IMPACT III AND IV – YEAR 1 (2008/09) ANNUAL EVALUATION REPORT FEBRUARY 2010

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2008 – 2009

EXECUTIVE SUMMARY

In July of 2008, thirty schools around the state of North Carolina received funding to begin full implementation of the IMPACT model, which is designed to facilitate the infusion of instructional technology into schools. This report summarizes findings from the 2008-2009 school year, focusing on the implementation of the project and effects of the intervention on administrator, teacher, and student outcomes. Three of the school districts participating in the IMPACTing Leadership training, held during the 06/07 school year, received funding as the IMPACT III cohort, and included 17 schools, with grade levels ranging from K through 12. Four additional school districts were selected through a competitive RFP process that took place in Fall of 2007, and received funding as the IMPACT IV cohort, which included 13 schools, with grade levels ranging from 4 to 12.

Methodology

In order to conduct this evaluation, we designed a quasi-experimental (matched groups) longitudinal evaluation looking at multiple outcomes, which included teacher, student, and administrator skills, perceptions, and behaviors. Each IMPACT school was matched with a similar (comparison) school based on multiple factors such as geographical proximity, demographic makeup of the school, and prior years' achievement.

Results

Teacher-level Outcomes

A variety of teacher-level variables hypothesized to have a relationship with the IMPACT model implementation were examined. These included use of confidence in technology skills, perceptions of professional development in their school/district, classroom practice and equipment usage. During this year, results from the ISTE Performance Standards for Inservice Teachers (NETS-T) survey indicated that teachers in IMPACT III schools did not change significantly in their level of confidence in using technology. However, teachers in IMPACT IV schools did show significant increases this year in their level of confidence related to the use of technology. In IMPACT III schools, a fairly high percentage of teachers (68.4%) reported confidence in their abilities to implement the national technology standards prior to a majority of the equipment purchases. This indicates teachers in these schools felt they were already equipped with some of the skills they would need to fully implement the IMPACT Model, which may explain the lack of significant growth in teachers' confidence levels during this year.

Overall, 85% of teachers in IMPACT schools felt their principal was frequently/always committed to providing teachers with opportunities to improve instruction. During follow-up interviews in the spring, several TFs reported that there had been a shift in the school mindset so that technology was now seen as an integral part of instruction, even among teachers who had

originally resisted the idea. Further, IMPACT has reportedly inspired teachers to try new techniques in their classroom, suggesting that the grant may play a role in changing instruction. For example, several schools noted that lessons were more project-based, and there had been an increase in the use of small-group and collaborative learning. In addition, 53% of teachers reported they frequently/always set aside time to collaborate about what they learned from their PD experiences

Student-level outcomes

Overall, students' exposure to various types of technology seems to have improved their literacy in this area, and has led to growing confidence in their abilities to meaningfully use technology. For example, in grades 3-5, the IMPACT III students who reported "Using a computer made learning…easier for me" grew significantly from 62.4% (fall) to 70.1% (spring), and in all grade levels, students' technology skills increased significantly during the 2008/09 school year.

While findings from the analyses of achievement data are presented in detail within the report, some of the more positive highlights are presented here, indicating the promise this intervention holds for schools seeking to improve student achievement. There were a larger number of significant, positive findings related to student achievement in IMPACT III schools, which is most likely attributable to the length of implementation. The IMPACT III schools began implementing certain parts of the IMPACT model during the 2007/08 school year, prior to receiving the bulk of their funding. This additional year of preparation and implementation may result in more noticeable gains in student achievement. Similar findings may be observed in IMPACT IV schools for the 2009/2010 school year.

IMPACT III

- Students in grades 3-8 showed significantly stronger growth in **EOG-Math** scores than students in matched comparison schools.
- The % of students passing **Math** (in gr.3-8) increased significantly, from 69.6% in 2007 to 79% in 2009. Comparison schools did not show similar increase.
- In 2009, IMPACT III students (in gr. 3-8) were 30% more likely to score above grade level (Level 4) on **EOG-Math** than students in comparison schools.
- IMPACT III students were 42% more likely than comparison students to increase performance levels from 2007 to 2009. Further, IMPACT III students were 46% more likely to improve their status from *not passing* to *passing*; and economically disadvantaged students in IMPACT III schools were 54% more likely than their comparison counterparts to improve their status in Math from *not passing* to *passing*.
- The percent of economically disadvantaged students passing the English I EOC in IMPACT III high schools increased from 60.8% to 66.1% from 2007 to 2009. A slight decrease was observed in English I pass rates for ED students in the comparison schools.

IMPACT IV

- IMPACT IV students were 11% more likely than comparison group to increase their EOG-Math performance level from 2008 to 2009.

- Economically disadvantaged (ED) students in IMPACT IV schools were 12% more likely than ED students in comparison group to increase Math performance levels from ’08 to ’09.

Recommendations

- Focus groups reported varying success in terms of the technical professional development that was offered. Only 49% of teachers said they frequently/always got to choose the kind of professional development they received. Suggestions for improving the usefulness of professional development include: differentiating technical professional development by the audience’s level of skill with technology; using a ‘menu’ system where teachers are free to select among topics of interest to them and relevant to their grade level/subject area; scheduling professional development prior to the start of the school year to avoid overwhelming or inundating teachers with new information.

- The aspect of the IMPACT Model most challenging for elementary schools was the requirement that library and technology resources (e.g. computer labs) could not operate on a fixed schedule, but rather, should be available for teachers to use when it fit with their lessons/units. This flexible access required creativity on the part of the school administrators when they were trying to schedule planning periods for each grade level. Specific guidance from NCDPI and other IMPACT elementary school administrators may be helpful in developing strategic ways to implement flexible scheduling.

- One aspect of the IMPACT Model that was particularly challenging for high schools was the implementation of frequent, structured collaboration. This was difficult not only because scheduling during planning times was problematic, but also because there seemed to be more resistance from high school teachers with collaborating across subject areas. It was sometimes rare for teachers of the same subject to have common planning times, so high school teachers and administrators were tasked with developing a way for teachers of different subjects to share their knowledge and experiences with each other in a meaningful way. Providing IMPACT high school administrators opportunities to collaborate with other high school administrators would likely provide support and innovative approaches as they continue implementation of the model.

- Overall, student achievement in IMPACT III schools is exhibiting a promising trend toward improvement in Reading and Math, over and above what was observed in comparison schools. Economically disadvantaged students, in particular, experienced significantly more growth at IMPACT IV schools than they did at comparison schools. It should be noted that the baseline year for IMPACT IV schools is 2008, so these changes observed in Reading and Math scores represent only one year of growth. Evaluators will continue to monitor changes in student achievement throughout the 2009/10 school year.

IMPACT III AND IV – 2008/09
YEAR 1 EVALUATION REPORT
FEBRUARY 2010

I. INTRODUCTION

The IMPACT model for technology integration focuses on professional development and 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 improved student achievement. The model promotes 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 school-level administration, and a budget sufficient to support purchases of a substantial amount of educational technology equipment. 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.*
- We recommend that future IMPACT schools 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 and Implementation plan at the start of the 08/09 school year, when funding for technology purchases was received.*
- 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
    - *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 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 as the IMPACT IV cohort. A unique feature of these third and fourth cohorts of schools, that was not present 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 several schools within their district, specifically, schools that established a feeder system. In two of the three IMPACT III districts, it was a district-wide K-12 initiative. In all of the IMPACT IV districts, it was considered a district-wide initiative, but did not include any students younger than grade 3.

The primary goal of the IMPACT evaluation is to measure whether a fully-funded implementation of the IMPACT model of integrating technology into teaching and learning in North Carolina K-12 schools makes a significant difference in student achievement, based on North Carolina End-of-Grade and End-of-Course test scores. Given the encompassing nature of the IMPACT framework, we also anticipated that this model would affect a number of student, teacher, and school outcomes, in addition to student achievement. Specifically, we expected that for schools participating in the IMPACT program, the following variables would improve to a greater extent than in schools not participating in IMPACT:

- Student achievement, as measured by End-of-grade and End-of-Course test scores
- Student utilization of technology for academic purposes, as well as improvement in student's technology skills
- Teacher attitudes and skills related to technology and integration of technology into the NC Standard Course of Study
- Teacher perceptions of the quality of professional development received
- Teacher retention/decrease in turnover rate
- Administrator attitudes toward technology and utilization of computer-related technology for academic purposes
- The integration and utilization of technology in the classroom, both in quantity as well as quality

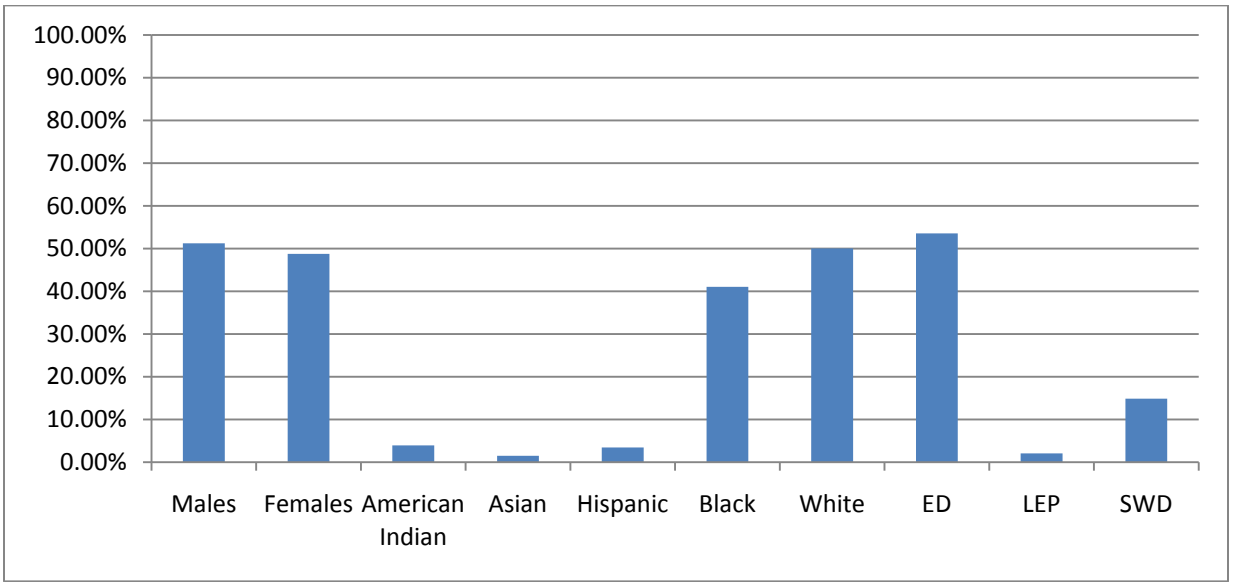
II. DESCRIPTION OF IMPACT III SCHOOLS

IMPACT III schools include 17 schools in three LEAs across North Carolina. The IMPACT III cohort included three school districts: Asheville City Schools (all schools, K-12); Pamlico County Schools (all schools, K-12); and Scotland County Schools (two of the three middle schools and three of the seven elementary schools). These include eight K-5 schools, one K-2 school, one 3-5 school, four middle schools, and three high schools. Seven of the schools are located in the western part of the state, four schools are located in the eastern part of the state, and five of the schools are located in the south central region of the state.

