Micro-Level Allocation of ARRA Funds*

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Abstract

The federal government, through the Department of Education, distributed millions of dollars to state education departments as part of the American Recovery and Restoration Act (ARRA). Many districts applied for and received thousands of dollars in order to make improvements to schools and impact student achievement. Several districts purchased technology equipment, along with the necessary supporting infrastructure, as a resource in the classroom with the ARRA funds. This paper examines the micro-level resource allocation of funds as it pertains to instructional technology. It identified 103 districts that requested funds for instructional technology and selected one district to track the expenditures of the money. It outlines the disposition of the monies at the district level and school levels in three categories: instructional technology, technology infrastructure/support, and non-computer technology. The district has not spent its entire allocation of ARRA funds, but has currently used 46% of its expended funds on instructional technology.

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1 Introduction

Depending on who one asks, America has the greatest education system in the world or has an education system that is failing today's student. It was this idea that sparked inquiry in to how we, as a nation and

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a state, are addressing this issue. This research was designed as a case study to better understand how the American Recovery and Restoration Act or ARRA (2010) funds were being distributed and utilized within the districts of Arkansas and, more specifically, one particular district. Are we equipping our schools with the appropriate technology and infrastructure support within the state to move Arkansas forward in the 21st century?

There is no doubt that major trends in globalization, demographic changes, political influences, "changing values and attitudes", and technological advances have made an impact upon our society, students, and education system (Daggett, 2008). Cavenaugh (2009) identifies "increasing global forces are among the new and growing external pressures on American elementary and secondary schools" (p. 1). America has seen increases in the Hispanic population, increases in the capabilities of technologies, and sweeping federal legislation, all of which have influenced how schools respond to students needs. More importantly, Americans have seen other countries out-performing U.S. students on international exams. Test scores from 2006 show 15 year-old students rank 17 and 24 out of 30, in science and math respectively, when compared to their peers in other industrialized nations (Glod, 2007). Results such as these have created a "rhetoric of crisis" (Glass, 2008) in which a plan must be implemented to "fix" our failing education system.

While many suggestions have been proposed, two solutions seem to have become popular. The first, and most popular politically, is a legislative approach. At the start of the 21st century, a major legislative reform was passed impacting every state called the No Child Left Behind Act of 2001 (NCLB, 2002). This reform called for standardized testing in Language Arts and Mathematics, which included punitive measures for schools not making Adequate Yearly Progress (AYP). More recently, the Obama administration placed education near the front burner in conversations, as part of the economic recovery plan, by dedicating $100 billion for schools.

A second solution is the integration/incorporation of technology into the classrooms. Computers in the classroom are not a new idea and have been used in classrooms since the 1960's (Bransford, et al., 2000) in a variety of roles, such as tutoring and "surrogate teacher" (Fouts, 2000). The role for computer technology in schools has increased and will continue to do so (Bransford, et al., 2000). Jeffery Fouts (2000) would agree. He stated, " there is evidence that computers and the related technologies have made major inroads into the schools...[with] one instructional computer for every 5.7 students and more than half of the nation's classrooms have been connected to the internet" (p. 1). However, three issues consistently surface when technology is considered as a solution: funding, time, and accessibility.

The American Recovery and Restoration Act (ARRA) of 2009 has, in some fashion, addressed the first concern, as a short-term solution, by providing monies for education, something NCLB did not do (Glass, 2008). In a press release, Secretary Duncan announced the Federal Department of Education was going to release $44 billion of the stimulus funds to the states, while the remaining funds were going to be competed for in Race to the Top grants (Abrevaya & McGrath, 2009). These funds contain certain expectations from the states, primarily the "improvement of student achievement" and the creation of a "transparent" funding system that provided "evidence and plans for progress." Arkansas was one of the states that accepted the conditions of federal funding and distributed monies to districts.

According to the press release, funds will be distributed over a two-year period. In 2009, governors could apply for the first allotment, which consisted of 67% of the total funds. The remaining 33% will be released in the spring of 2010 (Abrevaya & McGrath, 2009).

