

Running head: THE ROLE OF A SCHOOL TECHNOLOGY COORDINATOR

The Role of a School Technology Coordinator: Changing Teachers' Attitudes and Their

Use of Technology in the Classroom

A Review of the Literature

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Introduction

There is no doubt that the new information age is impacting educators and students all across the country. In 1999, nearly all (99%) public school teachers reported having computers available to them somewhere in the school building (National Center for Education Statistics, 2000). As computers became available to teachers, they also became available to students. In 2000, The National Center for Education Statistics (NCES), showed a dramatic increase in the ratio of students to computers in the classroom over the past five years. In 1995, the ratio of students to computers was 1:69 (Byrom, 1998), but in 2000, the ratio of students to computers was 1:6 (NCES, 2000).

Despite the influx of technologies into the schools, many people question whether teachers are really utilizing the technology they have been given. One educator has been very outspoken regarding teachers' use of technology. Dr. Larry Cuban, a professor at Stanford University, has published several books, written articles and delivered speeches across the U.S. on the topic of educational technology. He has been considered a critic of "techno-enthusiasts" and believed that educational technology was overrated (Salpeter, 2001, para. 1). Cuban (2000, 2001) argued that computers were too hard to master, and teachers had too many students and too little time to incorporate technology into their regular instruction. He did not believe teachers would adapt and accept technology as an instructional tool (Cuban, 1993, 1999, 2001).

However, Becker and Ravitz (2001) surveyed 4,100 teachers and found that Cuban's implications regarding computers in K-12 schools were incorrect. The results of the Becker and Ravitz study indicated that when teachers had adequate technical expertise, adequate classroom access, and a philosophy that supported meaningful learning, most teachers used computers in their classrooms quite frequently.

Teachers are being pressed to accept the idea that they must incorporate technology into their daily lessons. The United States Department of Education (2000, para. 3) identified five technology goals:

1. All students and teachers will have access to information technology in their classrooms, schools, communities and homes.
2. All teachers will use technology effectively to help students achieve high academic standards.
3. All students will have technology and information literacy skills.
4. Research and evaluation will improve the next generation of technology applications for teaching and learning.
5. Digital content and networked applications will transform teaching and learning.

The United States Department of Education (USDOE) challenged educators, researchers, policy makers, students, and parents to collaborate to achieve the goals listed above. In addition, the International Society for Technology in Education (ISTE) initiated a National Educational Technology Standards Project (NETS), which defined standards for students, teachers and administrators. The NETS standards were based on the USDOE's five technology goals (ISTE, 2003). Twenty-nine states accepted the USDOE's challenge and adopted technology standards into their regular K-12 curriculum (Editorial Projects in Education, 2001). Georgia's Department of Education (GDOE) published state technology standards in 2001, which were added to the state's K-12 Quality Core Curriculum (GDOE, 2002). Teachers in Georgia are required to include technology standards in their daily lesson plans (GDOE, 2002).

Since the early 1980s, when the placement of computers in the classroom began, the rate of technology integration was rather slow (Mann & Shafer, 1995). A study conducted in the late 1980's by King (1987) revealed that only 12% of teachers were integrating technology into their classrooms. However, there was a gradual increase in the number of teachers using technology over the next decade. In 1998, Teaching, Learning and Computing (TLC) conducted a national survey of more than 4,000 teachers and found that approximately 24% of teachers used computers regularly in class (Center for Research on Information Technology and Organizations, 2001). In 1999, The National Center for Educational Statistics conducted a survey and found that 41% of teachers were using technology in the classroom. The most recent findings were published in Education Weekly's Annual Technology Counts Report, which revealed that in 2001, 53% of teachers were using computers for instructional purposes (Editorial Projects in Education, 2002). Despite the increased numbers of teachers using technology, there were still close to half of K-12 teachers not utilizing technology to improve instruction.

The focus of my literature review will be the process of integrating technology into the classroom. The main areas that will be addressed include the concerns of teachers in regard to technology and what it takes to use technology successfully in the classroom. The roles of a school technology coordinator will also be discussed to establish how the technology coordinator's actions impact the successful integration of technology within a school.

