Evaluating a K-12 Technology Integration program: IMPACTing Students and Teachers

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I. INTRODUCTION

The IMPACT model for technology integration focuses on collaboration between teachers in conjunction with the technology facilitator and media coordinator. This collaboration emphasizes the best uses of technology and media collections matched to content standards with the goal of improving classroom instruction, and ultimately, student achievement. The model promotes effective, supportive school leadership that includes the principal, a technology facilitator, and a media coordinator. (NCDPI, 2008) The model also includes strong leadership and support from the central office and district-level administration, and a budget sufficient to support purchase of a substantial amount of educational technology equipment and software. Due to page/word limits for this conference paper, an abbreviated description is provided. More detailed information can be obtained from the NC Department of Public Instruction, or found at http://www.ncwiseowl.org/Impact/ .

All four IMPACT cohorts have been funded through the federal *Enhancing Education Through Technology* (EETT) program. Evaluation reports for previous IMPACT cohorts, from 2003 to 2007, included several recommendations, some of which provided assistance in designing the structure of IMPACT III and IV implementation. (Osborne, Overbay, Seaton, Vasu, & Grable, 2006) These recommendations included (but were not limited to):

- A more continuous means of communicating with one another be provided by NC DPI (e.g., more regular conference calls among schools, facilitated by regional consultants) so that schools can provide one another with additional support, ideas, and feedback
  - *The IMPACT IV cohort of schools met quarterly throughout the 08/09 school year to discuss issues related to implementation, share ideas with other schools, and receive guidance and training from members of NC DPI Instructional Technology Division.*
- Future projects might want to delay purchase of some instructional technology until after teachers, students, and infrastructure are prepared to receive them via these above-mentioned mechanisms

  - *The IMPACT III cohort of schools received extensive training for their school administrators, throughout the 06/07 school year, as part of the 'IMPACTing Leadership' program, and funding to purchase the technology was delayed until July 2008 when training was complete.*
- Future IMPACT schools should be required to develop objectives and strategies that explicitly align with every element of the IMPACT model.
  - *All of the schools in IMPACT III and IV cohorts were required to develop an Implementation plan at the start of the 08/09 school year, when funding for technology purchases was received.*
- With future iterations of the IMPACT model, NC DPI should allocate funding based on ADM. The funding model for schools in IMPACT I did not account for wide disparities in school size, and correspondingly, there were substantial within-group differences in terms of technology saturation and resource availability at IMPACT I sites
  - *Schools in both IMPACT III and IV cohorts were allocated funds based on school and district size*

In July 2008, funds were awarded to seven school districts, including thirty schools, spanning all levels – elementary, middle and high. Three of the school districts participating in the IMPACTing Leadership training, held during the 06/07 school year, received funding in July 2008 as the IMPACT III cohort. Four additional school districts were selected through a competitive RFP process that took place in Fall of 2007, and received funding in July 2008 as the IMPACT IV cohort. A unique feature of these third and fourth cohorts, that was not present/required in the first or second cohorts, is the district's role in planning and implementation. In these latter cohorts, applications were accepted from districts, as opposed to individual schools, with the district applicants planning to implement the IMPACT model at most/all schools within their district.

The primary goal of the IMPACT evaluation is to measure whether implementation of the IMPACT model (e.g. integrating technology into teaching and learning in K-12 schools) makes a significant difference in student achievement. Given the encompassing nature of the IMPACT framework, we anticipated that this model would also affect other student and teacher outcomes, in addition to student achievement.

II. DESCRIPTION OF IMPACT SCHOOLS

IMPACT III schools include 17 schools in three LEAs across North Carolina. The IMPACT III cohort includes three school districts: Asheville City Schools (all schools, K-12); Pamlico County Schools (all schools, K-12); and Scotland County Schools (5 of 10 elem/middle schools). IMPACT III schools serve 7,340 students. Most students are white (50.04%) or black (41.05%). Teachers reported having an average of 13.2 years of experience in IMPACT III schools.