2 The Real Problem

The real problem in most districts and classrooms is making technology accessible for the students. Accessibility of instructional technology, like computers/laptops, on a daily or weekly basis, is a real concern, simply because there are not enough to go around on a regular or consistent basis in many classrooms. In a quote from Jeffery Fouts (2000), he stated, " there is evidence that computers and the related technologies have made major inroads into the schools...[with] *one instructional computer for every 5.7 students* and more than half of the nation's classrooms have been connected to the internet" (p. 1). In one local district, administrators claimed to have a 3:1 computers-to-student ratio, with the majority of the computers found

not in the classrooms, but rather in computer labs. Statham and Torell (1996) cited Terrel H. Bell (1993) with this quote, "Computers must come out of the labs and into the classroom, where they can serve...the next generation..." (p. 12).

The availability of funds through ARRA has been a welcomed resource. In several conversations with administrators, the sentiment is consistent regarding the ARRA funds; they are generally happy to have received these funds and recognize the importance of spending the money wisely, since it is a limited resource. The money allocation is a good change from and an obvious difference between the NCLB legislation, which provided no funding (Glass, 2008). Regardless of how much money a district receives, additional problems still surround the implementation of technology.

3 Purpose

The purpose of this paper is to investigate how districts are allocating and spending ARRA funds, also called stimulus monies, at the district and school levels to make instructional technologies more accessible for students. In other words, this paper examines the micro-level resource allocation (Pijanowski, 2008, Hartman & Boyd, 1998) of the stimulus funds by selecting one district to track the expenditures. As part of a specialist project, the authors investigated the origination of resources and the disposition of resources (Monk, et al., 1996), by looking at both the district level and school level. Hundreds of thousands, and in some cases millions, of dollars were issued to districts. Were all the dollars assigned to state distributed completely or did some remain at the department level? Once those funds reached the district level, how many of those dollars reached the classroom for instructional technology components? Ultimately, the authors would like to determine if districts and schools are maximizing the dollars for appropriate resource purchases and placing technology into the students' hands. The last question will not be answered at the conclusion of this paper.

4 Why Invest?

4.1 Assumptions

This broad question is not unique to this paper but has surfaced during the research, along with several assumptions made by researchers on how technology can impact instruction. For example, Culp, et al., (2003) argue technology should be invested in, because it can be used as a tool for "addressing challenges in teaching and learning," as a "change agent" (Fouts, 2000), and as a "central force in economic competitiveness" (p. 5, 6). While the authors agree with the assumptions made by Culp, et al., (2003), specifically their first assumption, the authors have developed three separate, but similar, assumptions that influenced their work during this project.

First, technology does make an impact on learning. While research is still early, ongoing and even conflicting (Fouts, 2000; Schacter, 1999), there are several reports indicating positive and, in some cases, significant differences in the outcome of student learning. "In general, technology-based tools can enhance student performance when they are integrated into the curriculum and use in accordance with knowledge about learning" (Bransford, et al., 2000, p. 216). Waxman, et al. (2002) shared from their study that the effects of teaching and learning with technology indicated "that teaching and learning with technology has a small, positive, significant effect on student outcomes when compared to traditional instruction" (p. 2).

While many studies identified the positives of technology in a general sense, other studies focused on specific technology and its impact upon student learning. For example, one study found teachers who used interactive whiteboards did have higher student achievement (Haystead & Marzano, 2010). In another study, a comparison was made between generating essays by hand and those created on a "word-processor" (computer). It reported those who used the "word-processor" had improved performance over the other group (Stathman &Torell, 1996).

It may appear this paper is using instructional technology, computers, and "technology-based tools" interchangeably. In most cases, it is. However, clarification is warranted and provided in the next section titled *Clarifications*. The reason for using these terms interchangeably is based partly on the second assumption,

that technology makes a positive impact on student learning, coincides frequently with the lives of most students', and influences their preference on how, along with their ability, to learn.

