

**Pennsylvania TAPP**

**Executive Summary**

The State of Tennessee Department of Education has developed and implemented a number of educational interventions that incorporate technology applications to improve student outcomes, particularly in core academic areas. In conjunction with these programs the state conducted a three year evaluation of the systematic educational technology intervention. The Tennessee EdTech Accountability Model (TEAM) is a rigorous, scientifically based high quality evaluation of those interventions.

The TEAM evaluation began during the 2003-2004 school year using a rigorous quasi-experimental method (matched treatment-control schools). Data collection took place at 26 matched pair schools, 13 of which were grant recipients and 13 which served as control schools. In 2004-2005, 14 additional treatment and control schools were added to the study. A vast amount of information concerning the extent and quality of instructional strategies, student and teacher technology use, program implementation, stakeholder perceptions, and student achievement has been gathered.

**Methodology**

The Tennessee EdTech Accountability Model (TEAM) is a rigorous, scientifically based high quality evaluation of those interventions. Three research questions were formulated to help guide the study. The research questions asked the following:

Does implementation of the TnETL model raise student achievement?

Does implementation of the TnETL model increase the use of research-based classroom practices?

Does implementation of the TnETL model improve students’ ability to use technology as a tool?

To answer the research questions, comparative analyses were conducted on classroom practices, teacher attitudes, student performance outcomes, and student achievement. Descriptive analyses were used to describe reactions to TnETL Program by teachers, principals, and technology coaches. The evaluation methodologies involved using the Formative Evaluation Process for School Improvement – Technology Package (FEPSI/TP). Data gathered through the FEPSI/TP were derived from direct classroom observation, teacher surveys, interviews/focus groups, technology implementation benchmarks, and analysis of student achievement.

**Results**

TnETL helped increased student engagement.

TnETL students and teachers increased the use of technology tools.

A promising trend emerged as the Program students out-performed or performed as well as Control students in all instances except with regard to Launch 2 5th grade math and language arts, however, they also emerge with more experience using technology as a learning tool in meaningful computer activities. Students in Program classrooms were significantly more engaged in student-centered learning activities and were better able than the Control students to demonstrate the application of critical thinking skills, which for some students resulted in superior or comparable TCAP math and language arts performance.

Overall, both the randomly conducted whole school and targeted observations revealed that the instructional strategies implemented in TnETL Program schools were more reflective of research-based practices that accommodate technology integration that those observed in Control classes. The Program teachers were better able to integrate greater and higher-quality use of computers as a learning tool and for instructional delivery, as compared to Control teachers. The students’ attention and interest was more frequently observed in Program classes than in Control classes. Though these results are positive and certainly reflect the goal of TnETL, continued professional development is needed to better prepare teachers to increase the frequency and intensity of implementation, which could yield greater and more consistent improvement in student learning.

Overall, the project was successful. Anytime that technology flows seamlessly through instruction, there is success. Teachers’ attitudes grew more positive toward technology. Students were more engaged in their learning, which was evidenced through the outcomes of the problem based learning situations. The school climate was perceived to be better during the course of the study. The observations and surveys supported the hypothesis that when technology is used as a tool, student performance increases and improves.

**Methodology**

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1. Does implementation of the TnETL model raise student achievement?

2. Does implementation of the TnETL model increase the use of research-based classroom practices?

3. Does implementation of the TnETL model improve students’ ability to use technology as a tool?

To answer the research questions, comparative analyses were conducted on classroom practices, teacher attitudes, student performance outcomes, and student achievement. Descriptive analyses were used to describe reactions to TnETL Program by teachers, principals, and technology coaches. The evaluation methodologies involved using the Formative Evaluation Process for School Improvement – Technology Package (FEPSI/TP). Data gathered through the FEPSI/TP were derived from direct classroom observation, teacher surveys, interviews/focus groups, technology implementation benchmarks, and analysis of student achievement.

