

EXECUTIVE SUMMARY

Title: **NCLB Enhancing Education Through Technology - IMPACT Evaluation Report**

Type of Executive Summary:

- Action
- Action on First Reading
- Discussion
- Information

Policy Implications:

- Constitution _____
- General Statute # _____
- SBE Policy # _____
- SBE Policy Amendment
- SBE Policy (New)
- APA # _____
- APA Amendment
- APA (New)
- Other No Child Left Behind Act of 2001, Title IID, Enhancing Education through Technology

Presenter(s): Mr. Robert Logan (Associate Superintendent, Innovation and School Transformation), Ms. Wynn M. Smith (Interim Lead, Instructional Technology), and Mr. Jason Osborne (Senior Research Fellow for Evaluation, The William and Ida Friday Institute for Educational Innovation)

Description:

The North Carolina Department of Public Instruction, in partnership with the Technology in Learning unit of SERVE Center at UNC Greensboro and The William and Ida Friday Institute for Educational Innovation at NCSU, conducted the Looking at North Carolina Educational Technology (LANCET) project in order to study the implementation of the state's educational technology IMPACT Model and communicate the effect on schools, teaching practices, and student achievement.

Resources:

N/A

Input Process:

This study was implemented through a partnership with the North Carolina Department of Public Instruction, the Technology in Learning unit of SERVE Center at UNC Greensboro and The William and Ida Friday Institute for Educational Innovation at NC State University.

Stakeholders:

USED and all schools who have received funding through the NCLB Enhancing Education through Technology awards, as well as all schools in NC that can learn from this model and its evaluation.

Timeline For Action:

N/A

Recommendations:

N/A

Audiovisual equipment requested for the presentation:

- Data Projector/Video (Videotape/DVD and/or Computer Data, Internet, Presentations-PowerPoint preferred)
Specify: _____
- Audio Requirements (computer or other, except for PA system which is provided)
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Motion By: _____ Seconded By: _____
Vote: Yes _____ No _____ Abstain _____
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IMPACT

YEAR THREE REPORT

2005-06

-EXECUTIVE SUMMARY

Starting with the 2003-04 school year, 11 schools around the state of North Carolina began full implementation of the IMPACT model, which is designed to facilitate the infusion of instructional technology into schools. This report summarizes findings from the final year of the three-year project, focusing on the implementation of the project and effects of the intervention on school, teacher, and administrator outcomes.

Methodology

In order to conduct this evaluation, 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.

Implementation

As in Years One and Two, each 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.

Results

School Outcomes

In examining results for schools, we focused on two main variables: teacher retention and the implementation of the IMPACT model.

Retention

Analyses of available data showed that IMPACT classroom teachers and administrator were more likely to be retained at their school than classroom teachers and administrators in comparison schools. Special subject teachers were less likely to be retained in IMPACT schools, although it is not immediately clear why that might be.¹

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, and beginning teachers have the highest attrition rates, nationally.

IMPACT Implementation

Our measures of IMPACT implementation indicate that schools made significant progress in implementing this complex model over the three year period of the project. As the School Technology Needs Assessment (STNA) results indicated, teachers at IMPACT and comparison schools reported significant and meaningful differences on items related to “Technical Infrastructure and Support,” which assesses the adequacy of the school’s technology base and staffing. Other relatively substantial effect sizes occurred for “Community Linkages,” “Professional Development – Instructional Strategies,” “Supportive Environment for Risk Taking,” “Professional Development - Skills, Policies, and Structures,” and “Resource Media, Software Tools.” These results were echoed by the other measures of implementation (the IMPACT Rubric and IMPACT Implementation Checklist).

Teacher Outcomes

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 technology usage.

¹ Retention was examined through looking at our school rosters from year to year. We were unable to access NC DPI records or other employment records that would help us understand true retention (retention in the profession) vs. retention in the schools, which is what we were forced to do. It’s possible that teachers leaving these schools went to other schools, rather than leaving the profession completely.

ISTE Performance Standards for Teachers

We measured self-reported technology skills via an instrument that measures six dimensions of the National Education Technology Standards for Teachers (NETS-T). Overall, IMPACT teachers started out less confident (about a half standard deviation below) than their comparison teacher counterparts, but had substantially stronger growth so that by the beginning of the second year of the project, IMPACT teachers had much higher overall scores on the NETS-T (about one-half standard deviation *above* the comparison teachers). Similar patterns held for all the subscales.

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 included the following: 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

During the three years of the project, comparison school teachers became significantly less teacher-centered.² At the same time, 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.

Concerns-Based Adoption Model (CBAM)

According to our teacher concerns measure, IMPACT teachers did not move through the stages of concern as anticipated, but became more intensely clustered at the awareness stage. We hypothesize that this pattern of development occurred as a result of the complexity of the intervention and the way in which it was deployed over time.