Technology is already ubiquitous in our students' lives. It affects how they make decisions, receive information, and exhibit their understanding of the world. Ian Jukes, et al. (2010) stress the need for teachers and schools to be willing to "embrace in classrooms the digital world that's an everyday and internalized part of the students' lives outside of school" (p. 36). Therefore, we need to assume that technology has influenced brain development in today's youth and, therefore, impacted learning in today's youth. Current brain research highlights how both halves of the brain are influential in the learning process (Pink, 2005) and how technology is impacting students' learning (Jukes, et al., 2010), both of which, must be considered in the decision making process of technology use and purchases. Recall previous comment from Bransford, et al., (2000) on how technology can make an impact when integrated into curriculum with "knowledge about learning".

As Jukes, et al. (2010) stated it, students are being "bombarded with technology," which results in their brains being wired differently. The brain is constantly restructuring itself as it receives new stimulus and inputs and is, therefore, making new cells, new connections, and new thinking patterns (p. 24). So what are the results to our students' brains in light of these new stimuli? Current brain research is highlighting the brain's plasticity and ability to continuously reshape, reconnect, and mold itself as new information is received (p. 26).

5 Clarifications

5.1 What I am not assuming?

It would be understandable if one concluded that positive impact on student learning through the use of technology was motivated more by positive behavioral outcomes as part of the improvement. That is not the case for this study. While there were several observations concerning student behaviors, researchers (Waxman, et al., 2002; Schacter, 1999; Cavenaugh, 2009) differentiated, collected data on, and illustrated that behaviors were positively impacted with the use of technology, but kept behavior and performance results separate. Their conclusions did not indicate positive behavior, while using technology, was necessary to create positive outcomes. In respect of their work, this paper continued to keep the two ideas distinct from one another.

5.2 What constitutes Instructional Technology?

Technology was categorized into three areas: instructional technology, technology support, and non-computer technology. Instructional technology consists of the following items: mobile computer labs, computer labs, slates or interwrite boards, computers, laptops, software (including upgrades), iPods, smartphones, instructional software and interactive whiteboards. Other researchers identify these tools as "informational technology" (Gray & Lewis, 2009), however the intent is the same. Certain pieces of non-computer technology, such as VCRs, overhead projectors, and digital cameras, were not included. While useful in the classroom, they do not conform to my criteria. Previous studies have made similar distinctions among equipment types (Gray & Lewis, 2009). Technology support consists of upgrades to infrastructure that enhances the ability to support the Internet, Web 2.0 resources, and on-line computer programs, like USB extension poles. Included in this case study were the costs for installation, mounting brackets and wireless capabilities, since ARRA funds paid for the items.

5.3 Grade-Level Configurations

This brings me to another clarification: grade designations. Districts, with variations in student populations, have different grade configurations, so the grades were divided into three different groups: elementary grades K-4; middle school grades 5-8, and high school grades 9-12. If a school has grades that fell into two groups, then I placed the information in both categories for the appropriate grade level. For example, if a junior

high, grades eight and nine, identified computers for the eighth grade and software for ninth grade, then I placed computers in the 5-8 category, while the 9-12 category received the software. This was applied to any school whose grades fell into two categories.

6 Conceptual Issues and Methodology

6.1 Conceptual Issues

It is helpful to understand how the ARRA monies were received and issued for this study. The research team of Monk, Roelike, and Brent (1996) provided a model followed by this paper regarding the flow of funds. They described "three broad dimensions" with the "origination of resources," the "disposition of resources", and the "utilization of resources" when describing how the money flowed among the various educational levels (p. 7).

The origination of resources came from the federal government through the stimulus (ARRA) funds. These monies, as described previously, are to be distributed over a two-year time period and spent in accordance with the guidelines.

The disposition of resources in this paper differed somewhat from Monk, et al. (1996). In their project, disposition referred to the "decisions school officials and others make that give students access to resources" (p. 8). The amount of money to be dispersed by the district was predetermined by the state department using student demographic data to allocate the fiscal resources. Therefore, in this project, the district's accounting practices were used tracking the items purchased and the monies spend. Again, the district was to be very transparent in their spending of the ARRA funds.

