

Technology Integration: A Best Practice Perspective

Lee J. Lesisko
Pleasant Valley School District (PA)

Robert J. Wright
Widener University

Brenda O'Hern
Widener University

Abstract

The technology coordinator has the responsibility of collaborating with school leaders and educators to integrate technology into the curriculum and operations of the school. Not only does this individual have to understand how technology works, but also must determine the best way to infuse it in a school setting. Technology leaders must possess an easygoing personality, understand curriculum, be an effective communicator, and enjoy working with children. The coordinator must be ready to work directly with children and teach complex ideas about technology. The focus of this study was on student learning. This analysis revealed that there is a consistent pattern of increased student learning with regard to curriculum content, as well as measured technology skills over time by young learners taught by technology coordinators. Potential problems include available technology resources for elementary students and competing needs for the computer laboratory area during the school day.

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Introduction

Technology leadership in schools can take many forms. Some technology coordinators have the responsibility to manage and support the computer workstations, file servers, electronic whiteboards, digital projectors, telephone systems, and the cabling infrastructure. These technical professionals usually have specialized certifications from manufacturers such as Microsoft, and Cisco. They also work with vendors to find the optimal cost effective technological solution for the school system.

Conversely, there are technology leaders who assist educators and students directly in the classroom on the use and integration of technology resources. These individuals are often professionally certified by the state department of education. This type of technology coordinator typically has a background in education with excellent leadership skills. These highbred teacher-technicians must be open to change, understand instructional technology, and must be well versed in curriculum development.

Leadership for the technology division of a school system requires an individual educated for this task (Wright & Lesisko, 2007). These leaders have a need for a foundation built on three pillars including skill in technology, leadership and supervisory skills, and the skills of a good teacher.

The focus of this research paper is technology leadership. In addition, for the purposes of this report, the school system analyzed will be referred to as the Granite Rock School District.¹ Granite Rock enrolls approximately 6,000 students in grades Kindergarten through 12 in four elementary, one intermediate, and two secondary facilities. The communities included in the district cover almost 120 square miles and children are transported each day by 195 school bus routes.

There is no doubt that the nation needs a population that is well versed in technology and is knowledgeable in its use and development. The future needs of the nation also imply that many young people complete advanced education in the science of technology and the physics and engineering that underlie all technologies. President Barack Obama pledged \$500 million to the public schools in matching grants for the improvement of technology and technology instruction in the nation's public schools (Obama & Biden, 2009). The quest for these new scientists begins in our public schools and the efforts of schools to teach Science, Technology, Engineering, and Mathematics (STEM). This instructional effort requires high caliber leadership.

Research Question

This study answers the following research question: Does having an individual, other than the classroom teacher, provide technology instruction assist in the improvement of student's technology use? The answer to this question will better inform school leaders on how to plan for and implement the integration of technology instruction into a classroom environment.

Literature

The individual promoting technology literacy, technology curriculum, and related resources is the technology coordinator. McIntosh (1987) explained that this individual is critical to the successful implementation of technology education in a K-12 environment.

According to Moursund (1992), a technology coordinator has the following responsibilities:

- (a) Provide timely help to both educators and students in the use of technology.
- (b) Provide assistance to the technical director and technicians, as well as district administration in the development of long and short-range goals and objectives for the district.

- (c) Ensure that youngsters moving from one grade to the next have the necessary technology related skills needed for that next grade level.
- (d) Assist teachers and curriculum leaders in developing specific building level goals and objectives on how to use technology.
- (e) Assist educators in developing curriculum activities and lesson plans that coincide with the instructional goals and objectives of the school.
- (f) Help to coordinate the technology component of each faculty member's daily lessons.
- (g) Provide in-service training for teachers and administrators throughout the school year by sharing new ideas and current issues related to technology and its integration.
- (h) Work with support personnel to make effective use of technology in their jobs.
- (i) Provide or coordinate education in the utilization of technology to parents and community members on the equipment available in the school.

