

Technology Integration and School Leadership

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Abstract: The No Child Left Behind Act of 2001 (NCLB) brought many significant changes to American schools including accessibility to technology. Through an extensive literature review of the relationship between technology leadership and student achievement, five major themes emerged from data that support the need for more effective computer-based education in schools.

The NCLB Act stresses the importance of providing technology integration for all students, teachers and school leaders. In short, this translates into technology integration initiatives for educators across the nation. Consequently, educational leaders have been scrambling to get a handle on what it means for them, and how to deal with the mandates, deadlines, and requirements. Today's convergence of a down economy, unprecedented cutbacks, and new NCLB accountability requirements make it tougher than ever for educational leadership (McLester, 2003). Building an infrastructure enables integration of technology into curriculum and provides information to the public. Teachers and administrators agree that they can not meet the goals of the nation without effectively implementing technology in today's classrooms. This paper explores the effectiveness of integrating technology for improving student achievement. In addition, it also addresses the critical role school administrators play in effectively implementing and supporting the use of educational technology within their schools.

Method

A review of the literature was used to collect data for this manuscript. The data were extrapolated from on-line press releases, professional and academic journals, as well as pertinent web sites and teaching experience from past years. Once these data were collected, they were placed in categories for analysis. Each article was read, re-read and analyzed in order to create common themes and categories on the effects of educational technology in student achievement and the role that school administrators have in the successful implementation. The analysis was conducted by reading and re-reading the data, and cross-checking to keep track of common themes and patterns that emerged. The data within the articles were compared and categorized by subject matter taught in a school setting. For example, some of the research articles focus their data in subject matter such as mathematics and science, while others concluded studies in reading comprehension and analyzing text. The following conceptual organizers occurred as a direct result from the literature search: (a) changing ways of learning, (b) technology in the classroom, (c) student achievement, and (d) administrators' role, and (e) obstacles in the classroom.

Theoretical Perspective

The decline in student achievement and performance on standardized state exams such as the Florida Comprehensive Assessment Test (FCAT) and the Stanford Assessment Test (SAT) has been a concern in state governments for many years (Berliner & Biddle, 1995). Increasing student achievement has long been a debate of government officials, school administrators, teachers, parents, and students. In an effort to raise student standards and improve the public educational system, President George W. Bush created the No Child Left Behind Act of 2001, also known as NCLB. No Child Left behind Act of 2001 is considered to be a landmark in

education reform designed to improve student achievement and change the culture of America's schools (NCLB, 2003). The NCLB is built on four common sense pillars: accountability for results, an emphasis on doing what works based on scientific research, expanded parental options, and expanded local control and flexibility.

Changing the Way They Learn

The effectiveness of educational technology has often been debatable among students, educators, administrators, and government officials. Liu, Macmillan, and Timmons (1998) found that 57% of students in the study agreed that computers were a waste of money while 52% of the students disagreed and stated that computers made their work easy (p.195). Students perceive the use of technology in the classroom differently from their teachers or administrators. Liu et al. (1998) state that when students were asked about technology impacting their academic subjects, many students said that the use of computers to complete assignments had made their learning more engaging and more interesting. In addition, the students were more enthusiastic about the learning process. (Liu et al., 1998, p. 195). In addition, the study found that students who use computers throughout their educational process at home or in the classroom will have a desire to use them in the future. A study conducted by The International Association for the Evaluation of Educational Achievement (IEA) found that in most countries the integration of computers into school subjects tended to be focused within the higher grade levels (Liu et al., 1998, p. 189).