Monk, et al., (1996) also used personnel data to "gain insight into resource allocation behaviors within schools" (p. 8) as part of their understanding in the dispersal of resources. The case study district's business administrator shared with me in an interview that, because federal funds were already predetermined, the district asked each school to survey and develop a "wish list" for resources. From this list, the monies were distributed accordingly. For this part of the project, the district business administrator and the district principals were identified to better understand what procedures, research, and surveys were used to develop buildings' resource list.

7 Methodology

7.1 District Selection Criteria

As ARRA funds were being distributed, superintendents received guidance on the funds distribution. The intent of this funding was not to be a facilities bill, however certain additions or projects could be done if there was an impact on student performances (Thompson, 2009). 253 districts had access to the federal funds that fell into one of three categories. The Arkansas Department of Education clarified for the districts in a memo that "ARRA funds [were] being made available to the schools via the state departments of education in three main funding categories: Title I, A; IDEA, B and State Fiscal Stabilization Funds" (ADE, 2008).

The first step in separating districts was to determine if there was a consistent funding category utilized by all districts. Several districts did not qualify for Title I or IDEA funds due to student demographics, while other districts used funds solely from one of those two funds to purchase all their equipment. For example, one district purchased all equipment under Title 1 categorical funds. The only fund consistent with each of the districts was the State Fiscal Stabilization Funds (SFSF). Therefore, if technology purchases were allocated in either of those two funding categories, then they were removed from the list. The district had to purchase equipment and resources from the SFSF category only.

Several districts dedicated funds to enhancing specific classrooms for vocational courses, business leadership courses, EAST labs, teacher computers, printers, or career orientation classes. If districts identified only these as their technology purchases/upgrades, then they were not included in the selection. Instructional technology, for this research, was to have the broadest accessibility to students and not prohibited by students' choices of course or program. However, some districts did purchase technology for elementary or

middle school grades, while upgrading EAST labs or vocational classrooms in high schools. These districts were included in the selection process, but only those grade levels with available instructional technology.

7.2 School Case Study Selection

Of the districts that qualified, only one district was selected based on three criteria. First, they agreed to participate. The superintendent was very supportive and was interested in learning about the findings. Second, they had a manageable number of schools within the district. This district has four school buildings spanning the K-12 grades. Finally, their ARRA proposal had each school requesting instructional technology for general student population. The district was looking to integrate technology in a broad manner and wanted to create continuity with its technology as students progressed through grade-levels.

7.3 Dollar Metric Methodology

The dollar metric was employed as a way to account for the actual dollars used and where and how the money was being spent (Monk, et al., 1996). For this paper, $210, 946.49 represented 100% of the dollar metric; this was the fiscal starting point the primary author established to determine the actual, current amount spent within the district and then, tracked to each building regarding their specific technology expenses.

The business administrator provided expense reports at the author's request detailing the most current ARRA funds expenditures. Some of the costs were not included in the dollar metric, because they did not qualify as one of the three technology categories described earlier. This lowered the total amount of ARRA expenses in the *Case Study* section of the paper and made it different from the total, actual expenses recorded by the district.

8 Findings

8.1 State District Data

Figure 1 contains the 103 of the 253 districts that fit the selection criteria and information about the types of instructional technology purchased and allocated in the various grade levels. The selected district was included on this figure. The instructional technology found in each of these districts by grade level included interactive white boards (IWB) and computers (C). Computers being such a broad category include laptops, mobile laptop carts, computer labs and/or instructional software (S). The figure also highlights two districts purchasing iPods and smartphones.

The last column designated "District Infrastructure" identifies technology personnel (TP) in addition to infrastructure improvement (I), such as wiring, bandwidth, or wireless capabilities improvements. TP were primarily identified as district resources in the application forms to be used within the district and not necessarily for one particular school. Further, they were mostly part-time positions with short duration, which typically coincided with the length of the ARRA funding.