The IMPACT IV cohort includes 13 schools within four school districts: Asheboro City Schools (gr. 6-12 only), Kannapolis City Schools (gr. 5-12 only), Thomasville City Schools (gr. 4-12 only), and the Northeast Consortium (gr. 3-12), which includes schools from both Perquimans County and Edenton-Chowan County Schools. IMPACT IV schools serve approximately 8,676 students. Most students are white (45.62%), black (34.61%), or Hispanic (18.17%). Teachers in IMPACT IV schools reported having an average of 11.6 years of experience.

III. DATA COLLECTION INSTRUMENTS

Teachers/Certified Instructional Staff

Performance Standards for Inservice Teachers (PSIT). Teachers, technology facilitators, and media coordinators were asked to complete the Performance Standards for Inservice Teachers, which is based on the National Educational Technology Standards for Teachers (NETS-T) from the International Society for Technology in Education (ISTE). This instrument assesses six constructs including: Technology Operations and Concepts (10 items), Planning and Designing Learning Environments and Experiences (8 items), Teaching, Learning, and the Curriculum (6 items), Assessment and Evaluation (6 items), Productivity and Professional Practice (7 items), and Social, Ethical, Legal, and Human Issues (11 items). (Corbell, Osborne, & Grable, 2008)

School Technology Needs Assessment (STNA). Teachers, technology facilitators, and media coordinators were asked to complete the School Technology Needs Assessment, which assessed their perceptions of the IMPACT implementation (SERVE, 2005). STNA collects data on school technology program strategies (status of a supportive environment for technology use and provision of high quality, targeted professional development for technology), and school technology program outcomes (appropriate technology use for teaching and learning, and changes in instructional practices and student learning outcomes). Based on a factor analysis, items are grouped into four major constructs: Supportive Environment for Technology Use, Professional Development, Impact of Technology, and Use of Technology for Teaching and Learning. (Corn, 2009) 'The Supportive Environment for Technology Use construct primarily focuses on the level to which conditions are in place at the school to support effective technology use. These items ask if the right tools, resources, staff, opportunities, etc. are in place to enable teachers and other staff to successfully integrate technology'. (p.5) The Professional Development construct is for respondents to indicate the level of need for, as well as the quality of, specific professional development opportunities that address the use of technology for instruction and planning. The items included in the Use of Technology for Teaching and Learning construct examine both teachers' and students' current use of technology. The items included in the Impact of Technology construct examine school staff's perception of the impact of technology on both teaching practices and student outcomes.(p.6) Further information is available at www.serve.org/Evaluation/Capacity/EvalFramework/resources/STNA.php

Standards Assessment Inventory (SAI). The quality of the professional development was also measured, by asking teachers to complete the SAI developed by the National Staff Development Council (NSDC). This inventory addresses the twelve standards, combined into three key categories (Context, Process and Content), found to be essential to effective professional development. (Hirsch, 2006) Teachers, technology facilitators, and media coordinators were asked to complete the SAI to measure the degree to which the professional development offered in their school adhered to the state standards for North Carolina, which are based on the standards developed by the NSDC. Those standards are categorized as: Learning Communities, Leadership, Resources, Data-Driven, Evaluation, Research-Based, Design, Learning, Collaboration, Equity, Quality Teaching, and Family Involvement. Further information is available at www.nsdc.org.

Students

End of grade tests for grades 3-8 (EOG). On EOG assessments, three types of scores are reported: developmental scale scores, percentiles, and achievement levels. The raw score is converted to the developmental scale score for comparison of the students' progress in each subject from grade to grade. The achievement level was developed to identify levels of student performance which may be used as a comparison between students throughout the state. There are four achievement levels reported for each subject tested (I, II, III, IV). A detailed description of each performance level is available at the NCDPI website. (www.ncpublicschools.org/accountability/testing). Typically, EOG scores are not available until several months after administration, so as a result, achievement data from the IMPACT I cohort is presented here. Achievement data for the IMPACT III and IV cohorts will be available in September 2009.