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

² While this sounds positive, it is unclear as to whether it is desirable to become LESS teacher-centered in a technology - intensive classroom. The way this was operationalized includes things that might be highly desirable in a technology rich environment.

intervention, but that by 2006 IMPACT teachers reported using most classroom technologies more frequently than comparison school teachers.

Administrator Outcomes

Administrators were assessed in several different ways. We examined administrators' technology attitudes, skills, and usage as well as their leadership styles. In the case of media coordinators and technology facilitators, we asked IMPACT principals to complete performance appraisals to describe how well these individuals fulfilled their job descriptions.

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.

Performance Appraisals

IMPACT principals rated media coordinators and technology facilitators using instruments created by NC DPI as part of the revised IMPACT guidelines. In both cases, principals ranked these individuals highly (near the maximum of 4.0) on all constructs. Both groups were ranked highest on Program Administration Performance. These data suggest that IMPACT principals were satisfied with the job performance of their media coordinators and technology facilitators.

Student Outcomes

End of Grade Achievement- Math

In general, HLM analyses indicated that students in IMPACT schools began the study scoring lower in Math than their comparison school counterparts, although once

background variables were controlled for there were often fewer differences. Looking at Math EOG test scores, students in IMPACT schools showed stronger growth curves (faster improvement). The average difference between the two was about 1.0 points over the first two years (note that expected growth for one year on these tests were often less than 3.0 points) and a difference of about 1.5 points in Year 03.

Looking at Math 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.

Looking at Math achievement levels as passing/failing (levels I, II vs. III, IV), we see that IMPACT students were less likely to pass in Year 00 and were more likely to pass in Year 03. Looking at change from Year 00 to Year 02 we see no difference in the odds of going from passing to not passing, but IMPACT students' odds of improving their status from not passing to passing were 42% higher than the odds for comparison students (which was highly significant). Because the pass rate for Year 03 was so dismal (due to a change in the test) we only examined the probability of failing. The odds of an IMPACT student passing was 24% higher than for a comparison student, although this gap narrowed as age of student increased.

Finally, to test our largest subsample of students who had the longest exposure to the IMPACT environment, elementary students in grades 3-5 were analyzed in separate, parallel analyses, and produced similar (although often stronger) results.

End of Grade Achievement- Reading

HLM analyses indicated that 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.

Looking at Reading 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 the odds for 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 those for comparison students.

Looking at achievement levels as passing/failing (levels I, II vs. III, IV), at baseline (Year 00) IMPACT students were significantly less likely to pass the reading EOG than comparison students (62.7% vs. 73.9% respectively). By the end of the project, there was no significant difference in the pass rate (80.8% vs. 82.2%, respectively), representing a

large improvement for IMPACT schools. Once background variables were controlled for, the odds that IMPACT students would go from non-passing to passing status from Year 00-03 were 55% higher than the odds for comparison students. Interestingly, this gap between the two groups' odds of passing increased in higher grades.

Our analyses did not find a significant difference in the reading achievement of IMPACT and comparison students in the primary grades, based on the results of the Gates-MacGinitie reading test. However it is important to note that this test was only given to each cohort of 2nd graders at the beginning and end of the school year, and not across multiple grade levels, so only limited conclusions may be drawn from these results.

IMPACT Implementation and Achievement

SAS performed several analyses using their EVAAS methodology to investigate the relationship between IMPACT and student achievement. Using SERVE's School Technology Needs Assessment (STNA) as a proxy for technology integration and utilization, they found that there was an interesting interaction between technology utilization and group (IMPACT vs. comparison) on student achievement growth ("school effects") during the 2006 school year.

Our replication of these analyses produced somewhat different results. Our analyses found that as STNA scores increased for IMPACT schools, there was significantly stronger growth in student achievement, while higher STNA scores were associated with flatter growth curves for comparison students. We can speculate that these results occurred because the environmental supports in IMPACT schools allow teachers to leverage instructional technology to benefit students more, whereas in comparison schools it is possible that the lack of a technology facilitator and the other structural supports that IMPACT brings can inhibit student achievement as teachers attempt to utilize more technology.

A different pattern occurred, however, for the STNA factor related to IT infrastructure and support. Our analyses indicated that as teachers perceive (or receive) more IT infrastructure and support, students tend to benefit more than when teachers receive less support—and this pattern held for both IMPACT and comparison schools.

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.

Technology Skills

Data related to student technology skills produced varying results in this study. In the 2005-06 school year, comparison students were more likely to pass the 8th grade Computer Skills Test (CST) than IMPACT students. However, there was a change in the test in that year, and the test only measures one grade level (present in only two IMPACT sites), so these results should be interpreted with care.

Results from technology skills surveys that were administered to students in grades 3-5 and 6-8 indicated that by 2005-06 there were significant differences across most of the technology skills listed on the instrument. This effect was more pronounced for students in grades 3-5, where comparison school students often ended the year rating themselves lower than the IMPACT students had at the start of the year.

Recommendations

Based on the available results of the three-year evaluation of the project, we have a number of recommendations for NC DPI.