District	Grades K-4		Grades 5-8		Grades 9-12		District Infrastructure
Alma	IWB, C		IWB, C		IWB, C		
Ashdown			IWB, C		IWB		
Bald Knob	C	S	C	S	C	S	I
Batesville			IWB, C	S	IWB, C	S	
Bauxite	IWB				IWB, C		
Bay School	IWB,C				IWB, C		
Bentonville	IWB		IWB		IWB		TP
Bismark					IWB, C	S	
Blytheville	IWB,C						TP
Bradley					IWB, C		
Buffalo	C		IWB, C		IWB, C		
Cabot	IWB		IWB	S		S	
Calico Rock							TP
Camden Fairview						S	
Cedar Ridge				S		S	I
Clinton	IWB		IWB				
Concord							I
Cotter	IWB, C						
Cross Country	C						
Crossett							I
Danville	C		C				
Dierks							TP, I
Dover	IWB				IWB,C		I
Drew Central	IWB		IWB				TP
Dumas	IWB		IWB, C				I
El Dorado					IWB		
Elkins	IWB		IWB, C		IWB		
Emerson-Taylor	IWB						
England	IWB		IWB		IWB		
Farmington	C	S	IWB, C		IWB, C		
Flippin						S	
Forrest city	C		C	S			
Fouke			C		C		I
Genoa							I
Gentry							I
Glen Rose			C				
Gravette	IWB, C		IWB, C		C	S	
Green Forest	IWB, C	S	WB, C	S	IWB, C	S	
Gurdon	C	S	C	S	C	S	I
Hackett	IWB,C	S			IWB, C	S	
Harrisburg							I
Harrison					IWB		
Hazen	IWB, C				IWB, C		
Hermitage	IWB, C		IWB, C		IWB, C		
Lavaca	C	S			C	S	
Lawrence County					IWB, C	S	
Lee County		S	IWB, C				
Lonoke					C(smartphones		
Magazine					IWB, C		
Malvern					IWB, C		
Manila	IWB, C		IWB, C	S	IWB, C		I
Marmaduke		S		S	IWB, C	S	
McGeehee							I
Melbourne							I
Mena			IWB		IWB		I
Midland	IWB		IWB		IWB		
Mineral Springs	C				IWB		
Monticello			IWB		IWB, C		
Mount Ida	IWB, C				IWB, C		
Mountain Pine	C				C		
Mountainburg		S		S		S	
Mulberry			IWB, C		IWB, C		
N Little Rock	IWB, C		IWB, C		IWB, C		
Nashville	IWB		IWB		IWB		
Nemo Vista			C	S			I
Nettleton	C	S	C	S			I
Newport		S			IWB, C		I
Norphlet	IWB				C (IPODS)		
Ouchita	C				IWB, C		
Ozark			C		C		
Paris	IWB				IWB, C		I
Parkers Chapel	IWB, C	S			IWB, C	S	
Perryville					IWB, C		
Piggott	C	S			C	S	
Pine Bluff			IWB, C				I
Pottsville					IWB		
Poyen	IWB						
Prairie Grove	C		C		C		I
Riverside	IWB, C		IWB, C		IWB, C		I
Rogers	IWB	S		S		S	
Rosebud							I
Russellville	IWB		IWB		IWB		
Sheridon	IWB		IWB				
Siloam Springs							I
Smackover	IWB				IWB		I
So Miss County					C		I
Spring Hill							I
Springdale	IWB,C	S	C		C		I
Stephens School district	C	S	C	S	C	S	
Valley Springs	C		C		C		I
Van Buren		S		S			I
Vilonia	C		IWB, C		IWB,C		I
Waldron					IWB		I
Warren	IWB		IWB		IWB		
Weiner	IWB				IWB		I
West Fork	IWB, C		IWB, C		IWB, C		I
West Memphis			IWB, C		IWB		I
Westside Consolidated Distric	C		C (IPODS)		IWB, C		I
White County							I
White Hall							I
Wonderview						S	I
Woodlawn							I
Wynne		S					

Figure 1: ARRA Expenditures for Districts Under Selection Criteria

8.2 Case Study Micro-level Resource Allocation

Using data provided by the district business administrator and a similar dollar metric process used by Monk et al. (1996), a "flow" of the monies was developed with three different micro-level allocations and a current percentage of ARRA expenses dedicated to Instructional Technology. Figure 1 details the total district expenditures in each of the three categories, minus non-technology expenses such as proxy readers and door upgrades.