Technology Skills Checklist (TSC) The Technology Skills Checklist was originally designed by Berkeley Planning Associates in conjunction with the Teacher Led Technology Challenge project (Berkeley Planning Associates, 1998). The TSC assesses students' technology skills using a five point scale that includes the following responses: "I do not know if I have done this," "I have never done this," "I can do this with some help," I can do this by myself," and "I can show someone how to do this." Two instruments were administered to students for this evaluation, one for grades 6-12 and another for grades 3-5. The assessment for grades 3-5 is a subset of the questions used in the TSC for grades 6-12. The TSC for grades 3-5 and grades 6-12 were analyzed as a summary score (Cronbach's alpha= 0.96). The TSC was administered to most students in September/October of 2008 and again in April/May of 2009.

IV. RESULTS

Teacher Outcomes

In examining results for schools, the initial IMPACT evaluation focused on two main variables in addition to student achievement: teacher retention and the changes in teachers' perceptions/practice. (Osborne, Overbay, Seaton, Vasu, & Grable, 2006) This research examined 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 and its potential benefits, perceptions of administrative support, and classroom technology usage. The evaluation team conducted site visits to IMPACT III and IV schools in the fall of 2008 and again in the spring of 2009. During the fall site visits, evaluators observed an average of five classrooms at each of 19 schools and interviewed the Media/Technology Advisory Committee (MTAC) at all 30 schools. In the spring, an average of five classrooms were visited at each of 21 schools, and evaluators conducted semi-structured interviews at all 30 schools to discuss progress with implementation throughout the year.

Classroom visits to document technology use

The evaluation team visited classrooms in 20 IMPACT schools in the Fall and 18 schools in the Spring of 2009, for a total of 181 classroom visits. Because the evaluations for IMPACT I examined elementary schools, we focused our efforts on secondary schools for these visits, observing all middle and high schools when possible, but only a subset of elementary schools. The most commonly used technologies were interactive whiteboards, web browsers, and desktop or laptop computers (often, but not always, linked to a digital interactive board). In general, teachers were observed using technology more often than students in both IMPACT III and IV schools. It is worth noting that in nearly one-fourth of observed lessons, across schools, students used no technology at all. In most cases, students in these lessons took notes or filled out paper worksheets while teachers projected information on a whiteboard.

Because digital interactive boards were so prevalent in IMPACT III & IV schools, we paid special attention to the ways in which these tools were being used. We observed many classrooms in which the digital boards were used similar to overhead projectors; for example, teachers simply projected information or asked students to work out problems on the board using the stylus as they would a dry erase marker. We observed few classrooms in which teachers used the more advanced functions of the boards, though teachers' creativity and comfort with the boards seemed to increase from the fall to the spring. Elementary teachers were more likely to allow students to use the boards, for example by playing "games" in which they were asked to highlight or drag/drop items on the screen, whereas high school teachers were more likely to use it to present information, either by streaming video or just projecting text. The vast majority of observed classes did not encounter any technological problems, and most of the problems that were observed were relatively minor.

Focus groups/Interviews with MTAC members

Technology Facilitator's role - All IMPACT III and IV schools were expected to hire and fund a full-time technology facilitator (TF) to take charge of the integration of instructional technology in the school. Most TFs reported working as a team with the media coordinator. In some cases, the curriculum facilitator was also a part of the team. Most TFs described their primary role as supporting teachers in the use of technology; however, there was a range of interpretations of what this support should look like. Some TFs are also in charge of staff development related to technology and its use in the classroom. In some cases this means organizing workshops, but more often, TFs work informally with individuals or set up meetings with small groups of teachers on an as-needed basis. Several TFs noted that they are frustrated at the amount of "fix-it" work they are doing, but many noted that it seems to be decreasing as more people become accustomed to the new technology and more teachers are able to solve their own problems. Some schools that were unable to hire a full or part-time technology assistant were still able to provide support to the TF through teams of teachers at the school. Such teams, which were given names like "tech buddies" or "vanguard teams,"(as in Kannapolis City Schools) were made up of teachers with a good understanding of technology who could offer support for simple problems. This type of support freed up the TF to handle more complex problems and instructional activities, and was most important on campuses with multiple buildings. In addition to supporting the TF, this system fosters collegiality throughout the schools and supports the collaboration goals of IMPACT. In spring interviews, several TFs noted that teachers were learning to troubleshoot their own problems, and more and more teachers were taking the initiative to help each other rather than running immediately to the TF when problems arose.