IMPACT III schools serve 7,340 students. The percentage of students classified as economically disadvantaged (ED) at IMPACT III schools ranges from 27.70% to 88.60%. The percentage of

students classified as limited English proficient (LEP) ranges from 0.00% to 8.10%, and the percentage of students classified as students with disabilities (SWD) ranges from 7.30% to 19.10%. Most students are white (50.04%) or black (41.05%). Hispanic, Asian, and American Indian students make up a small minority of the population (3.46%, 1.51%, and 3.94%, respectively). Demographic information about the student body is presented in Figure 1.

Figure 1. Gender and Ethnicity of Students at IMPACT III Schools



IMPACT III ADMINISTRATORS

There were 34 administrators from Impact III schools who responded to the *Administrator Demographic Survey*. Of these respondents, 41% were female and 59% were male. Of those administrators surveyed, 82% possessed full administrative licensure. There was a sharp divide in the experience levels of administrators within IMPACT III schools with the greatest number of respondents (38.2%) claiming to have 0-3 years of experience and second greatest number of respondents (29.4%) reported that they had 15+ years of experience. All administrators reported using technology, ranging from 5 to 50 hours within one week's time. Specifically, 88% of administrators reported using technology to complete administrative work, and 68% of them reported using computer applications such as word processing and spreadsheets.

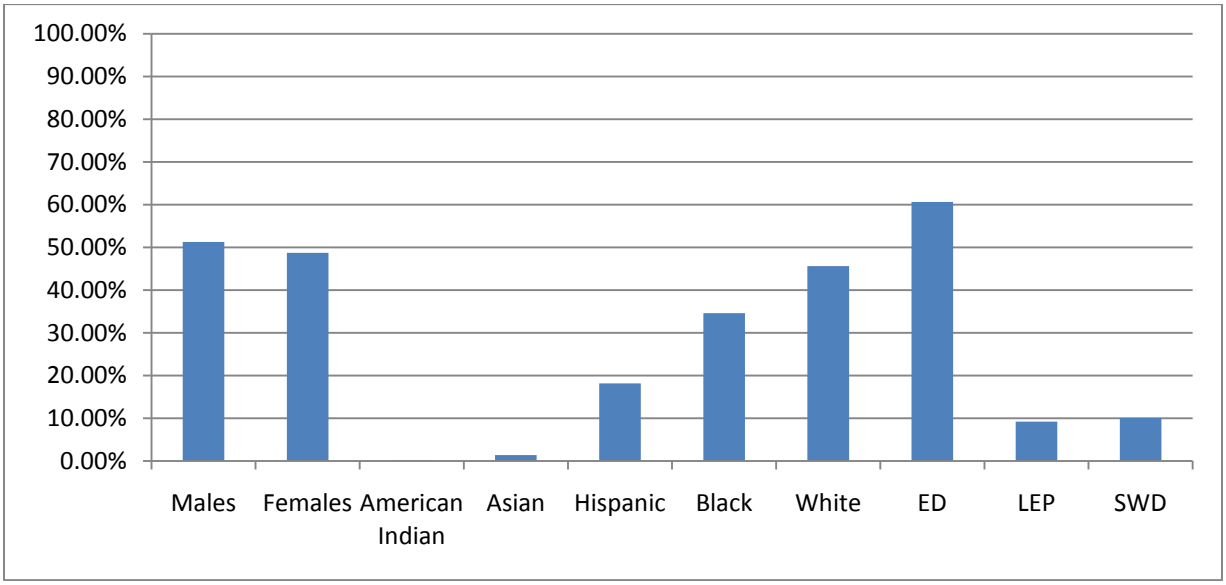
III. DESCRIPTION OF IMPACT IV SCHOOLS

The IMPACT IV cohort included 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 included schools from both Perquimans County and Edenton-Chowan County Schools. IMPACT IV included 13 schools in these four LEAs throughout North Carolina. These included two gr.3-5 schools, one gr.4-5 school, one gr.5-6 school, four middle schools, one 7-8 school, and four high schools. Nine of these schools are

located in the central part of the state, and the other four are located in the eastern part of the state.

IMPACT IV schools serve approximately 8,676 students. The percentage of students classified as economically disadvantaged (ED) at IMPACT IV schools ranged from 40.50% to 84.70%. The percentage of students classified as limited English proficient (LEP) ranged from 0.70% to 21.50%, and the percentage of students classified as students with disabilities (SWD) ranged from 6.20% to 14.90%. Most students were white (45.62%), black (34.61%), or Hispanic (18.17%). Asian students and American Indian students made up a small minority of the population (1.41% and 0.20%, respectively). Demographic information about the student body is presented in Figure 4.

Figure 2. Gender and Ethnicity of Students at IMPACT IV Schools



IMPACT IV ADMINISTRATORS

Of the 43 administrators surveyed, 58% were male and 42% were female; and 28% black and 72% white. In terms of administrative certification and years of experience, 74% reported possessing full administrative licensure but there appears to be an uneven distribution, with high numbers of administrators at either end of the experience continuum. Weekly technology use among IMPACT IV administrators ranged from a low of 3 hours to a high of 40 hours. More specifically, 93% of administrators reported daily use of technology and this same percentage of administrators reported using technology to complete administrative work; although, only 51% of those surveyed claimed to use computer applications such as word processing and spreadsheets.

Only a small number of IMPACT IV administrators (2.3%) stated they received no technology training. The vast majority reportedly participated in the following types of computer training: basic (60.5%), computer applications (81.40%), computer integration (67.40%), other (69.80%). Those administrators stipulating ‘other’ specified the following courses taken: Interactive

Whiteboard, Administrative applications, Intel - palm pilots, Quest, NC Wise, Inspiration, network operating systems, QTL, ActivClassroom, and website development.

IV. SOURCES OF DATA

Administrators

Administrator Demographic Survey. Administrators at each school were asked to complete the Administrator Demographic Survey, which was developed to identify the characteristics of principals, including gender, age, race/ethnicity, years of administrative experience, area of licensure, and degrees. Questions also addressed principals' experiences with technology and professional development.

Profile for Administrators. Administrators at each school were asked to complete the Profile for Administrators survey, which is based on the National Educational Technology Standards and Performance Profiles for Administrators (ISTE, 2002). This instrument includes six subscales: Leadership and Vision (3 items), Learning and Teaching (2 items), Productivity and Professional Practice (2 items), Support, Management, and Operations (3 questions), Assessment and Evaluation (3 questions), and Social, Legal, and Ethical Issues (3 items).

IMPACT Implementation Checklist. Administrators' perception of the degree to which the IMPACT model has been implemented at their schools was assessed using the Implementation Checklist, constructed for the previous IMPACT evaluations, based on the IMPACT rubric, an instrument included in the original IMPACT:*Guidelines for North Carolina Media and Technology Programs*, published by NC DPI in August, 2005, and revised in January, 2008. For the IMPACT Implementation Checklist, respondents were asked to rate their school on a condensed list of items from the IMPACT rubric using a 7-point Likert scale (strongly disagree-strongly agree).

Teachers/Certified Instructional Staff

Teacher Demographic Survey. Teachers, technology facilitators, and media coordinators were asked to complete the Teacher Demographic Survey, which was developed to identify teachers' characteristics, including gender, age, years of teaching experience, area of licensure, and degrees. Questions also addressed teachers' technology experiences and professional development.

Performance Standards for Inservice Teachers (PSIT). Teachers, technology facilitators, and media coordinators were asked to complete **t**he 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)

Classroom Equipment Inventory. Teachers, technology facilitators, and media coordinators were asked to complete the Classroom Equipment Inventory, which assessed their access to technology. This instrument asked teachers to identify the technologies available in their classrooms and to indicate how frequently these technologies were used.

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 prevalence of professional development practices/supports in their school aligned 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.

Student Academic Achievement

End of grade tests for grades 3-8 (EOG). On N.C. EOG assessments in reading and math, three types of scores are reported in each subject tested: 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 percentile is used to compare the student to all NC students who took the same test in the "norming year" (first year administered). The norming year was 2003 for reading and 2006 for mathematics. 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). The following description of each level is taken from the NCDPI Division of Accountability Services (*www.ncpublicschools.org/accountability/testing).*
Achievement Levels

Level I: Students performing at this level do not have sufficient mastery of knowledge and skills in the subject area to be successful at the next grade level.

Level II: Students performing at this level demonstrate inconsistent mastery of knowledge and skills in the subject area and are minimally prepared to be successful at the next grade level.

Level III: Students performing at this level consistently demonstrate mastery of the grade level subject matter and skills and are well prepared for the next grade level.

Level IV: Students performing at this level consistently perform in a superior manner clearly beyond that required to be proficient at grade level work.

It is expected that students score at level III or above in order to be considered performing on grade level. The reading comprehension portion of the EOG administered at each grade level includes both literary and informational selections. Students are asked to answer questions related to the selections to determine their comprehension levels. The knowledge of vocabulary is assessed within the context of the selections and questions posed.

Student Technology Skills

NC Computer Skills Test (8th grade). The Computer Skills Test (CST) is administered in grade 8 and is a requirement for graduation from a public high school in NC. The CST measures student competencies of the Computer Skills Curriculum first instituted in 1992 and subsequently updated in 1998 and again in 2005-06. The CST consists of two parts; a multiple-choice test (passing score = 47 or above) and a performance test (passing score = 49 or above).

The CST performance test is divided into three parts which include Desktop Publishing, Database Use, and Spreadsheet Use. Both sections of the CST are scheduled to be administered to eighth grade students during the testing window from February through mid-March. The online test requires that the students use applications software developed for the test designed by NCDPI. More information may be found at:
http://www.ncpublicschools.org/accountability/testing/

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.