Technology Categories for District Expenditures

Total Expenditures $210, 946.49		
(Minus Non-Technology Expenses, such as Proxy Readers and Door Upgrades		
Instructional Technology — Technology Support — Non-Computer Technology		
$78, 177.21	$91, 317.09	$38, 582.22

Table 1

The next set of data in Table 2 and 3 illustrates the percentages pertaining to the technology expenses for each of the schools.

Technology Expenditures at the Elementary Schools

Elementary 1		Elementary 2	
Expenses($)	Items Purchased	Expenses($)	Items Purchased
35,425.89	28- Smart Boards	1,855.18	2-Smart Response Systems
4,968.57	24- Smart Board Mounting Brackets	7,957.00	10- Projectors
7,420.72	8- Smart Response Systems	1,060.07	1- USB Extension Pole
5,559.00	7- Projectors	12,018.08	Wireless Capabilities for Building
2,075.36	7- Lamps for Projectors	1,445.00	Wireless Installation
1,470.34	Smart Board Installation		
1,605.00	Wireless Installation		
1,060.07	1- USB Extension Pole		
1,650.00	Proxy Reader for Door		
7,573.00	Upgrade Doors for added Security		
12, 952.47	17- Document Cameras		
4,803.63	13- Smart Slates		
99,567.02	Total Expenses	24,335.33	Total Expenses

Table 2

Technology Expenditures at Middle School and High School

Middle School		High School	
Expenses($)	Items Purchased	Expenses($)	Items Purchased
3,978.50	5- Projectors	20,960.50	Apex Software/Bundle
1,061.06	1- USB Extension Pole	17,334.70	6- 32 Pad CPS Pulse Systems
955.50	5- Smart Board Mounting Brackets	10,228.56	6- Smart Boards
724.34	Installation	573.30	3- Smart Board Brackets
12,018.08	Wireless Capabilities for Building	1,108.53	3- Smart Slates
1,520.00	Wireless Installation	2,414.35	Installation
		6,857.19	9- Document Cameras
		14,502.53	Wireless Capabilities for Building
		2,030.00	Wireless Installation
		1,252.41	Notebook
		7,548.00	Access Control/ Proxy Reader
		2,343.50	Upgrade Doors for added Security
20, 257.48	Total Expenses	87,153.57	Total Expenses

Table 3

In the remaining two tables, the data from Elementary 1 in Table 2 and from High School in Table 3 are further dissected into specific types of Instructional Technology expenditures and represented by dollar amounts and percentages. Tables 4 and 5 illustrate the most recent monies dedicated to each technology category and the types of Instructional Technology purchased for the two schools.

Instructional Investments and Costs for Elementary 1

Elementary 1		
Instructional Technology	$47, 650.24	52.70%
Technology Infrastructure/Support	$21, 646.90	24.00%
Non-Computer Technology	$21, 046.88	23.30%
Instructional Technology Total	52.70%	$47, 650.24
Smart Boards (28)	74.30%	$35, 425.89
Smart Response Systems (8)	15.60%	$7,420.72
Smart Slates (13)	10.10%	$4,803.83

Table 4

Instructional Investments and Costs for High School

High School		
Instructional Technology	$48, 523.76	63.80%
Technology Infrastructure/Support	$6, 857.19	9.00%
Non-Computer Technology	$20, 628.71	27.20%
Instructional Technology Total	63.80%	$48, 523.76
CPS Pulse Systems (6)	35.70%	$17, 334.70
Smart Boards (6)	21.10%	$10, 228.56
Apex Software	43.20%	$20, 960.50

Table 5

Table 6 displays the percentage of Instructional Technology in relationship to the current expenditures of the ARRA funds for the district. Automated Response Systems combines the CPS Pulse Systems and the Smart Response Systems, since the equipment performs similar functions.