Teachers and Technology Integration

Although reports were able to show that most teachers recognize the importance of using technology in their classrooms (Beichner, 1993; Fulton, 1993), they often lacked a clear vision of what it means to effectively integrate technology into the classroom (Scheffler & Logan, 1992). The Technology and Learning Center (TLC) (2001) defined technology integration as the

“seamless use of technology as a tool to enhance learning” (para. 3). To determine whether technology was being integrated effectively teachers should simply ask themselves, “How does technology enhance the lesson in ways that would not be possible without it?” (TLC, para. 4.)

To gain a better understanding of the relationship between teachers and technology integration, Dusick (1998) examined teachers’ perceptions and attitudes towards technology. She found that for teachers to be successful using technology, teachers should have confidence in themselves and believe that they can accomplish the task of integrating technology. Reil and Becker (2000) went to five schools and asked teachers to describe how technology was used in the classroom. The majority of the teachers stated that they used technology as a tool to help students conduct research, understand ideas and explain their ideas with both text and graphics.

A synthesis of the literature related to technology integration revealed a ^{common set} ~~commonality~~ of factors that influence the success or failure of technology integration. Sometimes referred to as barriers, the ^{of} ~~common~~ factors ~~mentioned in the literature~~ prevented teachers from successfully integrating technology when the factors were not present (Evans-Andris, 1995). The three barriers repeatedly mentioned in the literature (Becker & Ravitz, 1999; Bielefeldt, 2001; CEO Forum, 1999; Moursund & Bielefeldt, 1999; NCES, 2000; North Central Regional Technology in Education Consortium, 2001; Sheingold & Hadley, 1990; Strudler, 1996; Strudler & Gall, 1988) ^{were} ~~included~~ inadequate access to resources, insufficient time to plan and prepare, and a lack of local teacher training and support.

Another factor that influenced technology integration was what was referred to as techno-phobia (Bowers & Bowers, 1996; Rosen & Weil, 1994, 1995). Techno-phobia was defined as “a reaction caused by fear of social disgrace, which causes apprehension, tension or uneasiness in cognitive or behavioral patterns” (Bowers & Bowers, 1996, p. 441). Other reports supported the

techno-phobia theory, but usually referred to it simply as technology anxiety (Bradley & Russell, 1997; Heinssen, Glass, & Knight, 1987). Bradley and Russell (1997) conducted a study of 350 Australian schoolteachers and found that many teachers suffered from some sort of computer anxiety. A lack of computer experience and training were the most commonly reported causes of anxiety. Bradley and Russell (1997) found that 52% of elementary teachers suffered from technology anxiety, compared to 45% of secondary teachers. Rosen and Weil (1995) proposed that anxiety could affect any teacher, but veteran teachers were the ones shown to suffer from the phobia more routinely than new teachers. Rosen and Weil (1995) also found that experienced computer users suffered from techno-phobia; the fear was usually triggered by computer errors and computer jargon. The anxieties that teachers experienced stifled opportunities for teachers to experiment with technology and independently acquire better skills (Bradley & Russell, 1997).

Another central issue discussed in the literature was the relationship between teachers' use of technology and their teaching practices. As teachers began integrating technology into their classrooms, were they going to be able to maintain their current teaching methods? The literature noted that it would be highly unlikely (Becker & Ravitz, 1999; Wilson & Peterson, 1995). In two reports (Ravitz, Becker & Wong, 2000; Wilson & Peterson, 1995) it appeared that in an effort to use more technology, teachers shifted teaching methods away from traditional instructional strategies to more student-centered strategies. The use of technology also allowed teachers to act as facilitators and coaches in the classroom (Sheingold & Hadley, 1990). In examining the pedagogies and philosophies of teachers, Reil and Becker (2000) found the "highly active computer users" to be of a strong constructivist philosophy (Reil & Becker, 2000, pg. 13). Becker and Reil (1999) also noted the shift in teaching methods were moving toward a constructivist approach. Allan Collins (1991, pp. 29-31), a noted cognitive psychologist,

discovered teaching trends that concurred with the findings of Becker and Reil (1999). Collins cited eight of the trends he noticed in the early nineties. The trends included:

1. A shift from whole-class to small-group instruction
2. A shift from lecture and recitation to coaching
3. A shift from working with better students to working with weaker students
4. A shift toward more engaged students
5. A shift from a competitive to a cooperative social structure
6. A shift from assessment based on test performance to assessment based on products and effort
7. A shift from all students learning the same things to different students learning different things
8. A shift from the primacy of verbal thinking to the integration of visual and verbal thinking

Norton and Sprague (1997), of George Mason University, looked at various technologies and ways teachers used them in the classroom. They found that teachers came to the classroom with certain philosophies and teaching styles and new teachers that entered the system brought with them the same beliefs as their predecessors. “It is frequently difficult for teachers to challenge their existing image of educational practice. Thus, teachers continue to teach the way they were taught” (Norton & Sprague, 1997, para. 11). Expecting teachers to change their instructional strategies in a way that seamlessly integrates technology is a daunting challenge (Becker & Reil, 1999; Cuban 1986, 2000).

The School Technology Coordinator

In an effort to help teachers overcome the barriers of technology integration, many schools have begun hiring local technology coordinators to provide teachers the support they need (Anderson, 1993). Although the position has been around for a number of years, Strudler (1996) stated that the position was still relatively new to the K-12 education system. The position was first established with the movement toward instructional computing in the early 1980s, and it was first put into place at colleges and universities (Barbour, 1986; Moursund, 1985, 1992).

Dr. David Moursund (1992), the former executive officer for the International Society for Technology in Education (ISTE) and now the ISTE executive officer for research and evaluation, defined the position of technology coordinator as an “educator at the school level or the district level who works to facilitate effective use of a wide range of computer-related information technologies in instruction” (Moursund, 1992, p. 8). The number of full-time technology coordinators currently placed in K-12 schools is hard to determine. Few studies have attempted to accurately gauge the frequency of the technology coordinator position.

One survey by the International Association for the Evaluation of Educational Achievement (Anderson, 1993) was able to determine how many technology coordinators were working in K-12 schools at that time. The survey identified a statistically representative sampling of schools in the United States (U.S.) and based on the data, Anderson (1993) found that 87% of U.S. K-12 schools had a designated technology coordinator. However, further examination of the survey results showed that only 6% of schools had a fulltime position strictly dedicated to fulfilling the roles and responsibilities of the technology coordinator. Forty-nine percent of schools had a full time teacher who held the title of technology coordinator in addition to their regular teaching duties and 32% of schools had a technology coordinator that held some

other primary responsibility (e.g. media-specialist, para-professional, principal). A more recent, but modest, survey conducted by *Education Week* (1999) found that 30% of schools had a fulltime technology coordinator. (~~It should be mentioned that~~ the response rate to the survey was under 10 percent.) Jerald and Orlofsky (1999) determined that over two-thirds of American schools did not have a full-time technology coordinator.

The recurring theme found throughout the literature was that the technology coordinator should serve as a leader that provides support to the faculty and students of the school (Bruder, 1990; McGinty, 1987; Ronnkvist, Dexter, & Anderson, 2000; Strudler, 1996). In addition, Moursund (1992) also analyzed the roles of technology coordinators and categorized the roles into four main areas: computer facilities manager, working with school administrators, working with teachers, and working with students. However, the areas specified by Moursund only identified the roles in the very broadest sense.