Although most of the technology facilitators indicated they were employed on a ten-month contract, many of them reported working during the summer without compensation to ensure that the schools were ready for the return of teachers and students. Another barrier to success was the limited amount of technical support that was available. Although every school had a technology facilitator and many had technicians, in most cases the large influx of technology required much more manpower than was available for installation, maintenance, and technical assistance. District-level technology people were particularly stretched for time in districts that had all schools implementing the model at once.

Collaboration - The IMPACT model includes a strong emphasis on collaboration within a school, both within a grade level and across grades and subjects. For some schools this has meant changes in scheduling teachers' planning periods in addition to changing teachers' mindsets about how to plan their lessons. Teachers with technical expertise tend to be willing to share their knowledge with teachers who have less technical expertise. Beyond teachers' willingness to help each other with technology, their collaboration in planning instruction is increasing. Members of several focus groups reported that their schools bring in substitute teachers to allow teachers time away from the classroom for scheduled collaboration. During the follow-up interviews in the spring of 2009, many schools reported that the amount of collaboration had increased and its nature had improved. For example, several TFs and MCs reported that collaboration had become more a part of the school culture. Teachers who originally had to be "forced" to collaborate at the beginning of the year were voluntarily collaborating by the end, for example by planning grade-level lunches and informal meetings.

Professional Development - Professional development was required by the grant, but the format and timing was left up to individual schools. As a result, there was a lot of variation in the level and type of professional development that MTACs reported offering to staff. Several focus groups reported that teachers and staff regularly participated in informal methods of professional development. All schools/districts that reported having a summer training session, similar to the one conducted in Kannapolis City Schools, found the experience to be positive and beneficial. Conversely, schools that were not able to have professional development before the start of the school year found it difficult to get teachers trained and comfortable with the equipment in time to effectively use it in their classrooms. In spring follow-up interviews, TFs and MCs indicated that in addition to rolling out technology slowly, it is advisable to space out professional development. The constant training sessions, they reported, were just as overwhelming to teachers as the constant influx of new equipment. Further, one district reported training all of their regular substitutes in how to use the equipment so teachers could plan to incorporate technology even on days when they might be out of the classroom.

<u>*Description from Kannapolis City Schools – part of the IMPACT IV cohort*</u>

As we talked to other schools that had created a technology-driven curriculum, they encouraged us to provide professional development before handing out the technology tools. In order to be successful we knew we needed all teachers to participate in a weeklong summer training session. A visionary leadership team made the difference; in our three schools, all but two teachers attended. They also received a stipend and could take their equipment (laptop, Mimio and projector) home to use for the remainder of the summer.

We were determined not to have a week of boring lectures, but to create an environment that fostered enthusiasm and a passion for teaching with technology. We wanted our summer sessions to be very hands-on with participants constantly moving, sharing ideas, and creating learning objects. We knew we couldn't accomplish this by ourselves so the idea of a 'Vanguard team' was born. This would be a team of teacher leaders that would help with facilitating the summer workshops, and support teachers in their building throughout the school year. Each school facilitator selected 5-6 teachers who would make excellent trainers and convinced them to participate. Two professors from our grant partner, UNC-Charlotte, and one from the University of Memphis assisted us with preparing our Vanguard team during four days of a technology 'lightning round'. We included the topics these teacher leaders would need to lead the workshops for the remainder of the summer. For the rest of the teaching staff, we cross-scheduled the curricular areas and grade levels to maintain flexibility throughout the summer. For *example, we scheduled high school math/science with middle school language arts teachers one week and then scheduled high school language arts with middle school science/math teachers the next week. If a teacher had a conflict with their curriculum-based week, they could attend the opposite week and collaborate with either a different grade level or subject area. As a bonus, we found many of the teachers that trained in week #1 would come back during later weeks to create additional lesson plans and units with their colleagues.*

The initial planning sessions were extremely successful and with the Vanguard team's leadership our three schools were able to gain an understanding of how to function as a collaborative professional learning community. As we moved into the school year, the initial planning model helped maintain the 21st century environment that the principals had first envisioned.

