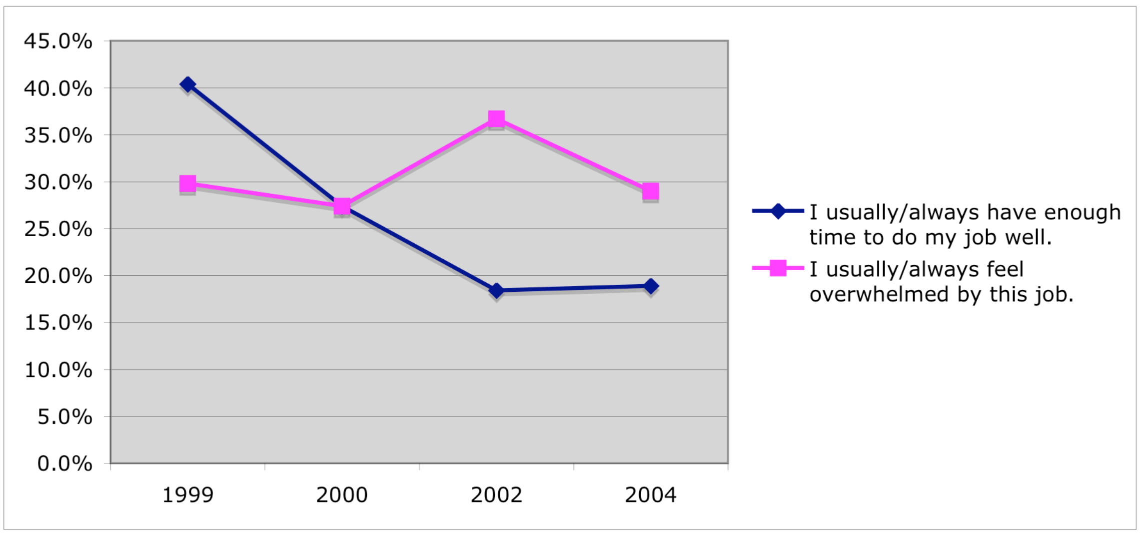
2. How effective do ECSs feel in performing various aspects of their role?

One indicator of effectiveness pertains to ECS's ability to perform their responsibilities within the time allocated. Figure 2 shows findings about ECS's perceptions of the adequacy of time for their role and the degree to which they feel overwhelmed. Since 1999, the percentage of

ECSs who reported that they usually or always have enough time to perform their role dropped from 40% to under 20%. Additional technical responsibilities due to large increases in the number of computers assigned to them and the amount of network activity likely account for this increase.

The percentage of ECS reported feeling overwhelmed had less variability over time, averaging around 30% of the total respondents. This finding suggests that with increasing time constraints on the job, ECSs are adjusting their expectations and coping with the increased technical demands of the role.