Young Children's Computer Attitude Questionnaire The Young Children's Computer Attitude Questionnaire is based on the Young Children's Computer Inventory developed by Knezek, Miyashita, Lai, and Sakamoto (1994). This instrument assesses how students in Kindergarten,

first, and second grade feel about using computers in school. The Young Children's Computer Attitude Questionnaire was administered to most students in September/October of 2008 and again in April/May of 2009.

Fidelity of Implementation measures

Site Visits. Fall site visits were conducted in October/November of 2008 and Spring site visits were conducted primarily in April of 2009. Each school's site visit was arranged by members of the evaluation team and the technology facilitator at each school. One or more members of the evaluation team visited each school and conducted classroom observations and/or a focus group, or semi-structured interview with the members of the school staff. Site visits were conducted at all thirty IMPACT III and IMPACT IV schools.

Classroom Observations. Members of the evaluation team worked with each school's technology facilitator to coordinate the classroom observations at selected schools. Teachers were aware in advance that an observation would be taking place in their classroom on the day of the site visit. In the fall, five classrooms were observed at each of 19 schools (including two K-5 schools, two 3-5 schools, one 4-5 school, six 6-8 schools, one 7-8 schools, and six 9-12 schools). Classroom observations occurred at nine IMPACT III schools and ten IMPACT IV schools. In the spring, five classrooms were observed at each of 18 schools (including two K-5 schools, two 3-5 schools, one 5-6 school, seven 6-8 schools, and six 9-12 schools). These observations occurred at nine IMPACT III schools and nine IMPACT IV schools. Observers used a checklist based on the LoFTI (***Lo****oking* ***f****or* ***T****echnology* ***I****ntegration*) checklist developed by SEIR*TEC at SERVE to collect data about technology integration in the classroom. Each classroom observation lasted 15 to 30 minutes.

Focus groups. The evaluation team conducted focus groups with the Media/Technology Advisory Committees at each school in the fall of 2008, and follow-up interviews with select members of these committees in the spring of 2009. Interviews were in a semi-structured format, using a protocol targeted at evaluation questions but allowing participants to respond freely. Fall interviews focused on how schools had structured IMPACT in their districts (including how MTACs were set up, how collaboration worked, what professional development had been planned, and how MC and TF roles had been interpreted); how strong buy-in had been from various stakeholders; what successes and challenges the MTAC had faced during implementation; what effects they had seen in their schools so far; and how they envisioned the future of the grant. Follow-up interview questions in the spring of 2009 were more general, as these interviews were intended to supplement the information from fall focus groups rather than setting up a pre/post comparison. Spring interviews were conducted only with MCs and TFs, except for a few cases where the school principal voluntarily participated. Both fall and spring interview questions are presented below. Although protocols were purposely organized by category, interviewers were free to ask questions out of order to maintain the conversational flow.

Fall interviews were digitally recorded and transcribed by an outside consultant. The transcripts were coded using Atlas.ti. Codes were determined by evaluation questions, and generally corresponded to headings in the report outline. A second level of coding was conducted for

larger report sections, where codes were generated from trends noted in the data and used to organize the subsections of the report. All coding was performed by a single evaluator.

Table 1. *Focus Group Protocols*

Fall 2008 – Media and Technology Advisory Committee

General

1. What role does the MTAC play at your school? How often do you meet? What kinds of decisions have you made so far?
2. What changes have taken place at your school so far as a result of IMPACT?
3. Which components of the IMPACT model have been emphasized at your school this year?
4. How well does the IMPACT model seem to be working at your school so far?
    - What have been the major effects on teachers/classrooms?
    - What effects have you seen on student behavior/attitudes/performance?
    - Have there been any school-wide or district-wide effects?
5. What has been the overall response to IMPACT-related changes in the school?
    - Response of teachers?
    - Students?
    - Parents/community?
    - Central office?
6. Describe the roles of the technology facilitator and media coordinator at your school.
7. What have been the biggest barriers to implementation of the IMPACT model at your school?
    - Have there been any problems implementing new technology?
    - Has the transition to a flexible schedule at the media center gone smoothly?
    - Have there been any problems with increasing collaboration at the school or between schools?
8. What methods have you used to establish collaborative planning at your school?
9. To what extent has the level of collaboration increased…
    - Among teachers within a grade level?
    - Among teachers across grade levels?
    - Between teachers and the TF/MC?
    - Across schools?
10. What kind of formative evaluation is your school doing related to IMPACT?
11. What is the plan for providing IMPACT-related professional development at your school? What plans, if any, does your school have for maintaining the IMPACT-related changes past the end of the grant?
12. Is there anything else you would like to say about the IMPACT grant that we have not covered?

Spring 2009 follow-up – Media Coordinator and Technology Facilitator

1. What has been going on at your school since our last site visit?
2. At the beginning of the year, the IMPACT schools identified a variety of challenges. How have you dealt with the following challenges at your school?
    a. Administrative support (either school level or district level)
    b. Getting buy-in to the technology from teachers and administration
    c. Instituting collaborative planning among people used to working independently
    d. Providing/scheduling adequate training to teachers at different skill levels
    e. Technical issues w/the equipment
    f. Preventing teachers from feeling overwhelmed
3. Are there any other major challenges you faced this year?
4. What are the major successes?
5. As you reflect on this past year of implementing the IMPACT model, what major lessons would you say you have learned? What are your plans for continuation of technology integration/collaboration, independent of additional funding you may receive?
6. What suggestions do you have for DPI about future grants that are similar to IMPACT?

V. RESULTS

Results from Focus Groups

Supportive Environment for Technology Use

Media and Technology Advisory Committees

IMPACT schools were expected to set up a Media and Technology Advisory Committee (MTAC), which met regularly and made decisions regarding the implementation of the IMPACT model. Some of the larger districts chose to have a district-level MTAC in addition to the school-level MTACs; in these districts, the hierarchy of decision-making is still being worked out. Smaller districts often included a district representative on the MTAC team.

Although all MTACs had a similar mission, there were variations in how they were structured across districts. Many met monthly, but some had been meeting more frequently at the beginning stages of grant implementation, and a few met only on an "as needed" basis. Most were independent entities, but a few were combined with the school improvement team. MTACs ranged from a core group of leaders (including the TF, MC, principal, and teacher representatives) to large groups of up to 20 people, including parents, students, and representatives from all academic areas.

MTACs were asked to describe the types of decisions they have made to date. Most reported that they were responsible for deciding what technology to purchase and how to dole it out amongst the teachers. Some indicated that they had performed a needs assessment to maximize their effectiveness. MTACs also described planning for training and troubleshooting, including making decisions about what professional development would be needed, when it could be offered, and how it would be funded. Finally, some MTACs were responsible for crafting technology-related policies, ranging from hardware- and software-related issues to policies on password changes and media releases. Most described themselves as a liaison between the classroom and the administrators.

Technology Facilitators' 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. It was suggested that the schools also hire a technology assistant to help with issues of installation and repair, freeing up the TF for more instructional roles.

The technology facilitators were almost universally described as integral to the school. Interviewed MTAC members used terms such as "crucial," "savior," "guru," and "supertech,". The TFs themselves noted that they play many roles, including "fix-it" person and instructional collaborator. 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 provided teachers with assistance in setting up and trouble-shooting the technology:

- *I think with so much technology that we have in the school now, that … it's just so completely necessary to have somebody that can go out to the classroom and help the teachers get their Smartboards back on track.*
- *You can walk in at 7:50, and they're looking for [the TF] … she's responsible for a lot, because when the server goes down, we're looking for [the TF]. If anything goes wrong in the course of the day, if your computer just goes out, they're calling for [the TF], so it is a much-needed position.*

Other schools described the role of their TFs as being much broader than technology support. TFs in these schools were described as having a more instructional role, and some were even referred to as Instructional Technology Facilitators to emphasize that aspect of their positions. Responsibilities for these TFs included working on curriculum plans, giving demonstration lessons, or suggesting ways of integrating technology into existing lesson plans:

- *My role as the technology facilitator is to advocate for the use of technology in the classroom, and I do that by planning with teachers according to their curriculum needs, and then we split the work - I help them lesson plan, I help them arrange, I help them develop, and then I'm support in the classroom for that lesson.*
- *They'll come to me with a curriculum idea, I figure out which technology pieces are most appropriate to fulfill that need, and what can we use to help differentiate the lesson, so maybe it's not that we need to add a whole technology piece, but, if you were to use this and this, your high-level kids could be doing this, your middle-level kids could be doing this, and you could bring more students in with this tool using technology.*

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. A few TFs play a role in the school's long-range planning for technology needs and upgrades. One principal described the selection process for her TF:

- *I want[ed] to hire somebody who's strong with technology and who can see what's coming, and that helps me to move a school forward in terms of technology…I like her leadership when it comes to technology, and knowing where we can take our school in the 21st century, I really appreciate the long-range planning that she has.*

Nearly all TFs expressed a desire for their role to be more than just tech support, but some were more successful than others at working instructional activities into their days. In some districts, the only other available tech support was at the district level, and it often took days to have a problem fixed. Technology facilitators were therefore used as the 'default' tech support, even if the school defined their role as instructional.

Several TFs noted that they were frustrated at the amount of "fix-it" work they were doing, but many noted that it seemed to be decreasing as more people became accustomed to the new technology and more teachers were able to solve their own problems. In the words of one TF:

- *Where was I that first month? I was probably 75-80% fix-it guy, but now, I'm… 30-40%, … and starting to actually get to my role, that I see as a facilitator, showing teachers how to use this technology.*

A few TFs noted that they do not mind teacher's requests for simple technology fixes, because they provide an excuse to get into a classroom and open up opportunities to offer instructional support. The most important factor in determining how a TF's time was allotted was the availability of an assistant. Those who had support, either officially, in the form of a technology assistant or unofficially, through other tech-savvy teachers, reported doing the most instructional work. Those who did not have such assistance indicated they were envious of those who did. Although it is understandable that budget limitations constrained many schools' ability to hire additional staff, it seems that technology assistants were a very good use of funds for those who were able to hire them. Given the centrality of the TF role, it was important that his or her time not be taken up with non-instructional duties. In a couple IMPACT III schools, staffing issues led TFs to take over teaching responsibilities for some classes, which further eroded the time available for them to assist teachers with instructional technology. Some schools that were unable to hire a full-time or even part-time 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," were made up of teachers with a good understanding of technology, who could offer support for simple problems to other teachers near them. 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 reportedly fostered collegiality throughout the schools and supported 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 requesting immediate assistance from the TF when problems arose.