- We suggest that in future iterations of the IMPACT model deployment, NC DPI allocate funding based on ADM. The funding model for schools in this project did not account for wide disparities in school size, and correspondingly, there are substantial within-group differences in terms of technology saturation and resource availability at IMPACT sites, particularly at middle schools.
- We recommend that future studies of the IMPACT model focus on the implementation of the model at one type of school site (e.g., K-5, 6-8, or 9-12). The variation in the types of schools selected for participation in this project made it difficult to select adequate comparisons, and made it more difficult to draw firm conclusions about the effectiveness of the model at any given type of school.
- In each year of the project, there was substantial variation in the ways in which the model was implemented across school sites. While it is important to empower schools to use the model to meet their specific needs, for projects of this type it is also important to ensure as much continuity and comparability across project sites as possible. We recommend that in future iterations of this project that NC DPI and SERVE continue to work to provide schools with guidance about the importance of implementing all aspects of the model, particularly Needs Assessment: People and Process, Designing Facilities, Planning and Evaluation.
- We recommend that future IMPACT schools be required to develop objectives and strategies that explicitly align with every element of the IMPACT model.

- NC DPI should continue to re-visit the IMPACT model to provide guidance in terms of a specific recommended progression for implementing the different aspects of the model and whether certain critical factors should be weighted more heavily than others. In addition, it may be necessary to describe a rollout of the model based on standard levels of technology and media funding.
- Schools appeared to find some elements of the model more difficult to conceptualize and implement than others. In particular, schools appeared to be challenged by the need to engage in formative evaluation. This component of the model may require special time and attention within the context of future implementations of the model.
- Our evaluation was not able to capture the range in the quality of staff development that was available at different schools, but this is a critical issue in ensuring that teachers are prepared to implement the IMPACT model. We recommend that schools implementing this model select staff development opportunities with care, based upon a rigorous needs assessment of their staff. Further, we recommend that schools monitor the quality of staff development by routinely surveying their staff on this subject.
- The structure of the MTAC varied across schools, with teachers at some schools having no opportunity to serve on this committee. We recommend that IMPACT principals incorporate the perspectives of teachers during every stage of the implementation of this project, and we recommend that NC DPI require schools to include teachers and parents on their MTACs.
- Leadership data indicate that teachers at IMPACT schools viewed media and technology staff as valuable leaders in their schools, in accordance with the principles of the IMPACT model. These individuals played key roles in the implementation of the model, and we recommend that their leadership roles be emphasized when advocating for funding for these positions.
- The concept of “best practice” as related to technology integration continued to vary across school sites throughout the project. This may have been a result of the site-based decision making that occurred with respect to professional development, as well as the varied backgrounds of teachers participating in the intervention. We recommend that in future implementations of the model, NC DPI provide as many illustrative examples of best practice as possible, and provide a platform for outstanding teachers from the current group of IMPACT schools to model activities and disseminate lesson plans.
- Teacher retention data indicate that IMPACT schools were more effective at retaining beginning and master-level teachers than comparison sites. We recommend that schools implementing the IMPACT model work to support all teachers, especially those who may be less familiar with technology than beginning teachers, and have less teaching expertise than master teachers.

- Teachers appeared to view the IMPACT model as highly complex and dynamic, and experienced some unanticipated changes in their attitudes and concerns with technology and with the innovation as a whole. While there may be no easy way to “unpack” this model for school staff, we recommend that NC DPI and IMPACT school principals make every effort to incentivize the change process for teachers, and create a transparent decision-making process at the school level.
- Further, because IMPACT teachers’ attitudes toward technology tended to plateau in Year Three, we recommend that future implementations of the IMPACT model account for “innovation fatigue,” and focus on finding new ways to motivate teachers to continue their personal development as learners and users of technology.
- Results indicated that comparison teachers became less teacher-centered, relative to IMPACT teachers, while IMPACT teachers made significant and substantial growth in their use of technology. This finding suggests that future professional development activities for IMPACT teachers should focus on ways of incorporating technology so that learning can remain student-centered.
- Because IMPACT teachers made substantial progress in their use of classroom technologies, we recommend that IMPACT principals continue to celebrate the successes of their staff, and investigate ways to support them in their continued growth as professionals and as technology users. Many IMPACT teachers may have felt overwhelmed by the many changes that the implementation of the model required, and may not be able to sustain their own professional development without targeted assistance.
- Overall, we recommend interpreting the results of this evaluation with care. The results of this study are only immediately generalizable to Title I schools in North Carolina. Further, because the majority of subjects were at elementary schools, it is difficult to draw firm conclusion about the effects of this model at the middle school level. Lastly, this evaluation used a quasi-experimental approach, as the intervention sites were not randomly selected. Because the comparison sites did not reflect a “control” condition, it is important to remember that all schools in the study were implementing multiple innovations at various points. As with any longitudinal study of a schoolwide intervention, this evaluation represents an attempt to describe a dynamic “moving target,” and conclusions should be drawn with these facts in mind.