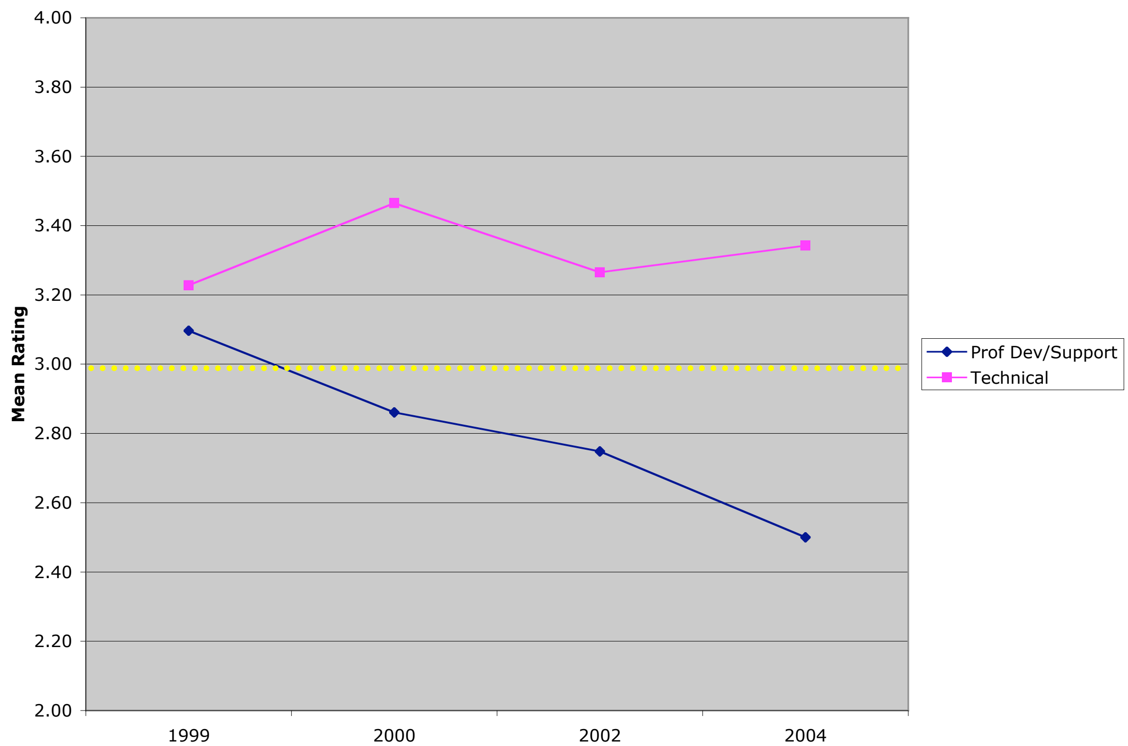
Figure 2: ECS Perceptions of Role



In the questionnaire ECSs were asked to assess their level of effectiveness performing various tasks. (See Table 2 or 3 for a complete listing of the tasks). As in Figure 1, it was deemed most instructive to combine professional development/support tasks and compare results with the technical tasks. The technical tasks are based on the fifth item in Tables 2 and 3 (installing, troubleshooting & maintaining technology), while the professional development/support tasks were computed by combining the first four items listed. Again, the final two items were not included in this comparison as they were not distinctly in one category or the other.

To reduce the "clutter" that results from several possible responses and multiple years of data, a mean effectiveness score was computed for professional development/support tasks and for technical tasks. A response of "very effective" was assigned a value of 4, "effective" assigned a 3, "somewhat effective" assigned a 2, and "ineffective" assigned a 1. Figure 3 shows the mean effectiveness reported by ECSs for professional development/support tasks vs. technical tasks. The dotted line drawn across the figure denotes a rating of 3 or "effective". Results indicate that while mean effectiveness for technical tasks is relatively high and stable over the years, the mean effectiveness for professional development tasks is substantially lower and declining consistently over the reporting period.

Figure 3: Mean Effectiveness on Professional Development/Support vs. Technical Tasks



Interview and focus group data indicate that the ECSs generally feel effective performing the technical aspects of their role. Overall, however, it appears that an increasing emphasis on technical responsibilities, coupled with a larger client base, is making it difficult for many ECSs to feel effective in the professional development functions of their job. It should be noted that professional development and support were identified as primary functions of ECSs when the position was created. Interestingly, the trend for reported effectiveness for technical tasks does not appear to be impacted by increasing demands in ECS assignments in terms of schools and teachers served (see Table 1). It appears that when confronted with limited time, ECSs have maintained their effectiveness performing technical functions by increasing the percentage of their time dedicated to those tasks. While they cite wanting to spend more time on curricular tasks, in some sense by necessity, they opt to fulfill the most pressing demands—keeping the technology functioning.

DISCUSSION AND IMPLICATIONS FOR PRACTICE

This study further documents the complexity involved in effectively integrating technology in school programs. Clearly, basic technical functions that coordinators perform are prerequisite to achieving the higher order outcomes that may enhance teaching and learning in significant ways. The goal, then, is to establish an efficient solution for providing technical maintenance and support so that coordinators have sufficient time to pursue the "higher order" goals of providing staff development, curriculum consulting, and follow-up support. Data from this study confirm that while the basic technical functions are being consistently provided—a positive outcome in its own right—providing curricular support is proving to be more of a challenge.

How then can the technology coordinator role be most effectively employed? In the best of all worlds, there would be adequate funding for the coordination and implementation support necessary for effective technology integration. But in a world of limited resources, optimal implementation of a school technology coordinator role must be examined. What strategies enable coordinators to achieve a good balance between technical and instructional support? What can be done to allow coordinators to increase their effectiveness in supporting teachers and ultimately supporting student learning? It is hoped that further analysis of the data gathered will provide additional insights in terms of the obstacles, rewards, and recommendations for how the role should evolve in the coming years. Clearly, further research is needed to inform the optimal implementation of technology coordinator role to help maximize resources and ensure that schools receive high quality technology support.