Media Coordinators' role

Although most schools already had one or more media coordinators (MCs) before IMPACT, the grant changed the nature of the MC role. At the very least, instituting flexible access to the media center affected the day-to-day work of the MC; for example, they can now work with several groups at a time or be available for support at the point of need rather than only at set times. Several MTACs noted that these changes have helped the media center be seen more as a "hub of learning." In many schools, the MC's role has become much more instructional in nature than it had been previously, as they collaborated with teachers and became school leaders as a result of the grant. Some MCs also noted that they now work much more with technology than they ever had before, as students are looking for resources online and using digital media in

addition to print. Some MCs are more comfortable than others with using technology themselves and helping students to use it appropriately. As some MTACs described the MC's changing role:

- *I think [MCs] are definitely more involved on the technology end. At one point I think media coordinators were just book people, and that's no longer true.*
- *It definitely has changed, in that [the MC] didn't have to do a lot of collaborating with the teachers, the only thing the teachers wanted to do was drop the kids off and be free for 30 minutes…and that role has changed tremendously, because now, [the MC] is more a resource person.*

Most MC's indicated that they enjoyed the expansion of their responsibilities, and some noted that this role felt more like the one for which they were trained. A few, however, noted that it had been a stretch for them, because they were unaccustomed to technology and enjoyed having a more traditional role. Some were uncomfortable with being seen as a technological leader, others were uncertain how their responsibilities were distinct from those of the TF, and still others were not able to find time for the activities that used to define their role. In the words of two MCs:

- *it's nice to be able to put [graduate degree] into some use and to feel like an integral part of the curriculum development and planning process, when in the past I felt like I just sat behind the counter..."*
- *In some ways I like it and in some ways I think I kind of miss the other, because I really loved being the story time lady, and I don't get to do that as much now, because it's more about research, it's more about information, it's more about what's going on with the curriculum.*

As with the TFs, the MCs noted that having an assistant to handle minor issues was very important, because it allowed them to take on the greater responsibilities that the IMPACT grant demanded. Without an assistant, some MCs felt constrained to the check-out desk or became burdened with some of the same technological "fix-it" responsibilities that the TFs described. For example:

- *This school has a full-time assistant, which is a huge difference. Last year, if I had a group, if there was a problem with somebody checking out a book, I had to leave my group [to] take care of that problem.*

Both TFs and MCs noted in spring interviews that they had struggled with helping teachers understand their instructional role. One reported that teachers did not want to "bother" her, and others indicated that teachers often came to them only for last-minute help rather than allowing time to plan large projects together. Such problems have abated somewhat over time, but it may be advisable in the future to provide suggestions to help TFs and MCs better publicize the new nature of their roles.

Changing perception of the media center

The influx of technology and flexible access seems to have made an impact on the general perception of the media center at many IMPACT schools. MTACs stated the media center was used more frequently, for a greater variety of purposes, and often by multiple groups of students at a time. In the words of two MTACs:

- *The media center becomes the hub of the campus, and we've seen a very large increase in traffic in the media center, which is a good thing.*
- *The media center is entirely looked at and viewed in a different light now. It's not where you go to check out a book or get an encyclopedia, but it's very technologically advanced in itself.*

Flexible scheduling of resources

The concept of flexibly scheduling access to resources was newer to some schools than others. Several IMPACT schools reported that they had had flexible scheduling for years, but most indicated that IMPACT has taken it to a new level. Different schools seemed to interpret flexibility in different ways. For example, in some places it was interpreted as open access to the media center, so that classes could enter on an as-needed basis and multiple groups could be working at a time. Others also mentioned that they had flexibly scheduled "sign-up" for computer labs, and some had created a flexible system of technology check-out.

- *Teachers are bringing kids in at different times so that [the MC] can help them do research, and so we could have two or three different groups in that media center at one time.*
- *We definitely have flexible access to personnel and to resources, not just the physical library. The media center is divided into several labs, and they can sign up for labs…[or] they can sign up for equipment they need.*

For the most part, IMPACT schools were happy with the results of the flexible scheduling, noting that it facilitated project-based learning. In the words of one MTAC:

- *I think flexible scheduling works very well because … our teachers are very independent thinkers and do large projects. You need that kind of flexibility to support an experiential program. If you're locked into "I can only go to the media center on Thursdays at 10:30," it just doesn't work for the kind of work we like to do here.*

In contrast, a few schools found resistance from the more traditional teachers who preferred to have a set time at which their students could come to the media center to check out books. Some MTACs noted it was difficult to persuade teachers to use the media center if there was not a specific time and reason for them to be there. For example:

- *Sometimes I still have a few teachers who want to refer back to the fixed schedule, and [they say things] like, "I want you at the same time every Tuesday and Thursday because that's the way it was,". I still deal with that, but I try to overcome it by explaining the differences.*
- *I have heard several teachers complain that "We should just have library time, it's not right that we don't …go in there every week at a certain time. My kids never go, and they never get to check out books"… [it takes time to get us] out of the mode that you go in [the library] at a certain time every week.*

One response to this resistance was to set up a hybrid model, in which some time was scheduled and some was left open. Whether as a transition or a permanent solution, this model seems to work well for those schools whose teachers would not otherwise come to the media center.

Teacher Buy-in

Most MTACs reported that teachers have had an overwhelmingly positive reaction to the implementation of the IMPACT model within their schools. For example:

- *I truly think our teachers are excited, I think that they're grateful for the resources that they have, and they're definitely looking for ways to use them. I don't see any of them being resentful that this is something else I've got to do or something else I've got to apply; I think they're looking for …different ways to use the technologies that they have. I think … it's another way to engage our kids, it's another way to reach that child that we haven't been able to touch in the past.*
- *I think a lot of the teachers are a lot more excited about coming [to work]. Of course there's a certain degree of stress, especially for those unfamiliar with technology, and not used to using it and having to implement it. Almost all of the teachers I have taught with have been very motivated and really excited about it. There hasn't been as much reluctance as I thought there would be with some of them.*

Some teachers within IMPACT schools have shown signs of reluctance to implementing the model. This trend was most noticeable among experienced teachers, who were often somewhat resistant to using new technology. Most schools noted that many of these teachers lost some of their initial reluctance as the grant progressed and they saw the benefits of instructional technology. Additionally, several schools reported that they encouraged buy-in by including teachers in the decision-making processes. For example:

- *We went to all of the grade-level meetings and talked to them about our options, and we decided at MTAC how we would spend the money, so it was definitely a group decision, and I think that helped the buy-in.*
- *We used the data that we got back from the surveys about what teachers said that they needed… so we really able to stand up and authentically say, "You said this, here are the offerings," so that there wasn't any guessing - "How did you come up with what you're doing?"*
- *I'm seeing a little difference in attitudes towards that professional development, because it's targeting areas that our teachers have told us they need help with, they need more opportunities to learn about. [The focus of the professional development is] not just how to use the stuff that we have gotten through this grant, but also those things that are going to affect my methodologies as a teacher, regarding instruction*

Many interviewed MTAC members described buy-in as a process that takes time. In some cases, teachers became more enthusiastic over the course of a workshop or summer institute; in other cases, the process was ongoing but discernible. As one focus group participant explained:

- *We would have people come in on Monday with "I don't know why we're here," we'd have a few of those. By Friday, everybody was actively involved, and going, "I can do this.*"

Overall, MTAC's reported that teacher buy-in is fairly high, and continues to progress. Several teachers in the focus groups indicated that they have become so entrenched in the IMPACT model that it would be hard to move to a school in which the model is not in place. In the words of one teacher:

- *I think that it will also help with teacher retention, as well…I drive 45 minutes to work here, and it would be hard for me to leave and go to another school and not have the technology that I'm able to have here.*

Student Buy-in

Similar to most teachers, students have responded positively to the influx of technology within the schools. MTACs were nearly unanimous in describing the increased level of engagement

and excitement among their student populations. Students also served as a source of pressure for resistant teachers. According to teachers, the students wanted to use the technology resources so much so that they were willing to assist teachers who might otherwise shy away from using the technology. For example:

- *[teachers resistant to technology] have kids in their classrooms who have seen me in other classrooms… and they are going, "Hey, how can we use this, my kids tell me that we could do something of this nature or something of that nature,". I've seen teachers that were normally resistors coming through, because they're being hassled by their kids, "Hey, why don't you use this?"It's making them change a little bit, because their kids are asking for it.*

Administrative Support

According to teachers within IMPACT schools, administrative support is crucial to the success of the implementation. Some MTACs reported that a few of the principals were reluctant due to their own technology skill level. In most instances, they moved forward with the implementation, and some even allowed themselves to be used as examples of how technology can be learned by more seasoned educators. For example:

- *With me as the principal, there was some reluctance, because I knew where I was with technology, but I call on [the TF], I just call on them, and that's what I want the staff to do for each other, to call on each other and help everybody to learn.*

District and DPI Support

District support for IMPACT model implementation has been mixed. The vast majority of schools reported feeling supported in the endeavor, as evidenced by the following statements:

- *We've had a lot of support from the school board all the way down to the instructional technology department.*
- *This whole thing could not have happened without the support of the folks downtown. There's no way that something of this magnitude is going to happen without the administration being right there, cheerleading and pushing and making an effort. I've been in situations where that wasn't the case, before, and you go nowhere.*

In contrast, school staff members in a few of the districts believed that their efforts to implement the IMPACT model were not supported by district level staff. As one MTAC member described:

- *To be honest with you, we feel like we could get a little bit more help from central office. They're beginning to buy in a little more now, moreso than the beginning of the year, and this may be due to the fact that they had too much on their plates.*

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.