Lesisko (2005) postulated that integrating technology into the classroom can be a difficult process if not implemented properly. Just as school libraries have been traditionally used to support a district's curriculum, instructional technology, with its range and versatility, can now support the curriculum far beyond what was accomplished in the past. LeCrone (1997) explained that one way to utilize technology in the classroom is to allow students to participate with each other in shared technology projects. Project collaboration will open dialogue between many students with a common goal, promoting a positive learning environment. Coley (1997) suggested that when determining the effectiveness of technology, an important aspect to remember is that the technology used is only one component of the instructional process. The outcome is dependent upon the quality of the instruction, not the type of technology utilized.

Forcier and Descy (2008) stated that technology is important in team learning projects. Students with diverse skills, backgrounds, and abilities tend to work together better on technology related projects and cooperative learning is improved using technology in the classroom.

Jonassen, Howland, Marra, and Crismond (2008) commented that web activities such as WebQuests or scavenger hunts are a common technology tool for developing inductive thinking, challenging students intellectually, and assisting with the development of problem solving skills. The authors further suggest that the use of technology is an effective tool and positively impacts students' motivation.

In his book, November (2001) reported that when technology is placed in the hands of learners they become better problem solvers and are more apt to communicate to solve problems. Lever-Duffy and McDonald (2008) explained that the ability to access and show video clips with a click of the mouse offers many exciting educational opportunities. The authors also explained that video travelogues, documentaries, and docudramas can place the learner directly in the scene with a great viewing angle that is completely safe for the individual. The researchers call this location shifting and its key asset provides students a way to explore a topic using video directly in the classroom.

Process

The target population chosen for this study consisted of classroom teachers working in a Pennsylvania public school system. The sample includes kindergarten through grade 12 educators employed in a midsize school district with access to a technology laboratory approximately every two weeks for the elementary grades and more frequently for the intermediate and secondary levels. A professional staff member in each of the seven buildings

oversees computer laboratory scheduling. The technology coordinator routinely communicates with these individuals to facilitate the booking of these areas. The role of the technology coordinator is to team teach, model proper technology integration, or support the lesson by providing a second set of hands in the classroom or laboratory. If the technology coordinator is asked to teach a lesson, the content always parallels what was currently being taught in the classroom. Occasional lessons were delivered by the technology coordinator to introduce an upcoming curricular topic, or to reinforce a lesson that was just finished. In all cases, technologies such as the Internet, Microsoft Office applications, streaming video, simulations, instructional gaming, WebQuests, scavenger hunts, or Web 2.0 tools were utilized during instruction.

Method

During the 2008-09 school year, the technology coordinator assisted 93 unique classes with technology instruction for a total of 428 visitations. Data for this study was collected through a survey instrument that was administered electronically during June of 2009. The questionnaire consisted of 12 questions (see Appendix A). The first four questions were demographic in nature; the next five questions asked the respondent to rate topics such as integration, skills, preparedness, and proficiency. These items were comprised of a Likert-scale type format. The final three questions were of open-ended format and asked the survey takers to comment on their feelings regarding scheduling, services offered, and overall opinions of the integration process. The researchers also conducted informal conversational interviews with faculty in order to understand their perceptions of student learning. The results were analyzed to identify significant patterns, differences and commonalities. Berry (1997) indicated that

interviewing involves asking informants questions, and probing wherever necessary to obtain data deemed useful by the researcher.

Analysis

Of the 93 questionnaires sent out, 72 or 77.4% were returned in usable format and the majority of them were from grade kindergarten through grade eight. Skewness and kurtosis indicated that the data are too positively slanted to make generalizations based on this sample and a one way Analysis of Variance by building suggested no significant differences in scores between the buildings.

