

**North Carolina TAPP**

**Executive Summary**

**Introduction**

Looking at North Carolina Educational Technology (LANCET) leveraged the resources and expertise of its four partners—the North Carolina Department of Public Instruction’s Division of Instructional Technology, SEIR\*TEC/SERVE, North Carolina State University and the Friday Institute for Educational Innovation, and the State Educational Technology Directors Association (SETDA)—to study the state’s IMPACT Model, which is the focus of North Carolina’s competitive and formula Enhancing Education Through Technology grants. The study hoped to explore what happens when the essential conditions for the implementation of educational technology are met in heretofore resource-poor schools? Do teachers teach differently? Do students learn more effectively? And above all, does student achievement improve? Must all essential conditions be in place for optimum teaching and learning to take place? Is one essential condition more important than any other?

Over a three-year period, the goal of this model, based on NCLB/EETT goals, was to:

Help teachers integrate technology into their teaching practice by providing the technology personnel, resources, and access necessary to implement an Outstanding media and technology program as determined in the Evaluation Rubrics within IMPACT: Guidelines for Media and Technology Programs (http://www.ncwiseowl.org/impact/evaluation.htm#Program%20Evaluation%20Rubrics)

Provide the necessary personnel, resources, access, professional development, and student instruction to produce technologically literate students by the eighth grade and

Have a significant impact on the academic achievement of the school’s student population.

LANCET’s comprehensive research design that includes experimental, quasi-experimental, and case study components is designed not only to determine which essential conditions of technology make the greatest difference in student achievement, but to build evaluation capacity within the state agency, its school systems, and schools and disseminate instruments, research, and lessons learned to educational leaders across the nation.

**Methodology**

**Project Design**

In order to conduct the evaluation of the IMPACT model, the central evaluation team at NCSU and the Friday Institute designed a quasi-experimental (matched subjects) longitudinal evaluation looking at multiple outcomes, which included teacher, student, and administrator skills, attitudes, and behaviors. Each IMPACT school was carefully matched with a similar school that could serve as a comparison. Schools were matched based on factors such as geographical proximity, demographics, and school configuration, and multiple measures were used to assess outcomes at each level.

Within the experimental component of the study, IMPACT schools were randomly assigned to IRCMS treatment or comparison condition, and recruits from geographically proximal schools were also assigned to condition. Multiple measures were used to assess outcomes for teachers and students.

**Research Questions:**

**QuasiExperimental Design**

For the quasi-experimental (IMPACT) component of the study, multiple variables were examined through a longitudinal repeated-measures approach. The hypotheses used took the following form:

Ha: Students or teachers participating in the IMPACT program will show greater change from the baseline through the third year than matched schools not participating in IMPACT

μ1d - μ1a > μ2d - μ2a

Ho: Students or teachers participating in the IMPACT program will not show greater change from the baseline through the third year than matched schools not participating in IMPACT

μ1d - μ1a = μ2d - μ2a

Variables that were addressed within the study included teacher technology use, teachers’ attitudes toward technology, teacher retention, student reading, math, and writing achievement, and student technology skills.

**Experimental Design**

Within the experimental design component (IRCMS), separate research questions were posed.

Students

How changes in reading comprehension varied across condition?

How changes in self-efficacy for reading varied across condition?

How changes in metacognitive awareness varied across condition?

How changes in strategy knowledge varied across condition?

Teachers

How changes in self-efficacy for teaching reading comprehension varied across condition?

How changes in metacognitive knowledge varied across condition?

How did teachers in the two IRCMS conditions vary in terms of treatment integrity?

**Results**

In all three years of the study, each IMPACT school had a different set of goals and objectives depending on its needs and environment. While each school made significant progress toward their stated objectives, there was variation in the extent to which each school implemented each component of the IMPACT model. Compared to Year Two, fewer schools included objectives that directly related to elements of the IMPACT model. Still, the major components of the model appeared to be in place across project schools by the end of the final year of implementation.

Overall, results for IMPACT schools, teachers, administrators, and students were generally positive, but with complex patterns occurring related to differential levels of implementation, especially with regard to student achievement. In some cases, as with teacher attitudes toward technology and stage of concern for the intervention (CBAM), unanticipated patterns occurred, with teachers showing less positive results than expected. We stress that all results from the project should be interpreted with care, and should only be generalized to similar (e.g., Title I) contexts.

Within the experimental design component of the study, the IMPACT treatment students scored significantly lower than the non-IMPACT treatment and the IMPACT comparison groups. With regard to the changes in self-efficacy for reading, analyses showed that the non-IMPACT treatment group scored significantly lower than all other groups. Finally, analysis of self-reported metacognitive strategy awareness revealed that the IMPACT treatment group reported significantly higher awareness than the non-IMPACT treatment group and the IMPACT comparison group. No significant teacher outcomes were reported. Again, we stress that these results should be interpreted with care.