- *We don't have the staff in place to support this level of infrastructure, and that worries me, because everything is working perfectly right now. What's going to happen in three or four years when we're going to need some technical help?*

- *Getting things that we need taken care of … has been difficult because of the limited resources at the central office as far as personnel, to get us what we need when we need it. They do come and they do what we need them to do, but it's not always when we'd like them to come, or it's not always exactly what we need them to do, so we're working through all of that. It eventually gets taken care of, but it is a work-in-progress.*

Most of the MTACs in IMPACT III schools indicated that they would have liked to receive more support and information from DPI. Because IMPACT III schools received their training in 2006/07, well in advance of receipt of funding, often turnover at the school or district level inhibited implementation. Several focus group participants reported that they were unclear on what they were allowed to purchase with IMPACT funds, and there was inconsistency in schools' understanding of whether they were allowed to purchase non-technology items such as furniture or books for the media center. Many TFs also indicated that they would have preferred to have more guidance on what technology would work best for their school, particularly in the IMPACT III schools that had to spend their funds in a very short time span. Finally, some focus groups requested more direction about how to manage the grant, including how to write their evaluation plans and how best to spend their professional development funds. In the words of three MTACs:

- *We didn't really receive any kind of training from DPI as a part of this grant; we had our IMPACT academy for the principals, but there wasn't really any… modeling or how-to. I kind of expected there would be a little more;*
- *I feel like we were on our own, to see that we were up to speed on the IMPACT model.*
- *[Details about the different kind of student response systems] were things that we didn't know, and were not explained to us. I'm sure there were plenty of people who knew all of that, but we were just given vendors, and were told, "You can buy your student response system from this one or this one or this one." We did not have adequate time to have every vendor come in and talk to us about every single thing… I do think that a list of schools with numbers and peoples' names that you could contact and say, "What did you buy and why did you buy and how satisfied are you with it?" would be real helpful.*

Community Buy-in

Schools have made efforts to inform the community of the changes that are transpiring due to IMPACT. Schools reported using a variety of means to reach out to the broader community, including newsletters, newspaper articles, parent conferences, technology nights, technology fairs, and school board presentations. Some schools also noted that their open houses and curriculum nights focused this year on the new technology from the IMPACT grant. Another form of outreach in some IMPACT schools was to keep the media center open after school hours, for student and community use. As several MTACs described their efforts:

- *We are going to have a parent education committee that's going to do a workshop later in the spring to teach our parents about the technology that we have.*
- *We also did live streaming on our first collaboration day, and anybody in the community could go on our website and watch the collaboration as it was going on,*

According to the focus groups, the overall response from parents and other community members has been positive and supportive. The outreach efforts seemed to be working, as parents and

community members were asking about the changes within the school, and schools that surveyed the community found mostly positive responses.

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 teachers and staff. Several participants reported that teachers and staff regularly participated in informal methods of professional development. For example, teachers shared information and tips with each other at meetings and in less formal situations. A member of one focus group explained:

- *With every faculty meeting this year we have incorporated a beginning… that we call TechnoTherapy, and we have [the technology assistant] there who leads us in focusing on the technology tip for this month, and he's going in and showing the teachers on the large screen how to manipulate something that they've had questions about.*

Members of some focus groups expressed a concern that technical professional development might be too advanced for novice technology users. Some suggested offering different levels of training to meet the needs of teachers with various levels of technical expertise. Despite the challenges that some novice technology users faced during some professional development sessions, staff remained supportive of each other and willing to assist each other. A focus group member explained:

- *It was extremely good for staff development to have the nurturing of one another and the training around during the summer. That was, I think, good strength-building for all of us as staff members*

Some focus groups reported that training sessions and professional development were held over the summer. All focus groups that reported having a summer training session found the experience to be positive and beneficial. As two focus groups summed up:

- *From the classroom teacher's point of view, doing it in the summer made all of the difference in the world. I cannot imagine your normal beginning of the year paired with… all of this new stuff. And all of that training that we had to absorb and start practicing with, I can't imagine how they've done that.*
- *I think that's why it was adopted so quickly, [since] training was done at the onset, as opposed to whenever we could fit it in this year. Their comfort level became high very quickly, and… the students' comfort level.*

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. This was most often the case when equipment was purchased or delivered close to the start of school, so the technology was being set up at the same time teachers were supposed to be learning how to use it. Two participants described this circumstance as follows:

- *It would be nice to be able to start training before school starts … because I think when you come in and you've got all the equipment coming in, …we're just trying to get it out, get it out, get it*

out, and that's literally how it was, …[if we] had had that… time, and been able to work with people to ease into it, [it] would have been nice.

- *It would be great if all the equipment could have been delivered at the end of school, installed in the early summer and then had some training in late July and August, before school started – that would have been the best timeline.*

Although schools in IMPACT III and IMPACT IV received their training in different formats and on different schedules, many similarities were noted regarding the changes that have occurred to date. Participants reported noticeable effects on their teachers and classrooms, their students, and the structure and culture of the schools as a whole.

Professional Development Issues

MTACs cited a number of barriers to implementing the IMPACT model in their schools. One commonly reported challenge was that teachers within schools had varying levels of technology skills, which proved to be problematic when planning for professional development. A few schools opted for general training and providing just-in-time services to augment the generalized instruction. In the words of two focus group participants:

- *One thing that kind of frustrates me, that I'm feeling a little bit from the teachers, is that we have so many teachers at different levels of understanding the technology. We'll have a person who doesn't know how to do anything much in terms of technology sitting next to someone who's been using a SmartBoard for a year in our training sessions.*
- *that's what gets really hard is making sure you meet the needs of everybody. I have some teachers where, if I put them all here at the table, it would be like having a table full of ESL kids – it's not going to work that way. So that is a big challenge, trying to figure out how to meet those needs.*

As with any school-based initiative, time also proved to be a major challenge. Schools reported having difficulty finding days in the school calendar to provide teachers the opportunity to collaborate and participate in extensive professional development opportunities. For example:

- *I think another barrier is providing ongoing staff development so that teachers get what they need. Like with anything else with technology, if you don't use the skill, you lose the skill. The public school calendar limits the days that we can involve the teachers in professional development. A couple of years ago they cut five workdays out of the calendar, and then they protected four more, so in effect we've lost 10 days that we could have used. We do try to be responsive, we do have 4 early-release days that the system has provided us, and we try to incorporate some professional development regarding teaching with technology on each of those days, but it's very hard with all of the other demands on teacher time and technology facilitator time and media center time to come together and get all of those things coordinated and organized and ready to go.*

The issue of substitute teachers was another challenge. Even when funding was available to secure substitute teachers on professional development days, schools found it difficult to find an adequate number of available substitutes.

In spring follow-up interviews, TFs and MCs indicated that in addition to rolling out technology slowly, it is advisable to map out professional development ahead of time. In hindsight, several

TFs and MCs noted that they should have had a plan for all of their trainings by the end of summer so that teachers would not be bombarded during the school year. The constant training sessions, they reported, were just as overwhelming to teachers as the constant influx of new equipment. At least one school reported plans to use a menu system next year, so that teachers could choose the trainings that most appealed to them rather than attending multiple mandatory sessions in a semester. Finally, some schools suggested that professional development should be spaced out so that teachers have time to digest what they have learned and try out their new skills in the classroom before attending more sessions.

Effects on Student and Teacher Outcomes

Most MTACs reported a high level of excitement and enthusiasm about the grant in their schools, even among the most veteran teachers who were expected to be reluctant technology users. Many noted that simply having the technology sparked teachers' interest about how they could use it in their classrooms, and others reported that teachers became excited and even competitive about technology use once they had time to see its potential contributions. As several MTACs described the level of excitement:

- *I've seen people who I've worked with for many years, who have been afraid of technology for many years, suddenly using it, and being excited about it.*
- *I think even some of the more reluctant technology users realized that these children were not the same children they were teaching 10 years ago, and I saw a real enthusiasm …wanting to engage the students in learning through technology, because they began to see that that's what really captures the student.*

In addition to being excited about the technology, MTACs reported a greater willingness to take risks among classroom teachers. This risk-taking took several forms. For example, teachers were relinquishing some of their authority during their lessons, acting as facilitators rather than lecturers and allowing students to help them:

- *My role in the classroom has shifted… there is an increased sense of collegiality with the students,… I think that they're more willing to take risks with me, because I have to take risks with them.*
- *I think it's a paradigm shift that we've all had to make, … going from standing in front of the class with a textbook to making sure the kids are doing the work, and we're just facilitating that process.*
- *It shows kids, "You are smart, you do know something important, and I'm willing to let you teach it to me; now I know something that's important, you are willing to let me teach it to you."…And I can see some teachers having a hard time with that, and to relinquish that [is] very powerful.*

In addition, teachers are accepting help from other teachers, either formally from "tech buddies" or "vanguard teams," informally through colleagues, or during sessions at workshops. In some schools teachers were reportedly unwilling to show vulnerability in front of colleagues prior to IMPACT implementation, so this change reflected an increase in collegiality. In addition, a willingness to take risks lead to a culture of reflective practitioners, as teachers considered which strategies worked and which did not. In the words of two MTACs:

- *When folks go in to help other folks, people aren't always receptive, but this has allowed us to expect that help will come or that it's okay to ask for help, … I think that's been a biggie.*
- *There's also an atmosphere of risk-taking. It is okay if that lesson did not go well, that's okay – you can reflect on it, you can tweak it for the next time, and that is perfectly okay – we're all a learning community.*

Finally, the new technology has reportedly inspired teachers to try new techniques in their classroom, suggesting that the grant may play a role in changing instruction. For example, several MTACs noted that lessons in their schools were more project-based, with center-based lessons even at higher grade levels. Small-group and collaborative learning were also reported to be on the rise. Some MTACs attributed these changes to the technology provided through the IMPACT grant.

- *What I've seen from last year to this year is we've gone from whole-group instruction to small-group instruction, a lot more active student learning, and I really think the Smartboards, and the projectors…have really changed the culture of the school.*
- *It's incredibly rare to walk into a classroom now and see the teacher standing up at the front and giving out information. There are laptops, there are groups, there are students working together, students collaborating, the teachers are collaborating much more with each other.*

Although the MTACs' descriptions of changes to teachers and classrooms were overwhelmingly positive, it is important to note that some of the excitement may be related to the newness of the technology, and may subside over time. The integration of technology needs to be followed up with ongoing professional development about the most effective ways to use it. With those caveats, however, it does seem that the technology provided with IMPACT funds made some tangible changes in the classrooms.

Collaboration

The IMPACT model includes a strong emphasis on collaboration, both within a grade level and across grades and subjects. For some schools this meant changes in scheduling teachers' planning periods in addition to changing teachers' mindsets about how to plan their lessons.

Many MTACs reported that collaboration across subjects, grade levels, and even schools had increased since implementing the IMPACT model. This increased collaboration was reflected in the reports of teachers helping teachers with new technologies. According to the focus groups, teachers are frequently helping other teachers with technical problems. Teachers with technical expertise tend to be willing to share their knowledge with teachers with less technical expertise. An example of this occurred during one of the focus group interviews:

- *Since we've been in here in the past 30 minutes, there's been an issue with accelerated math, and two or three teachers have worked together over Skype and worked it out.*

Many focus groups reported that their school offers a dedicated time for teachers and staff to work together and collaborate. A member of one focus group shared:

- *One of the main things that has happened is a devoted time for collaboration, and we've got really two strands of that going on – one is just planning period teams, that is cross-curricular, and another is subject-like teams, where we're hiring a substitute for teachers to collaborate about student achievement and things that they're using, technology-wise.*

The focus group interviews indicated that the frequency and format of scheduled collaboration was tailored to each school. Some collaborative meetings included teachers across grade levels, and some did not. Members of several focus groups reported that their schools brought in substitute teachers to allow teachers time away from the classroom. Teachers at some schools met to collaborate almost daily, whereas others meet weekly or monthly.