The profile of a typical educator employed at Granite Rock who utilized the services of the district technology coordinator is as follows: 82% were female, 39% were between 36 and 45 years of age, and 44% have been employed in education for less than 10 years. Table 1.0 explains the rating scale descriptive statistics found in the study.

Variable	N	Min	Max	<u>M</u>	<u>SD</u>
Integration of Technology into the Curriculum	72	2	10	8.96	1.74
Effective Helping Students Apply Technology Skills	72	1	10	9.11	1.67
Students Better Prepared to Use Technology	72	1	10	9.15	1.67
Helped You to Become More Proficient and Confident	72	2	10	8.97	1.71
Current Scheduling Process	72	1	10	8.32	2.34
All 5 Categories Combined	72	1.8	10	8.90	1.60

For the last section of the survey, respondents were asked to reflect on three open-ended questions. Question 10 asked the survey takers for their feelings about the current scheduling

process. The schedule is set up in each building so that an educator receives a stipend to facilitate the booking and simple maintenance tasks for the computer laboratory. Of 72 returns, 45 commented on the scheduling question. An analysis revealed that respondents felt the current scheduling process was working efficiently. However, there was an issue with the amount of time classes were spending in the laboratory; apparently it is not enough to complete technology projects. One survey taker reported, “I believe that my students would benefit from more opportunities to use the computer to gain valuable skills or concepts being taught.” Another who teaches in an elementary building explained, “We don’t get enough time in our lab as it’s shared between the library, music, and other subject areas.” An educator teaching in a larger facility explained, “I think that there should be more available slots over more days. First come, first serve is not always the best solution. Sometimes, teachers are left with no available slots that work for their schedule. More options and days would help.”

Forty-two individuals provided comments on Question 11 which asked respondents to provide feedback on how they felt about the need for additional technology services that the technology coordinator should or could offer while providing instruction. Analysis of this question revealed a need for the following:

- more training on electronic whiteboards
- the need for additional assistance with curriculum integration with respect to technology-based inquiry projects
- more training on how to utilize the microcomputer and digital projector
- the need for additional word processing training
- instruction on how to build and post podcasts
- locating online activities that support instruction

- more co-teaching opportunities
- time to consult on lesson planning

The last question on the survey asked respondents to provide any additional comments, ideas or concerns about technology integration. Twenty-eight educators answered this question and their comments focused on how the technology coordinator has assisted them with instruction during the past year. One teacher reported, “The technology coordinator has been a tremendous help for me and my class. I have developed a newsletter using programs he introduced to me and my students have done lessons with him that enhanced their learning by providing meaningful practice for the PSSA (Pennsylvania state mandated test). He also has helped us to be the first class in the district’s history to record and upload video podcasts onto the Internet.” An educator teaching in a large building explained, “I would have a difficult time taking my students to the lab and troubleshooting if they had any problems. The technology coordinator always goes out of his way to have activities ready to go for when we arrive. There is no downtime; we jump right in when we arrive to the lab.” This educator further explained, “I know I wouldn’t put the time in getting the activities together due to the time constraints of other subjects and errands I need to attend to during the teaching day. The technology coordinator has really taken my class to the next level with technology integration.”

One educator pointed out, “The technology coordinator is always available to help teachers and students to incorporate technology into the teacher’s lesson plans and is an effective co-teacher. His motivation and willingness to provide support to us and the students makes him a valuable and respected administrator.” In the area of student achievement, a respondent explained, “I know through ongoing observations of my students that they are developing

literacy and problem-solving skills because of their computer work. The technology coordinator has encouraged and taught me better ways to use the technology here at school as well.”

As far as curriculum related activities, an educator proclaimed, “The technology coordinator is great about matching each lesson to a specific topic that we are learning about in class and that is a great way to incorporate technology. He is an educator that goes the extra mile for the teachers and the kids.” In terms of student learning, an educator responded, “My students really benefit from having a technology coordinator to present lessons to them using technology. He uses ‘kid friendly’ terminology and is patient and helpful during the process. The children get excited when we go to the computer lab to have him instruct them.”