Technology in the Classroom

Teachers have often felt the burden of having to implement the use of technology in their educational programs in addition to many other instructional mandates. Integrating technology in the classroom involves activities such as the use of multi-media mathematical activities, in which a computer program that gives students the opportunity to solve mathematical problems at their appropriate instructional level and provides feedback. Activities that involve the use of computers enable the students to develop basic math skills and also develop higher order thinking skills. Using technology provides the learning of skills through different learning modalities. For example, students can use their sense of sight and sound to complete activities such as algebraic problems. In contrast, textbooks would only provide students with a two dimensional picture of the information. Students that are auditory learners would experience difficulties learning through the visual modality alone. Furthermore, the use of computers is not limited for the development of mathematical skills. Computers and technology can also be used in different subject areas such as foreign languages, reading, language arts, and science. Students can write, listen to, and read stories on the computer. However, adequate training for administrators, teachers, parents who volunteer on the appropriate and effective use of computers and instructional programs has been seldom offered? Consequently, the computers have been left sitting on tables collecting dust without use. According to Goddard (2002), the call for technology has gone out for higher standards and challenging learning activities; some elementary teachers are still sitting in their classrooms, staring at their computers, lamenting how change is difficult. Since the passing of the 2001 NCLB Act, the use of technology as a tool for learning in the classroom is a requirement that teachers have to abide by. The technology component of the No Child Left Behind Act is part D of Title II, called Enhancing Education through Technology. The Enhancing Education through Technology calls for states to submit an application addressing 15 topics related on how they will use their technology money to the Education Department (Fletcher, 2003, p. 56). The NCLB deadline for states to ensure technology will be fully integrated into the curricula and instruction of their schools is December

31, 2006. The NCLB bill also calls for national technology activities, including a long-term study on technology in education and the creation of a national education technology plan (Fletcher, 2003, p. 56). Furthermore, studies on the effectiveness of educational technology have been ongoing for several years.

Student Achievement

Some professionals claimed that the use of technology would be the solution to the problems in education. Hope (1997) stated that technology was being viewed as indispensable in schools during the 1990's (p. 3). According to Lowe (2002), many educators believe that Computer Based Education (CBE) is the panacea for education because of the education theories used in the development of the computer. "The cognitive orientation comes from a belief that students need to develop an understanding of the underlying concepts associated with any task and that this understanding is developed by allowing the students to interact actively with the environment" (Lowe, 2002, p. 164). The use of technology has allowed students in educational programs to individualize the program at each student's ability level and interact actively by answering questions and receiving corrective feedback, therefore making them an effective instructional and tutorial tool. Lowe's (2002) results indicated that CBE positively affected student achievement when compared to traditional classroom instruction by increasing their involvement in class projects and decreasing the time it takes to complete assignments (p. 167). Although the benefit of using educational technology to increase student achievement is evident, Lowe (2002) states that CBE should be used to enhance conventional teaching methods, not replace them (p. 168).

Administrators' Role

School administrators play a critical role in the effective implementation of educational technology in their schools. "A school administrator is an educational leader who promotes the success of all students by advocating, nurturing, and sustaining a school culture and instructional programs conducive to student learning and staff professional growth" (Ditzhazy & Poolsup, 2002, p. 10). Changing teachers' mind frame on the effective and multiple uses of technology might be a difficult task to accomplish; however, administrators have the advantage of making their staff feeling comfortable with this new change by providing clear expectations, support, and time for the technology plan to take place. Neither forcing nor obligating the use of technology will be conducive to continued use in the future. Hope (1997) discovered that technology in schools had not reached the level that had been envisioned, or the impact expected by so many, finding instead that some teachers in the school setting continue to teach the way they were taught when they were in school (Galín, 1995), and technology remains conceptualized as an add-on luxury (IBM, 1995) rather than integral to achieving educational outcomes. Goddard (2002) states that change may be difficult, but educators who capitalize on the relationship between technology and education reform can help students develop higher-order thinking skills and function effectively in a world beyond the classroom (p. 25). Introducing technology in schools threatens to disrupt the existing structure of the schools (Hope, 1997, p. 3). Furthermore, technology engenders new relationships between teachers, alters priorities regarding the allocation of resources, disrupts the continuity of schedule construction, and influences the kind of experiences teachers design for students (Hope, 1997). For teachers, knowledge of available software that can be implemented into the curriculum and comfort level that are increased with time of use can eliminate old teaching methods that are ineffective or inefficient. Additionally, application should include clear expectations, training and placement, equipment and physical capacity, incentives, and methods of encouraging internal motivation (Goddard, 2002, p. 23).