Strudler & Gall (1988) stated that the roles and responsibilities of technology coordinators varied greatly from school to school. Individual schools typically determined the roles of the technology coordinator and they usually varied from one institution to another (Strudler, 1994). In 1998, The Center for Research on Information Technology and Organizations (CRITO) distributed the Teaching, Learning and Computing Survey and received responses from about 3,000 principals, technology coordinators and teachers (Ronkvist, et al., 2000). The responses regarding the roles of the technology coordinator cited numerous roles and responsibilities, but the responses varied from one participant to the next. The responsibilities cited included: supervising and assisting computer use by classes of other teachers; installing, troubleshooting, and maintaining equipment, networks, operating systems, and software; selecting and acquiring computer-related hardware, software, and support materials for the

school; planning and running staff development workshops; writing lesson plans and units with other teachers that integrate computer activities with curriculum; and others as needed (Ronkvist, et al., 2000). Despite the fact that the roles and responsibilities of the technology coordinator varied, there were definite duties that must be performed so the technology coordinator was facilitating the “effective use of technology” referred to earlier by Moursund (1992, p. 21) in his definition of a technology coordinator.

The literature mentioned that technology coordinators should provide support (Lucas, 1995; Moursund, 1997; NCES, 2000; Strudler, 1996; Zhao, Pugh, & Sheldon, 2002), but none of the reports provided a concrete description of what was meant by the term support. In Strudler’s (1996) study, he mentioned that support included providing staff development, planning, purchasing hardware and software, maintaining equipment and assisting teachers with student use of computers. Two other reports (Anderson, 1997; Evans-Andris, 1995) specifically referred to support as maintaining computer equipment within the school. In their research report, Ronkvist, Dexter and Anderson (2000), noted that the term support had two distinctive concepts: instructional and technical. Instructional support was concerned with pedagogies, instructional strategies, and implementation of different teaching methods. Technical support, however, encompassed all aspects of the technology, such as the operation and troubleshooting of hardware and software, which are not generally related to a specific instructional method (Ronkvist et al., 2000,).

Planning

Dr. Larry S. Anderson (1997), director and founder of the National Center for Technology Planning (NCTP) at Mississippi State University, noted that less than 30% of American schools had a written technology plan. He defined a plan as a “written document that

represents the very best thinking accumulated in a particular environment (school, building, district, state) for the purpose of studying technology infusion, then recommending direction for the future.” (Anderson, 1997, p.2) Writing the technology plan was suggested by Strudler (1996) to be one of the earliest responsibilities of technology coordinators. The ultimate objective of technology coordinators was to create change and developing a technology plan was the first step in creating change (Strudler, 1996; NCATE, 1997; Wilson & Peterson, 1995). The plan needed to include short term and long term plans for technology and cover a three to five year time frame (Russell, Sorge, & Brickner, 1994).

A needs assessment, conducted prior to the development of the plan, allowed technology coordinators to determine the current status of the system and make plans accordingly (Flank & Livesey, 1993). This was an important step in planning since the needs assessment served as a foundation for the overall implementation of the plan (Flank & Livesey, 1993). The technology plan should have also included opportunities for professional development for teachers (Reil & Becker, 2000) and providing those opportunities was generally a responsibility of the school technology coordinator (Ronkvist et al., 2001).

Professional Development

In almost all of the literature relating to technology coordinators and their role in technology integration, professional development was mentioned repeatedly. It is the one factor that prevailed over all others. The need for professional development was obvious and teachers needed ample opportunities to participate in technology-related professional development courses (CEO Forum, 1999; Mann & Shafer, 1997; Matthews, 2000; Mahmood & Hirt, 1992; Moursund & Bielfield, 1999; NCATE, 1997; Taylor & Budin, 1992). Professional opportunities allowed teachers to become better prepared to integrate technology. Only 20% of teachers

surveyed in a recent study believed they were well prepared to integrate technology into their classroom (Scheffler & Logan, 1999). It was estimated that teachers who spent more than eight hours in professional development courses were more likely to feel prepared (NCES, 2000).