Finally, one teacher reported, “In the current global market, students need to be technologically challenged. We need more lessons and curriculum with technology utilized in order to be a competitive school district and meet the 21st Century skills and standards.”

Conclusion

The technology coordinator has the responsibility of tending to the needs of educators and students. Not only does this individual have to understand how technology works, but also must determine the best way to integrate it into the curriculum. Moreover, technology leaders must have the correct personality, understand curriculum, be an effective communicator, enjoy working with children of all ages, and use appropriate age level terminology during the lesson so that children can comprehend the concepts. This astute individual must also be motivated to go to great lengths to assist educators with finding quality resources and to promote technology use in an effort to enhance learning opportunities.

Quantitative analyses indicated there is insufficient data to draw conclusions about the research question with the exception that the technology coordinator is well liked by teachers and

students. Qualitatively, however, there is a consistent pattern realized from the data that suggests there is an increase in student learning with regard to curriculum content, as well as gains in technology skills overtime. However, more studies need to be done to validate the results in this report.

Additional conclusions that can be drawn are that there are not enough technology resources for student use, at least at the elementary level. Furthermore, in the smaller buildings educators are finding themselves competing with other curricular areas such as library, music, and unrelated instructional activities during the school day which makes the area unavailable for technology instruction. Clearly, there are many competing forces in a small building where many groups and individuals share one general-purpose room. This makes technology instruction difficult to plan. Survey respondents also felt the computer lab needs to be available for technology lessons on a regular basis. For these types of situations, school leaders must find a common ground to ensure all parties have equal access to technology, as well as the needed space for activities and meetings.

The last area of concern identified in this research is the need for a refresher course in current technologies available within each building. Educators are also asking for training on emerging technologies such as Web 2.0 tools and electronic whiteboards.

The technology coordinator has a pivotal role in education. As hardware, software and related devices become more prevalent and cost effective; school officials must take the necessary steps to ensure that educators understand how to integrate technology so they can effectively instruct youngsters on how it can be used in society. Although more research needs to be completed on the use and role of technology coordinators in education, this report explains how helpful these individuals can be, if used properly, in an academic environment.

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Appendix A

Survey Instrument

Technology Integration Survey

1. Gender:
 - a. Male
 - b. Female

2. Age:
 - a. 25 - 35
 - b. 36 - 45
 - c. 46 - 55
 - d. 56 - 65
 - e. 66 - older

3. Total number of years working in education:
 - a. Under 10
 - b. 11 - 15
 - c. 16 - 20
 - d. 21 - 25
 - e. 26 - 30
 - f. 31 - 35
 - g. More than 35

4. Building you teach in:
 - a. High School
 - b. Middle School
 - c. Intermediate School
 - d. Elementary School One
 - e. Elementary School Two
 - f. Elementary School Three
 - g. Elementary School Four

5. On a scale from 1 (lowest) to 10 (highest), please rate the following: To what degree did the Technology Coordinator help you to integrate technology into the curriculum?

6. On a scale from 1 (lowest) to 10 (highest), please rate the following: To what degree has the Technology Coordinator been effective in helping your students apply technology skills to the classroom curriculum and related projects?

7. On a scale from 1 (lowest) to 10 (highest), please rate the following: Has the Technology Coordinator helped students to be better prepared to use technology?

8. On a scale from 1 (lowest) to 10 (highest), please rate the following: Have the programs and support of the Technology Coordinator helped you become more proficient and or confident in using educational technology?
9. On a scale from 1 (lowest) to 10 (highest), please rate the following: How would you rate the current scheduling process to have the Technology Coordinator assist you in the classroom?
10. How can the scheduling process be improved?
11. What additional technology services would you like to have the Technology Coordinator provide?
12. Additional comments, ideas, or concerns:

¹ The Superintendent of Schools has requested that the district name remain confidential.