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ABSTRACT

This analysis aimed at determining whether implemented technology systems and staff development with those systems at professional development schools have affected the academic performance of learners. Eight Texas elementary and secondary schools that in 1994-95 enrolled 5,337 students across 5 school districts comprised the sample for the study. These schools are members of a school-university collaborative project in which a technology infrastructure has been developed that includes nearly 300 microcomputers, 7 V-Tel compressed video systems, and connectivity to a Sun Sparc server linked to the Internet. University technology coordinators have provided technology training for classroom teachers and school administrators; additional staff development has been provided by technology specialists located at the schools. The Texas Assessment of Academic Skills Test (TAAS) was administered to measure academic skills in reading, mathematics, and writing. Although not every school yielded cumulative test results that were higher than the preceding year's scores, the trend in four of the sites shows that the impact of evolving technology on students and teachers as well as other possible factors have led to higher academic performance. A table shows student success indicators. (AEF)

Accountability Effects of Integrating Technology in Evolving Professional Development Schools

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Objective:

This analysis has been undertaken to determine whether implemented technology systems and staff development with those systems at evolving Professional Development Schools have impacted the academic performance of learners resident in those schools.

Theoretical Framework:

Lauded as one means of fostering the restructuring of schools and linked to Goal Five of America 2000, technology infrastructures have evolved dramatically in schools across the nation. Technology is defined here as computers, telecommunications, and video systems (Anderson, 1993). Twenty years ago, classroom applications of computers emphasized tutorials, drill and practice and computer managed learning activities (Kulik, 1984). Today, these applications still occur, but attention and activity have shifted to multimedia applications and classroom connectivity through the Internet.

MultiMedia applications in teacher preparation (Wentworth & Breithaupt , 1995; White, 1995) and staff development of teachers (Gunter & Murphy, 1995; Wetzel, Chisholm & Buss, 1995) emphasize applications of software, such as, *ClarisWorks*, *KidPix*, *HyperStudio*, *PowerPoint*, *Excel*, *Word*, *Toolbook* that enable practitioners to develop software targeted for specific instructional applications. These specific applications may serve a variety of functions, but all appear to center on capturing the learner's interest and ultimately to motivate the learner to become involved with the instructional system.

A recent report of research notes that teachers who receive in-service technology training are more likely to use computers in instructional problem-solving applications with their students than teachers who have not received staff development in technology (Shore, 1995). Similarly, another report (Seline, 1995) indicates that technology-enhanced programs can promote engaged-learning, but to do so, school leaders must incorporate effective technologies into their classrooms. At a minimum, **access** is critical. Students must have access to technology in convenient settings, such as computers located in their classrooms rather than a "computer lab." Further, access to appropriate classroom technology means the teacher and student will have connectivity to the world through the Internet. In other words, schools that have invested in local area networks (LANs) need to extend their system by linking to other schools and a server that enables them to link with libraries, universities, and virtually anyone in the world that has an address on the Internet. The evolving project, Skymath (Lynds

& Gordon, 1995) is incorporating current environmental and real time weather data in graphical, textual and numerical modes for public school classrooms that are provided over the Internet for real time problem solving and forecasting by middle and secondary students. Another effort described by Anderson (1995) illustrates how the Internet provides a powerful communication medium for students using e-mail and listserver services providing the hardware and connectivity are accessible to the students.

Methods:

Sites: Eight schools that enrolled 5,337 students in 1994-95 across five school districts comprised the sample for this inquiry. Students enrolled in these schools represent diverse backgrounds with respect to cultural, social and economic indicators. To illustrate, the distribution of learners enrolled at these schools from low income circumstances ranged from 12% to 68%. The following list indicates the grade level and enrollment at each of the schools examined in this effort.

School	Grade Levels	Enrollment
SWE	K-4	554
RRE	K-4	443
AJA	3-5	549
JI	5-6	443
JLMS	6-8	852
SJH	6-8	187
WJH	7-8	889
AMC	9-12	1420
Total		5,337

Infrastructure and Staff development: These schools are members of a school-university collaborative project. The project began in 1992, with members being two universities, one junior college, five school districts, two regional education service centers, and parent and local business partners. Since the project began, a technology infrastructure among the schools and university partners has been developed that includes nearly 300 microcomputers (from 2 to 10 computers at each site are configured in multimedia presentation stations), seven V-Tel compressed video systems, and connectivity of all eight sites to a Sun Sparc (Netscape Navigator) server linked to the Internet. Extensive staff development has occurred across the collaborative over the past 3 years. University technology coordinators have provided technology training to over 440 classroom teachers and school administrators. During the past year, additional technology development has been provided by technology specialists located at the schools.