Some of the members of the high school MTACs reported that working collaboratively was challenging. Finding time when all teachers and staff were available for a scheduled collaboration was especially difficult, because teachers who participated in extra-duty assignments, such as coaching, could not attend after-school meetings. At one school where collaboration seemed successful, the principal noted that it was very beneficial. In this principal's words:

- *I think one of the best things as a principal is to see high school teachers collaborate, and I've just never seen that happen at a high school before… I think high school teachers get isolated in their classrooms too much and don't really know what's going on with the other teachers, so one of the most fun things with IMPACT, for me, has been… to see the high school teachers sit around a table from every department area and have the opportunity to talk about how they can work together and collaborate on projects.*

One of the major challenges in scheduling time for collaboration was finding time when all teachers were available to meet. For this reason, some schools had not established a scheduled collaboration time for all grade levels. A member of one focus group shared:

- *Those faculty members that work with our 9th grade students have a 3rd period common planning period, where they can use that for discussions around student achievement, alignment of curriculum, parent meetings, all of those things. We have not been able to do that school-wide in grades 10, 11 and 12, because it is… impossible to have … a common planning period for each grade level.*

One school's solution to the scheduling problem was to have short but frequent collaborative meetings:

- *I really wanted the teachers to have whatever amount of time we could afford. They needed that every day, and we were able to work that out, which means grade levels can sit down and focus. I think it's 30 minutes, it's not a lot of time, but when you manage your time wisely, you can get a lot done in that 30 minutes, and you have it every day, and know you're going to have it.*

More informal collaboration was also increasing in the IMPACT schools, as teachers were helping each other use the new technology. Many schools identified tech-savvy teachers throughout the school to act as leaders among their colleagues, which reportedly led to an increase in day-to-day collaboration and a shift in attitudes about seeking help from colleagues. 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.

Formative evaluation

IMPACT schools were charged with conducting a formative evaluation of their progress with the grant. IMPACT III schools were given training on formative evaluation during the IMPACTing leadership phase, whereas IMPACT IV schools received guidance during their meetings throughout the first year of grant implementation. The leadership played a crucial role in formative evaluation. In some schools, formative evaluation was done very informally with school 'walk-throughs'. Principals or technology facilitators visited classrooms on a regular basis to gauge teachers' technology use, as well as their comfort level. One principal noted that without even entering classrooms he could get a sense of the use of technology simply by hearing student comments. In the words of two:

- *As I make visits to the classroom, I'm certainly taking note of who is using technology, and at our collaborative meetings, what's being brought forth by whom, and how we're supporting each other, … I can look and see who is comfortable and how they need to be supported in using it.*
- *I don't think you even need to walk through a lot of classrooms to know what some people are doing, because I hear a lot of kids talking more than I ever have about some of the things that they're doing in their classrooms, "I've got a PowerPoint presentation due in this class" or "I have to do a video speech for this class," or something like that, so I think for the really exciting things you hear buzz about them before you even have to walk into their room.*

Another informal method of formative evaluation is self-reflection. Several MTAC members reported asking teachers to reflect on their own progress during grade-level meetings, after staff development sessions, or at the end of lessons taught collaboratively with the TF or MC. Other schools used a slightly more formal evaluation of their progress by keeping records of technology sign-outs and professional development offerings. Some teachers also submitted reflection logs in which they gave an overview of what was done in their classrooms and what new technology they tried. One MTAC member credited these logs with encouraging teachers to try new things so they would have something to report. Surveys are another type of formative evaluation used by IMPACT schools. Some MTACs described using surveys provided to them by DPI or the external evaluators, whereas others conducted their own surveys throughout the year. Surveys were used to gauge teachers' comfort with technology, solicit recommendations for future professional development, and estimate the schools' progress with the IMPACT changes.

Effects on Students

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. For example:

- *I am getting work from students who last year or the year before rarely would turn in work. Part of that I think is our relationship has changed a little bit; we work together to learn new things.*

Many MTACs also reported that student achievement seemed to be improving, and a variety of reasons were offered. Some noted that students' problem-solving skills were getting better, perhaps because of more project-based lessons. Others noted that the technology allowed for

differentiated instruction, which helped traditionally low-performing students succeed. Not only can differentiation allow students to learn in different ways, but it may also give them various opportunities to demonstrate what they know. In the words of two MTACs:

- *I have a class that's composed of a lot of repeaters and lower-level students, and I have been amazed. I was afraid to get the laptops out, some of them didn't even have access to the laptop and I got special permission, it's unbelievable what they can do.*
- *If you take a paper test and they're not that good at it, it helps because they can take the test in a different way, and they do – I have kids that do 100 times better with the quizzes we do on the Promethean board as opposed to a paper quiz, so their grades are improving.*

One MTAC noted that simply having the technology is not what makes the difference, but rather it's the innovative ways in which teachers are using the technology to reform their instruction:

- *I really think that the students are more engaged when you're not just using the tool for some sort of drill, but really deep projects; deep learning is taking place with projects that are happening.*

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. Students at some schools were also showing an increase in leadership skills as they found ways to work with the technology, helped teachers who were struggling, and had more academic success through new modes of learning. In the words of one MTAC member:

- *I see children feeling a bit more empowered, and I think some of their confidence is built, and we're getting at some other learning styles for these children. I think that's tremendous. I think we're only the tip of the iceberg, but I do see kids feeling a lot more confident about their learning.*

Some MTACs indicated that IMPACT had brought about less visible changes, such as changes in overall attitudes or an integration of many different aspects of reform. Such testimonials provide preliminary evidence that IMPACT is succeeding as a whole-school change model. As one focus group described the changes:

- *We now have a greater understanding of what an IMPACT model school is, with the collaboration and evaluation piece, and we understand that media and technology is not a separate entity,… it's part of the whole teaching/learning/evaluation cycle.*

According to members of one MTAC, the changes they had seen in students as a result of the grant had changed their expectations, both for the students and for themselves, causing them to set the bar higher and achieve more. In their words:

- *[It used to be that] all the time we made excuses for why the kids can't learn, because we're 85% free and reduced lunch, or they don't have parents at home. And now we've stopped that, and we've started finding creative ways to make things happen, and it's a very exciting thing.*

Equipment purchases/Infrastructure

The bulk of the funds from the IMPACT grant was used by schools to upgrade the instructional technology in their schools. Schools were given freedom to decide what equipment to purchase

with the funds. These decisions were reportedly finalized at the district level, with input from school-level personnel.

The process of selecting and purchasing technology is no small task, and members of the focus groups shared their strategies for doing so, while being mindful of cost and sustainability. One group reported that they previewed applications with a free trial version before committing to a purchase. The sustainability of the technology was mentioned as a concern by some groups. For these groups, the affordability of technology maintenance, as well as the lifespan of technology, was considered during the purchasing process. A member of one focus group explained how their school selected technology:

- *[We chose technology that] had low maintenance costs, like… video cameras with lithium ion rechargeable batteries, [so we would] not always have to be thinking about buying a battery, so the current cost to use it is low, and then replacement cost is not terrible . I tried to inform everyone about … replacement costs … so that everyone was informed well enough [to] make decisions and try to spend our money very wisely.*

Some focus groups reported challenges related to the use of technology. Some reported problems with viruses on teachers' laptops. Others found a lack of appropriate infrastructure to support the new technology. A member of one focus group explained:

- *I've got almost 100 computers sitting in my room, waiting for our wireless throughout the building to be put in, [and] waiting for the cart that they ordered … to be taken apart and wiring reversed on it, things like that*

Even when the wireless network was installed, problems with connectivity persisted. Members of some groups reported that the laptops were unable to connect to the network at times. Another technical issue raised by some focus groups was determining the appropriate level of filtering for the computers, while remaining compliant with CIPA regulations. Participants expressed concern about student safety on the internet, although the level of filtering varied across districts. A member of one focus group shared:

- *Filtering web content is a constant issue, and I think that it is a local decision, and we've made a decision to go with one set of filtering software and to have it set at one fairly consistent level across the district, and there are other districts who are probably far more conservative.*

Document cameras were mentioned by some groups as a useful tool in the classroom. MTACs noted that they increased visibility of classroom demonstrations, provided quick feedback on student writing, and were simple enough to use that they encouraged teachers to try other technology as well. Another popular tool was the digital interactive whiteboard, such as a Smart Board or Promethean Board. Several focus groups shared ways that the digital interactive boards were being used in the classroom. A member of one focus group explained:

- *We went to Williamsburg and did the virtual tour online, and the way a lot of them are set up, the kids can actually touch the Smart Board and move us around. Now the one we're getting ready for is the … electoral college, to count those votes, so we can see our new president,… they're really excited and look at the path we take. You can pull up the features of the capitol, and the kids can actually see what's going on, [and] otherwise we'd never get that experience.*

Another focus group shared that they had purchased a *Tricaster* for use with the news crew at their school. Several groups shared that they were uploading lessons and student work to the Internet to share with other teachers or parents. Another group shared their experience with SmartView, which allows students to see the step-by-step procedures on a graphing calculator. Several schools noted, in the spring, that technology had become an integral part of the graduation projects of fifth grade students and high school seniors. These are just a few examples of the uses of the technology that were discussed. There was an overall sense of excitement among the focus group participants over the versatility of the technology. The teachers and administrators seemed eager to share their experiences incorporating technology into the classrooms and their school. In some cases, a 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 many schools implementing the model at once.

Although the influx of technology was credited for many positive changes in the IMPACT schools, the addition of new forms of instructional technology also led to many challenges. Many focus group participants noted that when their laptops and digital interactive boards did not function properly, teachers and students quickly became frustrated. For example:

- *We need someone to come help us really analyze and fix these issues that we have, because it definitely is a turn-off. I know last year there were several teachers who really wanted to use the laptops, but they were feeling pretty frustrated. There were so many 'down' regularly that it was almost more of a problem to try to use them.*

Several schools, particularly those in older buildings, simply lacked an infrastructure that was conducive to using high levels of technology. Some focus group participants noted that even when the technology was working perfectly the inclusion of technology lead to a reduction in time on-task to learn course content. Many types of hardware are slow to warm up, and time must be taken to train students on how to use each new type of software. Typical comments included:

- *The amount of time that the students have to invest in learning how to work the software…is time taken away from content. That's not bad, but I think we have to be really thoughtful about what software we're encouraging them to learn, because it's going to be constantly changing.*

During follow-up interviews in the spring, several TFs reported that there had been a shift in the school mindset so that technology was now seen as an integral part of instruction, even among early resistors. The only schools where enthusiasm had not increased were those where numerous technical problems caused teachers to become frustrated. For example, one school reported that teachers had stopped using laptops in their classrooms, moving instead to the computer lab because there were fewer connectivity issues there. At least two schools have had issues with "dead zones" in the schools where wireless service is inconsistent, and older schools in particular are having difficulty with their infrastructure. Overall, though, schools' comfort with and use of technology appeared to have increased over the course of the year.