North Carolina Department of Public Instruction: <http://www.ncwiseowl.org/impact/>

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Within the experimental component of the study, IMPACT schools were randomly assigned to IRCMS treatment or comparison condition, and recruits from geographically proximal schools were also assigned to condition. Multiple measures were used to assess outcomes for teachers and students.

Research Questions: Quasi-Experimental Design

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Experimental Design: Research Questions

Within the experimental design component (IRCMS), separate research questions were posed.

Students

1. How changes in reading comprehension varied across condition?

2. How changes in self-efficacy for reading varied across condition?

3. How changes in metacognitive awareness varied across condition?

4. How changes in strategy knowledge varied across condition?

Teachers

1. How changes in self-efficacy for teaching reading comprehension varied across condition?

2. How changes in metacognitive knowledge varied across condition?

3. How did teachers in the two IRCMS conditions vary in terms of treatment integrity?

**Results**

**IMPACT has proven to:**

Increase Teacher Retention

Significantly Increase Student Achievement Results in Math and Reading

Increase Technology Integration

Increase Student Centered Instruction

Word Doc Complete Results

**Teacher Retention**

Initially we wondered if working in a technology rich, professionally and intellectually stimulating environment would leave IMPACT teachers less likely to leave the profession than their colleagues in comparable schools. Analyses of the available data showed that classroom teachers and administrators were more likely to be retained at their school than classroom teachers and administrators in comparison schools. When the data were examined more closely, it was clear that the most experienced teachers (those with 11-15 or more years in the profession) and new teachers (0-3 years experience) were more likely to be retained at IMPACT schools. This is an important finding, as master teachers are often the most valuable to schools.

Teacher Results - Our goal was to examine several different factors among teachers that might have been influenced by the IMPACT intervention. These included technology skills, the activities teachers employ, attitudes toward technology, teachers’ Stages of Concern, and classroom equipment usage.

Attitudes Toward Computers and Instructional Technology - Attitudes were measured via a complex instrument that assessed eleven different types of attitudes. Some of the more important findings were that, over the three years, IMPACT teachers consistently saw IT as more useful, and had more positive attitudes toward the usefulness of email, the World Wide Web, multimedia in the classroom, and instructional technology for teachers than the comparison teachers. Ironically, comparison school teachers were more likely to view student interaction with computers more positively.

Activities of Instruction - Requesting teachers to look at samples of their lesson plans, we asked teachers to report how often they engaged in various activities in the classroom. The goal was to see whether teachers became more student-centered, and progressive (using active learning strategies, e.g.). Because of difficulties with analysis of these data in HLM, these data were looked at two different ways: how teachers who were part of the project for all three years changed, and how any teacher in the project changed in their first year, regardless of when they joined the schools.

During the three years of the project, comparison school teachers became significantly less teacher-centered. More importantly, IMPACT teachers became significantly more constructivist, and showed a substantial increase in technology utilization, relative to their comparison-school colleagues. When only the first year of experience in the project was looked at, the only effect was that IMPACT teachers showed increased technology utilization relative to comparison school teachers.

Classroom Equipment Usage - A survey of classroom equipment usage indicated that there were few differences in classroom technology use for IMPACT and comparison teachers prior to the IMPACT intervention, but that by 2006 IMPACT teachers reported using most classroom technologies more frequently than comparison school teachers.

Administrator Results - Administrators were assessed in several different ways. We examined administrators’ technology attitudes, skills, and usage as well as their leadership styles.

Technology Attitudes, Skills, and Usage - Results for the ISTE Profile for Administrators revealed significant differences across the IMPACT and comparison groups, indicating that IMPACT administrators changed more over time than their comparison counterparts in terms of their technology attitudes, skills, and usage.

Leadership Profile - The Leadership Practices Inventory (LPI) was used to assess administrators’ leadership styles. Due to turnover and low response rates among comparison schools, it was not possible to perform significance testing on the differences between IMPACT and comparison principals. However, the data indicate that all IMPACT principals who were present for all three years of the grant were rated more highly in Year Three than in Year One on all 5 constructs of the LPI. These principals grew most in “Challenging the Process” and “Inspiring a Shared Vision.” At the same time, in Year Three, media coordinators and technology facilitators were generally rated more highly as leaders than principals, indicating that teachers at IMPACT schools value these individuals as part of the school’s leadership team.

Student Results - A number of different variables were measured at the student level, including achievement in math, reading, and writing, as well as level of technology skill.