We created a five day timeline with the following schedule:

- ***Monday**: Higher order thinking skills, Collaboration, Connectivity, Microsoft Office games, and Principal Expectations.*
- ***Tuesday:** Interactive whiteboards, online projects, webquests*
- ***Wednesday**: Choose your own adventure day. Participants selected two topics from Garage Band/iMovie, podcasting, google apps, Digital Storytelling, web 2.0 sites, movie maker, or Quizdom to study*
- ***Thursday:** Effective use of resources/Big 6, wikis, revisiting skills, guidelines for planning on Friday*
- ***Friday:** Collaborative Planning.*

Every week, participants would come in Monday with reservations about attending a week long workshop. What could possibly take FIVE full days to learn? By the end of Wednesday's sessions, we had hooked them all into using this new way of teaching. By the time they started planning on Friday, we just had to stand back and watch it happen. Systemic change was indeed beginning in Kannapolis City Schools.

Teacher practice - In addition to being excited about the technology, MTACs reported that teachers were showing a greater willingness to take risks and try new things in their classrooms. In addition, a willingness to take risks lead to a culture of reflective practitioners, as teachers considered what strategies worked and which did not. Small-group and collaborative learning are also reported to be on the rise. Some MTACs attribute these changes to the technology provided through the IMPACT grant.

Even in schools that felt supported by their district administrators, there was a strong sense that more technical support was needed at the district level to adequately support the implementation process. The main issues plaguing most districts were the existence of too few technicians to service or install equipment and an overall infrastructure that failed to support the needs of the evolving technologies.

Flexible access to media center and computer labs – The IMPACT Model requires schools to offer flexible access to media/technology resources. The concept of flexibly scheduling access to resources was newer to some schools than others. For example, in high schools and some middle schools, classes typically visit the media center/computer labs on an 'as needed' basis. Whereas, in most elementary schools, teachers have a scheduled day for "Technology" and/or "Library", as part of a rotation of electives freeing up teachers to have their planning time each day. Removing both technology and the media center from that fixed rotation (to a flexible schedule) caused teachers in some schools to lose their planning time once or twice per week, but in other schools, a different type of elective was created to substitute in the rotation so teacher's planning time was unaffected. Again, this seemed to be a bigger hurdle to implementation in elementary schools than in middle or high schools.

ISTE Performance Standards for Inservice Teachers

We measured self-reported technology skills via an instrument that measures six dimensions of the National Education Technology Standards for Teachers (NETS-T). The IMPACT III cohort completed this survey three times, in Spring 2008, Fall 2008 and Spring 2009. The IMPACT IV cohort only completed it twice, in Fall 2008 and Spring 2009. Overall, IMPACT III schools showed no significant growth in the overall self-reported skills rating of teachers from Spring 2008 to Spring 2009, $F(2,1379)=1.241$, $p=.707$. However, the IMPACT IV teachers did show significant growth in their overall self-reported technology skills rating from Fall to Spring, $F(1,1204)=41.408$, $p=.000$.

School Technology Needs Assessment (STNA)

Results from the Fall and Spring administration of the STNA indicated significant changes in teacher beliefs, based on a one-way ANOVA, for some of the IMPACT schools. Overall, in IMPACT III schools, there were no significant differences ($p>.05$) in any of the four constructs measured: Supportive Environment for Technology Use, $F(1,1043)=0.905$, $p=.342$; Professional Development, $F(1,1031)=0.211$,$p=.646$; Teaching and Learning, $F(1,1023)=1.947$, $p=.163$; or Impact of Technology Use on Teachers/Students, $F(1,1019)=3.105$, $p=.078$. However, for the IMPACT IV cohort, there were significant increases in the average ratings in all four constructs: Supportive Environment for Technology Use, $F(1,1186)=32.398$, $p=.000$; Professional Development, $F(1,1177)=9.919$, $p=.002$; Teaching and Learning, $t=-5.686$, $p=.000$; and Impact of Technology Use on Teachers/Students, $F(1, 1163)=32.45$, $p=.000$. The differences observed between the teacher responses in IMPACT III and those in IMPACT IV require further empirical investigation before conclusions or recommendations can be made.