Moreover, teachers need to be acknowledged for what they do. Just like students, teachers need praise and encouragement to give them the motivation to continue to explore and use technology.

According to Hope (1997), technology can reach its potential in schools only when school leaders, change agents, and teachers understand the impact these factors have on technology integration and use (p. 3). School administrators have the responsibility for understanding their staff's needs, teaching styles, curriculum goals, and students' needs in order to effectively create a plan that will be successfully adopted and implemented. School administrators also serve as role models in the use of technology. Faculty meetings could be conducted using PowerPoint presentations, in order to model an effective technology tool to deliver information. According to Hope (1997), leadership is viewed as being essential to the progress and performance of an organization. Therefore, lack of leadership is recognized as one of the obstacles to technology's integration into the instructional process of school (Galbraith, Grice, Carss, Edean, & Warry, 1990).

Obstacles in the Classroom

It has been found that students will use computers to the capacity that their teachers have taught them. This clearly might limit some students in their potential to explore other technological uses. Ditzhazy and Poolsup (2002) state that continuing current research suggests that student learning improvement relates to what teachers do in the classroom (p. 10). In addition, Ditzhazy and Poolsup (2002) state that teachers experience many obstacles to technology integration in their classrooms and that their skills and knowledge are critical to success. Professional development is a critical component of successful technology implementation in schools. School administrators have the responsibility of offering their school staff professional development opportunities. Furthermore, the administrator should evaluate each staff member's unique needs, in order to offer the most adequate professional development for him/ her. Hope (1997) suggests that for principals to support technology in a school, they are required to respond to teachers' demands for time and resources to use technology (p. 4). Ditzhazy and Poolsup (2002) found that teachers' skills and knowledge are critical factors in the successful integration of technology. Recent research shows that although teachers are eager to use technology for curricular activities, the lack of effective professional development programs and time dedicated to experimentation hinder successful integration (Ditzhazy & Poolsup, 2002, p. 11). Adequate professional development will increase the appropriate use of technology within the classrooms. In addition to the initial development, continuous professional developments need to be offered throughout the school year for the implementation of specific programs and to meet the continuous development needs of the staff. It is imperative to have appropriate training (Ditzhazy & Poolsup, 2002, p. 12).

Corporations are going to benefit hiring employees who are computer literate and know how to perform different tasks such as using technology to analyze data, make presentations, search for information, and create documents on the computer. In our society today, the number of computers being used in the home has increased because of the low cost that companies offer, services and support, an increasing number of technological advances available to schools, and huge investments by corporations to wire America (Goddard, 2002, p. 25). According to a report published by the U.S. Department of Education in October 2003, "Internet access in U.S. public schools and classrooms: 1994-2002," 99 percent of public schools in the United States had access to the Internet.

Conclusions and Implications for Practitioners and Policymakers

Educators must look continually at the answers to old questions, include new information as it becomes available, and make new, more informed decisions. Once these decisions are made, problem solving occurs. The process of identifying relationships, determining causation, and implementing remedies begins again. District and school site administrators, teachers, students, parents and the business community must continue to work together to create and support conditions such that no child, no teacher, nor administrator is neglected.

Although technology may not be for everyone, with the proper support, training, and funding, teachers and administrators can find that technology is not another task or curriculum that needs to be implemented into an already exhausted system. Implementation can be successful with time, support from other staff members, and proper training. Teachers and administrators can develop intrinsic and extrinsic motivation to use technology in their planning across the curriculum. Finally, continued support and monitoring would need to be conducted through the process. Change is difficult, but the benefits of technology integration into school curriculum and leadership are far greater. Through collaboration and dedication, success can be reached.

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