Percentage of current ARRA funds dedicated to Instructional Technology from Total ARRA Expenditures

Current ARRA Expenditures Total: $210, 946.49	
Smart Boards- 21.6%	Smart Slates- 2.3%
Automated Response Systems- 12.6%	Apex Software 9.9%

Table 6

8.3 Decision-Making Process

With ARRA monies to be spent, the district leadership instructed the principals to make the best decisions regarding the needs for their respective buildings. There was interest from both teachers and administrators when purchasing select technology pieces, to ensure equality and consistency of technology for every classroom at every grade level. After hearing from the principals, the decision-making strategies fell into three general categories: survey the staff to determine technology needs, work with the technology committee as part of the process, and, listen to teacher feedback regarding technology use and experiences. As for conducting research, the principals used teacher feedback and experience with current technology used in a building.

9 Conclusions

The number of districts found in Table 1 dedicating ARRA funds to the purchase of technology for general student use was much lower than anticipated. Approximately 41 percent (103 of 253) of districts indicated a broad investment of technology for students. Several districts allocated funds to instructional technology purchases, however they were for specific courses, such as EAST or vocational programs. By the very nature of course selection, some students may never have access to those technologies. Coleman, et al. (1998) stated it most succinctly when they wrote, "There are important differences in allocation policies among districts, which are related both to differences in norms or beliefs and to differences in district quality" (p. 101).

Limited in this case study, was information from each of those remaining 153 districts as to their current instructional technology condition and future instructional technology plans for purchases. At this point

in time, the information explaining why those districts were not purchasing instructional technology is unavailable.

As for the district's expenditures, a deliberate attempt was made to ensure all students in each grade level would have the ability to access technology in general content classes. Tracking the ARRA dollars down to the lowest level, the school building, using the available data, one finds approximately one-third of the ARRA funds spent, and only 46 percent of that money dedicated to instructional technology. There are two possible reasons for this. First, only one-third of the ARRA funds have been used. The second possible reason could revolve around the question, "The Chicken or The Egg. Which one first?" (Hall, 2008; Ketterer, 2008). Hall (2008) argued a district must develop the infrastructure to support the technology teachers would use during instruction. The demand placed on the system by teachers would create a "bottleneck" causing technicians to reroute the over-flow (p. 37). Where does one send data when the infrastructure is not available? The district has to contend with the problem of not having the amount of instructional technology it needs and the infrastructure necessary to support the technology integration.

Ketterer (2008), on the other hand, argued the district must create the vision and plan for purchasing and implementing instructional technology. She suggested creating district and building level technology committees to develop the vision and steps necessary to purchase and implement the technology into instruction. The acquisition of technology at the beginning, the implementation plan, and the eventual demand for better infrastructure will create the necessary conditions to enhance the support structures (p. 27). These pieces, according to Ketterer (2008), should correspond together and work seamlessly in the building and district.

Based on the current expenditures, it appears the district is taking the first of the two approaches. While it is roughly a 60/40 split with expenses, the items purchased, like the wireless capabilities, reflect the desire of the district to create a learning environment that contains a digital platform to support various approaches to teaching.

The one area, a different approach in the research might be suggested is in the decision-making process. Teacher experience and opinions regarding select pieces of technology is important, but may not provide the broadest exposure regarding the maximum capabilities on that piece of technology. Coleman, et al. (1998) discuss resource allocation and decision-making with schools that were "more successful" or "less successful" depending on the process. They found the "more successful districts" were decentralized, developed a common purpose, and allowed for school autonomy (p. 104). The district in this case study modeled this in its schools.

One characteristic from the "less successful" schools seemed to surface in the feedback provided by the principals. Teachers did submit feedback, but in a "wish list" of items they needed or wanted in order to ensure each classroom had that resource. What appeared to be lacking was the "intensive discussion" within the staff to determine if those resources were the best for the students or teachers (Coleman, et al., 1998, p. 106).