Math Achievement Looking at achievement levels (I – IV) revealed that IMPACT students tended to show more improvement than their comparison counterparts. Looking at the change in achievement level from Year 00 to Year 02, we see that IMPACT students are 25% less likely to drop achievement levels and are 37% more likely to increase achievement levels. This pattern was similar for Year 02-03, but was not significant.

Reading Achievement - In general, students in IMPACT schools began the study about on par with comparison students, particularly once background variables were controlled for.

Looking at reading EOG test scores, students in IMPACT schools showed stronger growth curves (faster improvement). Depending on grade, growth was up to 2 points stronger for IMPACT than comparison students.

Examining achievement levels (I – IV) revealed that IMPACT students tended to show more improvement than their comparison counterparts. Looking at the change in achievement level from Year 00 to Year 03, the odds that IMPACT students would increase one or more achievement levels were 6.45 times that of comparison students. Because of loss of data over the long time period, similar analyses examining the change from years 01-03 produced similar results, with the odds of IMPACT students increasing an achievement level being 3.09 times that of comparison students.

Writing Achievement - Our analyses indicated that 4th grade IMPACT students scored significantly higher than comparison students in 2006 (the only year of available data). However, there was no significant difference between the two groups at the 7th grade level.

**Recommendations**

Fullan (2005) suggests that in order for capacity building to be sustainable, it needs to be tri-level, i.e., to take place at the school, district, and state/federal levels. The lessons learned from the IMPACT schools suggest that there are certain things that policymakers and administrators at the state and federal and state levels can do that will ultimately improve their capacity for planning, conducting, and communicating the results of project evaluations.

Program: Setting the Evaluation in a Context. Perhaps the most important thing that federal and state program planners can do for grantees is to make every effort to ensure that the grantees understand the purpose of the overarching program (beginning with the federal statute and the U.S. Department of Education’s priorities), see how their particular project fits into the overall program, and appreciate the importance of their formative and summative project evaluations. It would save the would-be evaluation team a great deal of time, frustration, and angst if evaluation were built into the overall program design and if all of the varying purposes for the evaluation were identified and addressed at the outset, i.e., as the program is being designed. It would also facilitate matters if the program design were to include (a) the purpose(s) of the evaluation; (b) expectations for the scope and nature of the evaluation, i.e., formative and/or summative, internal and/or external; (c) components of the project evaluations, such as evaluation questions, data sources, methods for data analysis, timeline; (d) roles of various stakeholders in planning and conducting the evaluation; (e) expectations for reporting the results; and (f) anticipated uses of the results.

Expectations: All too often, funding agencies are disappointed with the quality of the evaluation plans in grant proposals and the quality of evaluation reports. This problem can be ameliorated somewhat if the Request for Proposals (RFP) or Grant Application Package outlines the agency’s expectations for the evaluation and provide enough structure such that inexperienced evaluators can develop a sound plan, but allow flexibility for the applicants to tailor the evaluation to their particular projects. A lot of time and energy could be saved if the RFP referred to specific data collection instruments that grantees can use for their project evaluations - so they won’t spend time developing their own instruments.

Communication: Evaluation guidance or requirements are commonly passed downward from federal program officers, through SEA administrators (often multiple levels of them), to district administrators, and ultimately to school staff members. Project goals and objectives, management expectations, accountability requirements, and expectations of dissemination must be effectively communicated through all these levels. Similarly, evaluation data and findings are typically reported upward through those same levels and must be communicated consistently and in ways that meet the needs of each successive level of management. Communication among all these various levels must take place in ways that are timely—and timed—to effectively engage stakeholders in the evaluation and thus ensure the effective implementation of the evaluation. Developing a plan for communicating with all stakeholder groups before project implementation begins and that encompasses new knowledge, roles and responsibilities, pathways and preferred methods for communication will go a long way in reducing confusion and unmet expectations, and toward gaining buy-in, understanding, and engagement.

**Published Articles**

Bradburn, Frances Bryant. “Putting Their Heads Together,” T.H.E. Journal (July 2007)

Bradburn, Frances Bryant. “Making an IMPACT: Methods to Enact Change in Technology Instruction,” Converge (Spring 2007): 50 – 52.

Bradburn, Frances Bryant and Jason W. Osborne. “Shared Leadership Makes an IMPACT in North Carolina,” eSchool News (March 2007)

Bradburn, Frances Bryant. “A Program with Impact,” T.H.E. Journal (January 2007): 50-52.

Bradburn, Frances Bryant. “Preloading Professional Development to Ensure Potential Success,” T.H.E. Journal (July 2004): 22-25.

Bradburn, Frances Bryant. “Tweaking Common Professional Development Models for Added Value,” T.H.E. Journal (July 2004): 26-28.

IMPACT: Guidelines for North Carolina Media and Technology Programs. North Carolina Department of Public Instruction, 2000, 2005,