The data gathered from direct classroom observations were derived through whole school and targeted observations. In this sector of data collection, challenges were faced in areas of implementation, but were overcome with changes to planning, scheduling, and communication methods. The implications for replication were that the instruments used were valid and reliable, national norms are available for comparisons, online submission was available and at a reduced cost over paper-based versions, continued use reveals change over time, and descriptive results were available online to schools, districts, program participants and the state. There were concerns with this method. This method of data collection requires trained observers; school based for formative evaluation and external for unbiased formative and summative evaluation. After the data collection has occurred, researchers are needed to conduct inferential analyses and generate useful reports.

Teacher surveys were also used to collect data. Challenges were noted along the way, as well as how they were overcome. Again, scheduling, paper vs. online surveys, and the availability of off-site observers for faculty meeting were some of the more prominent challenges. These problems were overcome again through better planning, paper surveys, and additional back-up observers.

The method of data collection that involved interviews and focus groups included principal interviews, teacher focus groups, and technology coach survey and interview. Concerns with this method were scheduling, accurate teacher lists, scheduling time and location, and absenteeism on the day of the focus group. Working with the Coach to schedule meetings, including principal interviews with other data collection strategies, using a teacher list for targeted visits, and randomly selecting more teachers than needed helped to alleviate the challenges in this particular category.

The technology implementation benchmarks presented their own set of challenges. Teacher and Principal buy-in, training teachers and principals to develop and effectively use benchmarks, and the timely use of the instrument were perceived to be the biggest challenges. These challenges were overcome by providing information packets, face-to-face training, en expert reviews to build rationale and trust in using the benchmarks; provision of a benchmark template, example templates, hands-on training, and expert review of each school’s initial benchmarks; and regular communication with the Technology Coach.

The student performance-based assessment portion noted challenges in the area of availability of schools that met the criteria, (8th grade students, computers, and teachers with basic computer skills); obtaining principal permission, teachers “waiting till the last minute” or not administering the assessment. These issues were resolved by using easy to understand solicitation materials, using easy to administer teacher-proof materials, adjusting the number of participants, and frequent communication.

The last data category in the FEPSI/TP was student achievement. The major challenges to obtaining this data were obtaining student pre-intervention and yearly performance data from the state due to lack of knowledge of who to contact and the ability to verify approval to receive that data in a timely fashion. The method by which these challenges were overcome was to make the request early and include all critical information that was needed in the request.

Plans for dissemination and presentation, as well as lessons learned about conditions for replication necessarily have been considered. Various ways and places have been considered as outlet methods. School level reports, state level reports, SETDA website, CREP website, articles and presentations were just some of the suggested methods for dissemination of the data. Lessons learned about replication such as building evaluation accountability into the competitive grant, collecting common data from all grantees, and having a high level of accountability from the state are all subject areas to be broadcast and shared for similar studies.

**Results**

Goal - Develop a plan to conduct scientifically based evaluation of an educational intervention that uses technology applications as a tool to increase student achievement in one or more core academic subjects.

Research Question: Does implementation of the TnETL model raise student achievement in program schools compared to control schools?

Finding: A promising trend emerged as the Program students out-performed or performed as well as Control students in all instances except with regard to Launch 2 5th grade math and language arts, however, they also emerge with more experience using technology as a learning tool in meaningful computer activities.

Students in Program classrooms were significantly more engaged in student-centered learning activities and were better able than the Control students to demonstrate the application of critical thinking skills, which for some students resulted in superior or comparable TCAP math and language arts performance.

Research Question: A) Does implementation of TnETL improve teachers’ skill levels in, and attitudes toward, integrating technology with curriculum and state standards? B) To what degree do teachers at Program and control schools feel competent in demonstrating the national Education Technology Standards (NETS) for Teachers?

Finding: Overall, both the randomly conducted whole school and targeted observations revealed that the instructional strategies implemented in TnETL Program schools were more reflective of research-based practices that accommodate technology integration that those observed in Control classes. The Program teachers were better able to integrate greater and higher-quality use of computers as a learning tool and for instructional delivery, as compared to Control teachers. The students’ attention and interest was more frequently observed in Program classes than in Control classes. Though these results are positive and certainly reflect the goal of TnETL, continued professional development is needed to better prepare teachers to increase the frequency and intensity of implementation, which could yield greater and more consistent improvement in student learning.

Goal: All students will be taught by teachers qualified to use technology for instruction.