Current research could assist a district or building level committee as to why certain technology pieces should be purchased and the requirements necessary to achieve the greatest impact on learning. For example, Haystead and Marzano (2010) conducted a study of teachers using the *Promethean* interactive whiteboard. This study found a significant difference among students who learned in a traditional classroom and those who had the *Promethean* in the classroom. Citing previous work, they stated, "Marzano and Haystead (2010) reported findings that suggested substantial gains in student achievement under the following conditions: a teacher has 10 years or more of teaching experience, a teacher has used Promethean ActivClassroom for two years or more, a teacher uses Promethean ActivClassroom between 75 and 80 percent of the time in the classroom, and a teacher has high confidence in his or her ability to use Promethean ActivClassroom" (p. 39). An article such as this could be influential in determining not only what type of instructional technology to purchase, but the steps necessary to develop a long-term implementation and professional development plan.

Another suggestion would be to determine or outline explicitly priorities regarding technology within the district. A colleague recently spoke to me on how their district shifted priorities from a "resource-based" district to a "skills based" district. This has redefined conversations and priorities for technology purchases and integration. In my conversations with the case-study principals, autonomy was given to each building, but priorities were not.

10 Implications

Tracking ARRA spending is important for the state and a district, but what is the potential impact of this study? To state it plainly, it is important to understand how funds are being utilized. The state already has a process for monitoring the ARRA fund expenditures. They assist in answering questions as to whether or not a purchase can be made using the funds and if the appropriate documentation is attached to the paperwork. What it is not doing, from the information available, is ensuring the equality of technology throughout the state for all students. Regionally, the state has "important differences in allocation policies among districts..." (Coleman, et al., 1998). Should students be without technology because of the lack of vision by the administrative leadership or even the community?

Another implication is the need to develop an evaluation system determining not only the general impact of instructional technology, but also which specific tool(s) has/have the greatest impact, on students. The information provided by the principals indicated that decisions made were based on previous teacher experiences, but did not indicate plans being in place to collect data from the teachers evaluating student performance. If technology is truly going to be a transformative tool, then data has to be available to support those claims. Culp, et al. (2003) discuss the idea further on how transforming education can occur through technology. These researchers noticed after 1995 the tone for policy education improvement began to change as a response to the development of the Internet. They write, "...policy reports begin to present education technology as a driver of school reform, rather than as a class of tools and resources that...could be matched to educational challenges...recognized by teachers" (p. 20).

Lastly, this study should encourage further conversations among districts and schools in two areas: developing a more rigorous technology plan, including an "expected outcomes" section for both students and teachers, and cultivating an expectation for technology use. First, they must develop a plan (developed around technology standards, like NETS) to train teachers and students in the use of the technology. Statham and Torell (1996) stated it most succinctly when they wrote, "Teachers and students who have not been trained in a number of specific technology skills will not use resources effectively" (p. 6). The plan should be implemented and on-going as the resources and staff become available. Second, the leadership and appropriate committees must develop expectations for students and teachers to use the instructional technology on a regular basis. To make this possible, the instructional technology resources must be accessible.

11 What's Next?

Two possible studies could be designed to further explore the issues. On the state level, a study could be conducted with those 103 districts to better understand their decision-making processes in the purchases of instructional technology and to determine if they have an evaluation or assessment system in place that measures the impact of student outcomes using technology in the district. The second study could continue to explore this study's schools by designing a study that measures the utilization of the technology and determines if specific instructional technology, like the interactive whiteboard, improves student outcomes through a cost benefit analysis (Schacter, 1999).

Technology can truly become the vehicle for transformation in today's schools. It is a very exciting time in education; we now have instructional technology devices that are inexpensive, flexible, adaptable, and portable. However, we must be good stewards of our resources (time, money and teachers) and become pragmatic in our decision-making process to ensure our choices and planning have the greatest impact on our students.

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