REFERENCES

Anderson, D.G. (1998). The elementary ECS: A study of expectations and performance. Clark County School District.

Barbour, A. (1986). Electronic learning's first annual computer coordinator survey. *Electronic Learning, 5*(5), 35-38.

Bruder, I. (1990). The third computer coordinator survey. *Electronic Learning, 9*(7), 24-29.

Becker, H.J., & Anderson, R.E. (1998). Teaching, Learning, and Computing : 1998. Technology specialists survey booklet. [On-Line]. Available: http://www.crito.uci.edu/tlc/html/questionnaires.html

CEO Forum on Education & Technology (1999). Professional Development: A Link to Better Learning. Washington, D.C.: Author. [On-Line]. Available: http://www.ceoforum.org/reports.cfm

Dexter, S., Anderson, R.E. & Ronnkvist, A. (2002). Quality technology support: What is it? What has it? And What difference does it make? *Journal of Educational Computing Research, 26(3) 287-307.*

Dexter, S., Seashore, K.R. & Anderson, R.E. (2003, April). *Leading and learning: Expertise and technology integration support staff.* A paper presented at the Annual Meeting of the American Educational Research Association, Chicago, IL.

Evans-Andris. M. (1995). Barrier to computer integration: Microinteraction among computer coordinators and classroom teachers in elementary schools. *Journal of Research on Computing in Education*, *28*(1), 29-45.

Lincoln, Y. S., & Guba, E. G. (1985). Naturalistic inquiry. Beverly Hills, CA: Sage Publications, Inc.

Marcovitz, D.M. (2000). The roles of computer coordinators in supporting technology in schools. *Journal of Technology and Teacher Education, 8(3) 259-273.*

McGinty, T. (1987). Electronic learning's second annual computer coordinator survey: Growing pains--A portrait of an emerging profession. *Electronic Learning, 6*(5), 18-23,48.

Moallem, M. & Micallef, s. (1997). Instructional technologists at public schools: A study on the role and effectiveness of technology resource teachers. *Proceedings of Selected Research and Development Presentations at the 1997 National Convention of the Association for Educational Communications and Technology* (19th, Albuquerque NM). ED 409 856.

Moursund, D. (1985). *The Computer Coordinator*. Eugene, OR: International Council for Computers in Education.

National Center for Education Statistics (March, 2000). *Teachers' Tools for the 21st Century: A Report on Teachers' Use of Technology.* NCES 2000102, Washington D.C: U.S. Government Printing Office. [On-Line]. Available: http://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2000102

Ronnkvist, A.M., Dexter, S.L., and Anderson, R.E. (2000, June). Technology support: Its depth, breadth and impact in America's schools. Teaching, Learning, and Computing: 1998 National Survey Report #5. Center for Research on Information Technology and Organizations. University of California, Irvine and University of Minnesota. [On-Line]. Available: http://www.crito.uci.edu/tlc/html/findings.html

Strauss, A. (1987). Qualitative analysis for social scientists. New York: Cambridge University Press.

Strudler, N. (1995-96). The role of school-based technology coordinators as change agents in elementary school program: A follow-up study. Journal of Research on Computing in Education, 28(2), 234-257.

Strudler, N., & Gall, M.D. (1988, April). *Overcoming impediments to microcomputer implementation in the classroom.* A paper presented at the Annual Meeting of the American Educational Research Association, New Orleans, LA (Eric No. ED 298 938).

Strudler, N., & Falba, C.J., & Hearrington, D (2001). The evolving role of school-based technology coordinators in elementary programs. . A paper presented at the Annual Meeting of the National Educational Computing Conference, Chicago, IL. [On-Line]. Available: http://coe.nevada.edu/nstrudler/necc01.pdf

Strudler, N., & Falba, C.J., & Hearrington, D (2003). School-based elementary technology coordinators: Their roles, goals and effectiveness. . A paper presented at the Annual Meeting of the National Educational Computing Conference, Seatle, WA. [On-Line]. Available: http://coe.nevada.edu/nstrudler/necc03.pdf

National Center for Education Statistics (March, 2000). *Teachers' Tools for the 21st Century: A Report on Teachers' Use of Technology.* NCES 2000102, Washington D.C: U.S. Government Printing Office. [On-Line]. Available: http://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2000102

U.S. Congress, Office of Technology Assessment. (1995, April). *Teachers and Technology: Making the Connections*, OTA-EHR-616. Washington D.C: U.S. Government Printing Office.