Research Question: What is the impact of TnETL implementation on school-wide improvement in organization and school climate?

Finding: Collectively, the participants were generally supportive and positive with regard to levels of school organization and climate in the Program schools.

Overall, the project was successful. Anytime that technology flows seamlessly through instruction, there is success. Teachers’ attitudes grew more positive toward technology. Students were more engaged in their learning, which was evidenced through the outcomes of the problem based learning situations. The school climate was perceived to be better during the course of the study. The observations and surveys supported the hypothesis that when technology is used as a tool, student performance increases and improves.

**Resources**

Lowther, D. L., Strahl, D. J., Inan, F. A., Ross, S. M.. (April, 2008). Does technology integration “work” when key barriers are removed? Paper presented at the 2008 American Educational Research Association National Conference, New York, NY

Inan\*, F. A., Lowther, D. L., & Ross, S.M. (April, 2007). Examination of factors affecting technology integration in K-12 schools: A path Analysis. Paper presented at the 2007 American Educational Research Association National Conference, Chicago, IL.

Inan\*, F. A., Lowther, D. L., & Ross, S. M. (April, 2006). Instructional strategies used by teachers during student use of technology. Paper presented at the 2006 American Educational Research Association National Conference, San Francisco, CA.

Lowther, D. L., Ross, S.M., & Strahl, J. D. (April, 2006). Integrating Technology in Classroom Learning as a School-wide Reform: A Foundation for Improved Student Achievement? Paper presented at the 2006 American Educational Research Association National Conference, San Francisco, CA.

Inan\*, F. A., Lowther D. L., & Ross, S. M. (2005, October). Observation of technology use: Identifying instructional strategies used in K-12 schools. Paper presented at the 2005 International Association for Educational Communications and Technology Convention, Orlando, FL.

Marvin\*, E. D., Lowther, D. L., Grant, M.M.& Inan\*, F. (2004). Technology Coaches: One Solution to No Child Left Behind Technology Requirements. Paper presented at the 2004 International Association for Educational Communications and Technology Convention, Chicago, IL.

Marvin\*, E. D., Inan, F. A., Lowther, D. L., & Grant, M. M. (October, 2003). The Roles, Responsibilities, and Expectations of K-12 Technology Coaches: Providing Support for Effective Technology Integration. Paper presented at the 2003 International Association for Educational Communications and Technology Convention Anaheim, CA.

Published Articles

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Lowther, D. L. (July, 2007). Investing in people. T.H.E. Journal, 34(7), 42-43. Available at http://thejournal.com/articles/20940

Lowther, D. L., Strahl, J. D., Inan, F. A., & Ross, S. M. (2007). Tennessee EdTech Launch 2005-2006 Evaluation Report. Prepared for the Tennessee Department of Education: Center for Research in Educational Policy, The University of Memphis: Memphis, TN.

Lowther, D. L., Ross, S. M., Inan\*, F. A., & Strahl, J. D. (2006). Changing Classroom Environments through Effective Use of Technology. In D. M McInerney, S. Van Etten, and M. Dowson (Eds.) Effective Schooling: Research on Sociocultural Influences on Motivation and Learning (Volume 6) (pp. 207-233). , Greenwich CT: Information Age Publishing.

http://books.google.com/books/infoagepub?id=DafTFscqsoYC&printsec=frontcover&dq=Effective+Schools#PPA207,M1

Lowther, D. L., Ross, S. M., & Strahl, J. D. (2006). The influence of technology integration on instructional practices. International Journal of Knowledge, Culture and Change Management, 6(5), 131-141.

Lowther, D. L., Ross, S. M., Strahl, J. D., Inan\*, F. A., & Franceschini, L. (2005). Tennessee EdTech Launch 2004-2005 Evaluation Report. Prepared for the Tennessee Department of Education: Center for Research in Educational Policy, The University of Memphis: Memphis, TN.

Lowther, D. L., Ross, S. M., Wang, L. W., Strahl, J. D. & McDonald, A. J. (2004). Tennessee Department of Education EdTech Launch 1 2003-2004 Evaluation Report. Prepared for the Tennessee Department of Education: Center for Research in Educational Policy, The University of Memphis: Memphis, TN.