Sustainability

During spring interviews, it was clear that those schools who saw collaboration as the heart of the grant had fewer concerns about sustaining the changes they had made than did those who believed the grant was more about increasing the availability of technology.

However, many MTACs did express concern about sustaining the IMPACT-related changes to their schools after the period of funding ends. In particular, schools worried about replacing and maintaining equipment such as projectors, bulbs, equipment carts, laptops, and flip cameras. Equipment issues are important because if a bulb blows during class, the teacher may not have a back-up lesson plan available; moreover, bulbs can cost several hundred dollars to replace. Even if their equipment remains in good condition, schools are also concerned about being able to continue using what they have purchased, as site licenses can be expensive to maintain and technology can quickly become obsolete. Once teachers and students become accustomed to teaching using technology, it may be difficult to revert to teaching without it. For example:

- *Now we've got almost 30 projectors that have $300 lamps in them. When those start burning out, if there's not another grant available, that money is going to come from the school, and it's going to cut into other funds. That's just the way it is, but it's scary to set yourself down that path.*
- *One of my main concerns at this point is that we lack the funds to replace damaged or outdated equipment. Some teachers are afraid to use the equipment for fear of wearing it out and being left without.*

The MTACs reported using a variety of sources to supplement the IMPACT grant funds, including school and district funding and capital outlay funds. Many schools had a technology fund that could be tapped, and others made technology a priority for the general funds. For example, one school mentioned shifting money from textbook funds to digital resources. A couple schools noted that the surrounding community had been very supportive, and the PTO may be able to provide funds through fundraisers and other sources. Most schools anticipate writing grants to ensure sustainability of the changes they have made to their schools.

Focus groups identified two factors that were crucial to sustaining the IMPACT-related changes in the schools. First, a few MTACs indicated that it was important to spend wisely to sustain low maintenance costs. For example, one MTAC chose video cameras with lithium ion rechargeable batteries, and another used the initial funds to buy replacement bulbs before they were needed. Several schools reported purchasing equipment they knew to be durable or unlikely to become obsolete in the near future. The other key factor reported by several schools was a supportive administration. In districts where the administration's vision included a strong technology program, MTACs were more confident that they would be able to meet sustainability costs. In the words of two MTACs:

- *We're blessed to have a principal who takes money and flexes it and rearranges it to make it work for bulbs and things that we need.*
- *I think it's a district challenge, and we met with the board of education, and the county commissioners, and we're working our way to fund a replacement cycle for equipment, and that's really what it's all about. I think the district has made a commitment to the model as a whole, and I think that's helped tremendously as far as personnel and other costs.*

Lessons Learned

A few schools noted that one of the major benefits to the IMPACT grant was a change in the culture of the school, and that this benefit would likely continue independent of future funding. Although the technology resources were integral to the grant, most schools reported that they would continue to do what was necessary to move each student forward in the 21st century. In the words of two MTACs:

- *We might not have everything up-to-date and perfect, but once the model is established… you're only going to get better. Even if you don't have the equipment that's high-class, you still have what you have, and you can just keep improving on it, with grants added to it.*
- *I'm sure we'll need grants for updated technologies, especially when we think about putting technology in the hands of every child, but the framework and the collaboration are institutionalized.*

Several lessons or pieces of advice emerged from the interviews with MTAC focus groups. Schools emphasized the importance of school readiness for reform, both in terms of technology and collaboration. In addition, the timing of the implementation made a difference in which schools felt they were having success. Many MTACs also felt strongly that such widespread changes should be implemented at a district level, so that the effort could be coordinated among schools and students would not graduate from an IMPACT school and move to a school with very different resources. Finally, several MTACs had suggestions for ways that DPI could be more helpful to schools working to implement the IMPACT model.

Staffing Issues

Many schools were concerned with the allocation of staff members to meet the challenges associated with the implementation of the IMPACT model. School leaders had to be creative in shifting staff to serve in technology associated positions. Although most of the technology facilitators indicated that 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. Other staff members, including administrative staff, were faced with overseeing installations and inventorying new technology as it arrived rather than focusing on their own duties.

High School Implementation Issues

Many of the barriers and challenges cited by the interviewed MTACs were similar to those faced by elementary and middle schools that received the grant in previous years; however, implementing the IMPACT model at the high school level posed its own unique challenges. One issue was that collaboration was not as much a part of the high school culture as it was at lower grade levels, and changing both attitudes and scheduling was reportedly more difficult in high schools. For example:

- *We're not like the elementary school and primary school – there aren't multiple teachers teaching the same thing,… I might have only one or two people that are teaching [a particular course]*
- *We still do not have the entire collaboration piece in place…because it's very difficult to schedule in a high school to make that possible. That's not something you normally do in a high school, sit*

down with teachers that are teaching common courses and talk about how we can do it better; each is usually in their own room or department and stays there.

Another issue was that internet security policies put in place by the districts for younger students did not always make sense for older students doing more complex projects. As one MTAC member described this challenge:

- *Sometimes it seems that at the district level, security features are put in place on an elementary school level, and so there's this conflict, because my (high school) students are trying to do work, but they don't have access to the resources that they need. There's this perception that the world is out to harm children, and we've got to protect them from that, so I think that they're responsive to making changes, but I think that a lot of our time is [spent] asking for the changes to be made.*

Timing of Funding

Many of the schools reported that they had trouble making purchases due to the timelines of both DPI and their school districts, as well as conflicting procedures between various entities. IMPACT III schools, in particular, had issues with the timing of the funding cycle. The time frame in which the money was to be spent was extremely constraining. For some, the amount of time was simply not sufficient to navigate all the levels of bureaucracy in the district. In other cases, schools would have preferred having more time to ponder their purchasing decisions, as the rushed decision process often resulted in schools opting for an item that they found to be less useful than another might have been. As one focus group participant described their frustration:

- *It's little things like, we get really excited about purchasing something, we make the purchase, we catalogue it, get it out there, and then we find out we had another option, and now things aren't getting used as much... I think about that a lot, because we put so much energy into trying to make the best choice.*

The most controversial issue for IMPACT III schools was the requirement that they encumber all professional development funds by September 30, 2008, after only receiving the funds 90 days earlier. This deadline precluded schools from providing professional development throughout the school year, and made it very difficult to hire substitutes.

Readiness is very important

Focus groups described readiness in terms of technological infrastructure and teacher readiness for change. Schools that did not already have some technology, at least partially flexible access to media centers, or teachers who were on board with the IMPACT vision had a much more difficult time in the initial year than those who had some signs of readiness. As three MTAC members described:

- *In a high school, we talk about the learning curve and getting people ready technology-wise to use the equipment, but there's also a 'want-to' part, a climate change that has to happen. Most high school teachers are used to going into their classroom and closing the door and being on their own, so for them to come together and talk about issues, talk about collaborating, talk about lessons and using technology is different, and we're not there yet.*
- *Some of the common barriers …would be [having] to go through a process of learning to deal with flexible access. This school has had flexible access for years, so that is nothing, and they've been a very collaborative staff for many years, … this school has had two major pieces [of the IMPACT model] in place for a long time.*

Implementing too much at once is overwhelming

In addition to readiness, focus groups reported that the timing for implementing the IMPACT model was very important. Because there is a learning curve for any new equipment, schools that rolled out new technology early in the year, with training in the summer, had the most success in reaching a high level of proficiency as the school year progressed. Moreover, schools that implemented the technology more slowly, by introducing only one type of hardware at a time, found that teachers were much less overwhelmed and the technicians were not as swamped. One school reported they had given each type of technology to only one department (e.g., iPods were given only to the English teachers) so that staff in that department could become experts and generate interest throughout the rest of the school as word spread of their success. Other schools suggested focusing on one school at a time, rather than the entire district, may have been more effective because district-level IT staff would have had more time to provide technical assistance. Typical comments included:

- *If I had to do this again and I were the superintendent or director of technology, I would not have phased this in to four schools at one time, because you only have the limited amount of IT people…I would have probably phased two schools in, and then phased the next two schools in … because we were all … sitting around going "I want my stuff!" you know, and the people were running around like crazy people, and working weekends, nights, Saturdays, vacations.*
- *The hardest piece for me is the inundation of all of this stuff at once. I can't imagine being a teacher and having to learn all of this at once.*
- *I think [it helped] that we started with five SmartBoards last year, and a smaller amount of folks [modeled for] those who didn't have it, so they pretty much had an idea of where we were going,*

System-wide coordination is important

Several IMPACT schools noted that implementing the model across the entire school system was important, because students moving up from one school to the next should experience consistency in the mode of instruction, as well as the availability of resources.

- *[IMPACT I] was elementary schools, and [those students] went to middle and high school and had nothing, so it's kind of like they lost everything, and the excitement.*
- *When you hire strong teachers and everybody has the same resources, you level the playing field for every child, and that is so important.*

In spring interviews, several TFs and MCs suggested that more formal avenues be set up for communication among IMPACT schools. One idea was to set up pairs of "sister" schools in the same geographical area to share ideas and mentor each other about the purchase and use of new technology. One school suggested that this system might ease the burden on the regional consultants from DPI, because schools would have broader support systems.

Results from Classroom Observations

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. We observed lessons in all core subjects as well as foreign languages, health, computer/technology skills. A breakdown of the observed schools and lessons are found in

Appendices A and B.

What technology was used
Teachers and students in IMPACT schools were observed using a wide variety of instructional technology. 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). The percent of observed lessons in which each type of technology was used by teachers and students is shown in Appendix C

In general, teachers were observed using technology more often than students in both IMPACT III and IMPACT IV schools. It is worth noting that in nearly one-fourth of observed lessons, both in IMPACT III and IMPACT IV schools and during both sets of site visits, 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 white board. The percent of students using no technology was lowest at the elementary school level, and tended to increase with students' age (see Table 2).

Table 2. *Percent of Observed Lessons in which Students did NOT Use Technology*

	Fall 2008	**Spring 2009**
Elementary	9%	14%
Middle	19%	30%
High	39%	30%

How technology was used
We observed technology being used in a wide variety of ways in the IMPACT schools, ranging from very simple presentations using LCD projectors to complex, project-based multimedia lessons. Teachers most often used technology for activities such as presenting information, assessing students, or lecturing. The relative frequency with which technology was used for various purposes in the observed lessons is shown in Appendix D.