Professional development comes in all shapes and sizes and can be site-based or district based. Reviewers mentioned various types of professional development, but the most commonly mentioned are as follows:

1. Informal/Formal (Little, 1994)
2. Train the Trainers (Russell et al., 1994)
3. Mentoring Programs (Leiberman & McCaughlin, 1995)

There was no consensus in the research that pointed to one method of delivery being better than another. However, the researchers agreed that for professional development to be successful, it needed to be of a comprehensive style and last from five to six years (Collins, 1991; Hadley & Sheingold, 1993; Mahmood & Hirt, 1992). Yamagata-Lynch (2001) determined that there was not a guarantee that offering professional development courses ensured teachers' participation. When professional development courses were offered, planners (technology coordinators) should have designed courses that met the existing work-lives of teachers and teachers' existing activities (i.e., parent conferences, team or club meetings, and sporting events) should have been considered when planning times for courses to be offered (Yamagata-Lynch, 2001). The courses should have been in alignment with the teachers' regular schedule.

Yamagata-Lynch (2001) also mentioned that staff development courses were more successful. If teachers were provided release time from classrooms, adequate equipment, and colleagues with whom they can share and develop a common vision.

Little research has been done on exactly what should be covered in professional development courses, but Mahmood and Hirt (1992) did mention that courses should offer teachers information on how they can use technology as productivity tools. The courses should also demonstrate ways teachers can integrate technology into individual classroom environments and how to make wise decisions for purchasing and using technology.

Technical Support

Another responsibility of the technology coordinator, which was only mentioned briefly in the literature, was that of technical assistance. There was no argument that someone must be in the schools to maintain all of the equipment being placed there (Lucas, 1995; Moursund, 1992; NCREL, 2001; Wilson & Peterson, 1995; Zhao et al., 2001). The literature suggested a definite need for it, but did not ~~focus on~~ ^{Such support, explore detail.} the topic in its entirety. Obviously, more research needs to be conducted in the area of technology coordinators providing technical support for K-12 schools.

It is hard to determine whether technology coordinators currently placed in schools have made an impact on the success of technology. There are a limited number of studies on the topic, since the position is relatively new to K-12 institutions. However, the studies that were conducted yielded positive results by revealing that technology coordinators were able to help schools achieve successful technology integration (Evans-Andris, 1995; Wilson & Peterson, 1995).

One of the leading researchers on technology coordinators in the K-12 schools is Neal Strudler. Through his studies, Strudler showed that schools with technology coordinators saw overall improvements including improved teacher skills, implementation of school goals, teacher satisfaction, increased feelings of self-esteem and professional growth (Strudler, 1996). Strudler and his colleagues, Falba and Herrington (2001), found that technology coordinators were

concerned that they might work themselves out of a job in the next few years. They discovered this concern to be unfounded, since technology was constantly changing (Strudler, Falba & Herrington, 2001). Without the support the technology coordinators provided, it was unlikely that technology would fulfill its potential to impact teaching in the years to come (Strudler, 1996, Strudler & Gall, 1988).

Conclusion

In reviewing the research on teachers and technology integration, it was evident that many teachers were not effectively integrating technology into the classroom (Becker & Ravitz, 1999, 2002; CEO Forum, 1999; Cuban 2000, 2001; Hadley & Sheingold, 1993; NCES, 2000; Office of Technology Assessment, 1995). *The literature seems clear* There were definite commonalities on the reasons teachers were not integrating technology and what factors played the most significant role in technology *of integration* success or failure. The three most common factors cited included the amount of *planning* time teachers were provided to ~~plan~~, the amount of adequate equipment they were given, and the amount of training and support they *received* ~~were provided~~. ~~With the numbers of computers placed in K-12 schools and the low numbers of teachers effectively using technology, it is apparent that changes must take place.~~

There was evidence in the literature that technology coordinators were able to aid e teachers in overcoming some of the barriers to technology integration (Evans-Andris, 1995; King 1987; Moursund, 1992; Strudler, 1996; Strudler et al., 2001), but since the technology coordinator position is relatively new to K-12 schools, the research is somewhat limited. The support they provided their faculties made a positive impact on the overall success of technology integration, despite the varied roles among technology coordinators. Along with providing support, school technology coordinators served as change agents. They were generally

responsible for developing a school technology plan, providing technology-related professional development courses, and providing technical support when problems arose. Further research is needed to ^{Now} ~~determine whether the actions of~~ ^{The} a school technology coordinator can positively impact teachers' attitudes and their use of technology.

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