The following listing of topics presented by university technology specialists reflect various hardware configurations that have been acquired and the overall emphasis on multimedia, compressed video applications, and Internet exploration.

- **1993-94 Staff Development topics**: Mac Basics, HyperCard, ClarisWorks, Quicktime Movies, Aldus Persuasion, Screen Play, Use of CD-ROMs, Use of Scanner, Telecommunications, Copyright Laws, Hardware & software purchases, multimedia presentations, use of TENET, Use of Zap camera,

- **1994-95 Staff Development topics**: computer installation and use, using computer graphics, HyperCard, Hyperstudio, ClarisWorks, Claris Works Slide Show, Compressed video system, KidPix, MacGrade, Use of CD-ROMs, Use of Scanner, Telecommunications, Copyright Laws, Hardware & software purchases, multimedia presentations, use of TENET, Use of Zap camera, using Internet, Microsoft Works, One computer classrooms

Data Collection: Because funds were provided by the state for the infrastructure and staff development activities, an accountability requirement was placed on the collaborative that required that the state mandated criterion-referenced test results for each school be monitored. This assessment, the Texas Assessment of Academic Skills Test (TAAS) is administered annually to measure academic skills in reading, mathematics, and writing. The TAAS objectives/instructional targets are drawn from the essential elements delineated in the State Board of Education Rules for Curriculum.

Results:

Table A provides a summary of TAAS performances expressed as the percentage of students reaching criterion in reading, mathematics and writing aggregated by school. Attendance data are also provided for each school. Bold claims that the process of establishing technology enhanced Professional Development Schools has positively impacted student achievement as measured by standardized measures cannot be supported by the data summary. Academic performance data comparisons across years suggest that something is happening that is positive, because direct comparisons of student achievement at these sites yield a +/- ratio of 3:2 (omitting the scores of one site due to a lack of fit between the grade level tested and the grade level impacted by the teacher development effort at that school).

Table A. Student Success Indicators: TAAS Performance Expressed as Percentage of Students Reaching Criterion at Site Schools

School	Year	Grade	N	Reading	Math	Writing	Attendance	Related Information
SWE	95	4	102	86	81	88	96.7%	
	94	4	123	88	64	96		Compressed video site-26 sessions
	93	4	106	81	71	93		Clock hours of Staff development-40
Change	94-93			+	-	+		
	95-94			-	+	-		
	95-93			+	+	-		
AJA	95	4	138	79	52	87	95.8%	
	94	4	194	56	23	60		Compressed video site-37 sessions
	93	4	173	45	26	54		Clock hours of Staff development-38
Change	94-93			+	-	+		
	95-94			+	+	+		
	95-93			+	+	+		
RRE	95	4	72	73	59	87	96.1%	
	94	4	72	64	38	80		Clock hours of Staff development-56
	93	4	88	68	58	91		
Change	94-93			-	-	-		
	95-94			+	+	+		
	95-93			+	+	-		
JI	95			5	194	66	42	95.8%
	94	5	195	74	38			Compressed video site-24 sessions
no tests adm in 93								Clock hours of Staff development-143
Change	95-94			-	+			
JLMS	95	8	243	59	45	57	93.3%	
	94	8	287	66	50	47		Program targeted 6th gr, not 8th gr
	93	8	259	73	50	60		Clock hours of Staff development-21
Change	94-93			-	NC	-		
	95-94			-	-	+		
	95-93			-	-	-		
SJH	95	8	47	42	50	67	96.3%	
	94	8	54	79	53	65		Compressed video site-49 sessions
	93	8	46	71	44	47		Clock hours of Staff development-28
Change	94-93			+	+	+		
	95-94			-	-	+		
	95-93			-	+	+		
WJH	95	8	273	60	45	72	94%	
	94	8	344	75	56	64		Compressed video site-14 sessions
	93	8	332	68	49	69		Clock hours of Staff development-34
Change	94-93			+	+	-		
	95-94			-	-	+		
	95-93			-	-	+		
AMC	95	10	404	88	70	94	94.6%	
	94	10	359	93	78	96		Clock hours of Staff development-64
	93	10	341	87	75	94		
Change	94-93			+	+	+		
	95-94			-	-	-		
	95-93			+	-	NC		

Significance:

This accountability summary has described in broad terms the infrastructure and staff development conducted at eight evolving Professional Development Schools across three years. Although not every school yielded cumulative test results that were higher than the preceding year's scores, the trend is in the right direction for four of the sites. The impact of evolving technology on the students and teachers of these schools as well as other possible factors have brought higher academic performance.

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