Student Outcomes (from IMPACT I evaluation-2006)

As of June 2009, student achievement is not yet available for the most recent cohorts, IMPACT II, III and IV, so achievement results presented here are from the initial IMPACT evaluation, lasting from 2003 to 2006.

End of Grade Achievement- Math

In general, HLM analyses indicated that students in IMPACT schools began the project 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).

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 2, 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 2-3, but was not significant.

Looking at Math achievement levels as passing/failing (levels I/II (failing) vs. III/ IV (passing)), a binary logistic regression showed that IMPACT I students were less likely to pass in Year 00 and were more likely to pass in Year 3. Looking at change from Year 00 to Year 2 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 3 was so dismal (due to a change in the standards for the test) we only examined the probability of failing. The odds of an IMPACT I student passing was 24% higher than for a comparison student, although this gap narrowed as age of student increased.

End of Grade Achievement- Reading

HLM analyses indicated that in general, students in IMPACT schools began the study comparable to 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). (Osborne, Overbay, Seaton, Vasu, & Grable, 2006)

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 3, the odds that IMPACT I 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 1-3 produced similar results, with the odds of IMPACT I 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 I 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 I students would go from non-passing to passing status from Year 00-3 were 55% higher than the odds for comparison students. Interestingly, this gap between the two groups' odds of passing increased in higher grades.

Student achievement data from the IMPACT III/IV cohorts will be available in September 2009.

IMPACT III and IV student outcomes- Spring 2009

Based on focus group and interview data, the MTACs' descriptions of the effects of the grant on students were almost universally positive. As with teachers, students were described as being very excited about the new technology. Nearly every MTAC described a high level of student engagement, as evidenced by increased participation in class, more school-related talk in the hallways, and students turning in more assignments than they had in the past. Many MTACs also attributed a decrease in behavior and attendance problems to the new technology, speculating that students choose to participate and behave appropriately because they enjoy using the technology. According to teachers, the students want to use the technology resources so much so that they are willing to assist teachers who might otherwise shy away from using the technology.

Student spring surveys showed that, in grades 6-12, 80% of students felt the use of technology made learning easier and more interesting. Similarly, 75% of students in grades 3-5 reported the use of technology made learning more interesting. (N=2377) Using a retrospective design, one question asked students to rate the amount of change (on a scale of 1-*No change* to 10-*Substantial change*) from last year to this year in terms of the variety of lessons and assignments used by their teachers; student ratings (in gr 6-12) averaged 6.45 (N=6806). When asked to rate the level of change in reference to the statement "Classes are more interesting this year", on a scale of 1-10, student ratings averaged 6.13.

Further, 90% of students in grades 6-12, and 87% of students in grades 3-5 reported having a computer at home, though it is unknown what percentage of them also had internet access at home.

Conclusion

This paper presents preliminary findings from the statewide evaluation of the IMPACT Model, funded through the U.S. DOE – EETT program, awarded to LEAs through the SEA. While this is an abbreviated version of the findings, to date, there are several recommendations and lessons learned presented here. In addition, the conference session includes examples of a professional development program found to be particularly effective in one of the IMPACT IV school districts, shared as an example of "best practices". Through all of the results collected so far, it is evident that purchasing and installing technology is not sufficient to effect substantial change in instructional practice. The components of the IMPACT model are designed to provide the support and scaffolding necessary to leverage the technology in valuable ways, ultimately improving student learning experiences. Future plans in IMPACT schools involve "taking it to the next level", focusing on improvement in classroom instruction, using more complex technological resources, and allowing students to become producers of technological products, rather than just consumers of technology.

Results presented are from the IMPACT I cohort, as well as the IMPACT III and IV cohorts. This evaluation is expected to continue through the 2009/10 school year, and findings will be expanded throughout the coming year. Interested session participants may contact the authors or the NC Dept of Public Instruction – Instructional Technology Section Chief for additional information.

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