Some typical uses of technology involved teachers using PowerPoint as a lecturing tool, or using student response systems for review or formative assessment. More specific examples of observed technology use are below:

- In a high school English enrichment class, the teacher periodically asked questions during a reading of a passage by Mark Twain, and asked students to respond using their student response systems. The teacher then changed the pacing of the lesson according to students' demonstrated understanding of the passage.
- In several middle and high school lessons, students generated and presented PowerPoint presentations about topics ranging from diseases (Health) to weather events (Science) to the biographies of presidential candidates (Social Studies).
- In a high school English class, students used flip cameras to create videos of ghost stories they had written at the end of a fiction unit.
- In a high school science class, students worked at laptops to perform a lab simulation of gel electrophoresis.
- In a middle school Language Arts class, the teacher projected a slide show depicting rain

forest animals and plants that appeared in myths that the students were reading. As students came across a term with which they were not familiar, the teacher would search the Internet for an image, write a caption, and add it to the slide show.

- In a high school social studies class, the teacher showed YouTube© videos of presidential campaign advertisements from different eras.

Table 3. *Use of Digital Interactive Boards in IMPACT Classrooms*

	Fall		Spring	
	III (N=40)	IV (N=49)	III (N=46)	IV (N=46)
Streaming Video or other use of Internet	35%	31%	9%	13%
Functioned similar to overhead proj.	23%	37%	46%	28%
Students used it for simple purposes (highlight, drag/drop, games, etc.)	21%	24%	13%	20%
Projecting computer screen (not using internet or powerpoint)	10%	14%	26%	20%
Student Response System results displayed	10%	18%	0%	20%
PowerPoint presentation by teacher	8%	14%	4%	17%
Teacher using interactive tablet	5%	0%	2%	2%
Students used it for complex purposes (e.g., multimedia presentations)	0%	2%	11%	2%
N/A (not used)	18%	8%	17%	24%

Because digital interactive boards were so prevalent in IMPACT schools, we paid special attention to the ways in which these tools were being used (see Table 3). We observed many classrooms in which the digital boards were used in similar ways to overhead projectors or simple white boards; for example, teachers projected information or asked students to work out problems on the board using the stylus as they would a dry erase marker. We observed very 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. Examples of ways in which digital interactive boards were used include:

- A Kindergarten lesson in which students drew a picture and wrote a sentence about what they had done the previous weekend, then projected their work from a document camera on to the digital board. Each student then used the highlight feature to show particular words or parts of the picture as they discussed what they had drawn and written.
- A middle school mathematics class in which students used the drag and drop feature of the digital board to match equivalent fractions.
- A high school social studies class in which the teacher projected an interactive map of the United States, showing how each state had voted in the recent presidential election.

Students went up to the board one at a time to click on a state that they had researched and discuss how its political history, population density, and geographical location may have contributed to the election results.

Table 4. *Use of Digital Interactive Boards in Observed Lessons, by Level*

	Elementary		Middle		High	
	Fall (N=25)	Spring (N=22)	Fall (N=31)	Spring (N=43)	Fall (N=33)	Spring (N=27)
Streaming Video or other use of Internet	28%	0%	26%	16%	42%	11%
Essentially as an overhead or white board	16%	45%	39%	42%	33%	22%
Students used it for simple purposes (highlight, drag/drop, games, etc.)	48%	27%	13%	19%	15%	4%
Projecting computer screen (e.g., spreadsheet)	12%	23%	13%	23%	12%	22%
Student Response System results displayed	4%	5%	19%	9%	18%	15%
PowerPoint presentation by teacher	4%	5%	13%	9%	15%	19%
N/A (not used)	4%	9%	13%	19%	18%	33%

We also documented the ways in which students used laptop and desktop computers in the observed lessons. Of the lessons in which students were observed using computers, most involved students using the Internet or creating presentations with PowerPoint or other software. (See Table 5).

Table 5. *Use of Computers by Students in Observed Lessons*

	Fall (N=23)	**Spring (N=34)**
Students using Internet for research,webquest, etc.	48%	38%
Students making/displaying PowerPoints or other presentations, including word processing	39%	50%
Learning to use technology (e.g., spreadsheet training)	22%	6%
Assessment	9%	15%
Lab simulations	9%	3%
Blogging	4%	3%
Instructional games	0%	9%

The vast majority of observed classes did not encounter any technological problems, and most of the problems that were observed were relatively minor (see Table 6). However, the few major problems that were observed were debilitating to the lessons. Examples of minor problems included slow connections to the Internet that created unnecessary down time and an interactive tablet that was not working properly so the teacher had to run the lesson from the desktop computer rather than circulating throughout the room. Major problems included a lab simulation that repeatedly crashed and a computer lab in which computers took nearly 20 minutes of a 30-minute lesson to boot up. In each of these cases, the lesson could not proceed as planned and all instructional time was lost. Teachers may benefit from support/guidance on how to plan backup lessons in cases where technology fails.

Table 6. *Technological Issues with Observed Lessons*

	Fall (N=89)	Spring (N=92)
No technology problems	87%	88%
Minor problems (lesson could mostly proceed as planned)	9%	10%
Major problems (lesson could not proceed as planned, or substantial amounts of instructional time were taken up with tech problems)	4%	1%

Administrator Surveys

The Profile for Administrators

Derived from National Educational Technology Standards for administrators (NETS-A), the Profile for Administrators survey provided information about the views of principals and assistant principals within IMPACT project schools in the six dimensions of NETS-A. Rated on a Likert scale ranging from 1 to 5, response options included: 0- Not at all, 2-Minimally, 3-Occasionally, 4-Often, and 5-To a great extent. The average rating, across all items, increased from Fall to Spring in IMPACT IV schools, but decreased in IMPACT III schools. Table 7

summarizes the results of the survey. A detailed summary of responses to individual items is provided in Appendices E and F.

Table 7. *Profile for Administrators Results*

IMPACT Model	Date	N	Mean	Std. Deviation
III	Fall 2008	31	4.32	0.59
	Spring 2009	27	4.19	0.60
IV	Fall 2008	36	4.27	0.68
	Spring 2009	31	4.50	0.39

The Implementation Checklist

The Implementation Checklist provides insight as to how closely administrators perceive their school's implementation of the IMPACT model aligns with the requirements outlined in the IMPACT rubric. Tables 8 and 9 present the mean scores on the Implementation Checklist for surveyed administrators within IMPACT III and IV schools. This instrument yielded results that suggest administrators in both IMPACT III and IV schools increased their level of agreement with their school's alignment to suggested IMPACT model guidelines in all construct areas with the exception of System Level Program Administration within IMPACT III schools. A detailed summary of responses to individual items is provided in Appendices G and H.

Table 8. *IMPACT III Administrator Mean Scores on Constructs of the Implementation Checklist*

	Fall 2008 (N=33)		Spring 2009 (N=22)	
Implementation Checklist Construct	Mean	Std. Dev.	Mean	Std. Deviation
Teaching and Learning	6.22	0.56	6.26	0.59
Information Access and Delivery	5.66	1.02	6.05	0.84
Program Administration	5.37	0.68	5.55	0.63
System Level Teaching and Learning	6.19	0.90	6.26	0.96
System Level Information Access and Delivery	5.65	1.50	5.67	1.84
System Level Program Administratn.	4.27	1.17	4.19	1.34

Table 9. *IMPACT IV Administrator Mean Scores on Constructs of the Implementation Checklist*

	Fall 2008 (N=36)		Spring 2009 (N=24)	
IMPACT Implementation Checklist Construct	Mean	Std. Dev.	Mean	Std. Deviation
Teaching and Learning	6.13	0.72	6.44	0.48
Information Access and Delivery	6.05	0.99	6.48	0.81
Program Administration	5.34	0.77	5.72	0.67
System Level Teaching and Learning	6.45	0.73	6.65	0.47
System Level Information Access and Delivery	6.11	1.52	6.66	0.65
System Level Program Administration	4.84	0.84	5.20	0.70

Teacher Surveys

ISTE Performance Standards for Inservice Teachers

We measured technology skills via an instrument that measures a teacher's self-reported skills in the six dimensions of the National Education Technology Standards for Teachers (NETS-T). The response options for these 48 questions included: 0-*Not at all*; 1- *Minimally* (need help); 2-*confidently* (knowledgeable and fluent); and 3- *Able to teach others*. The IMPACT III cohort completed this survey three times, in Spring 2008 (N=389), Fall 2008 (N=566) and Spring 2009 (N=506). The IMPACT IV cohort only completed it twice, in Fall 2008 (N=645) and Spring 2009 (N=560).

The ratio of kurtosis to its standard error can be used as a test of normality (that is, you can reject normality if the ratio is less than -2 or greater than +2). (Taken from SPSS.com) The kurtosis ratios were calculated for each administration (Spring 08, Fall 08 and Spring 09) and none indicated a lack of normality. In addition, Levene's test of homogeneity of variance was not significant for either IMPACT cohort. Stevens (1996) suggests that researchers test at a more stringent significance level when a study includes correlated observations, in an effort to correct for inflated levels of Type I error that can result from dependence of observations. For this reason, a significance level of .001 was used. A one-way ANOVA was used to measure differences in the average skills rating within each cohort, over the multiple survey administrations. Overall, IMPACT III schools showed no significant change in the average skills rating of teachers over the three survey administrations, $F(2,1460)=1.247$, $p=.288$. Further, based on Scheffe's post hoc comparison, there was no significant difference between Spring 2008 and Fall 2008 ($p=.718$) nor was there a significant difference between Fall 2008 and Spring 2009 responses ($p=.291$). However, the IMPACT IV teachers did show a significant increase in their average technology skills rating from Fall to Spring, $F(1,1204)=41.408$, $p=.000$.

Table 10. *Performance Standards for Inservice Teachers (NETS-T) Survey – Average Rating Across all 48 Items*

IMPACT Model/Date	*N*	*Mean*	*Standard Error*
IMPACT III			
Spring 2008	389	1.801	.027
Fall 2008	566	1.772	.023
Spring 2009	506	1.824	.023
IMPACT IV			
Fall 2008	645	1.815	.0201
Spring 2009	560	1.999*	.0202

**Indicates significant difference from Fall to Spring, p<.001*

The tables below summarize the percentage of teachers who responded either "Confidently" or "Able to teach others", and the percentage of teachers selecting the (highest) "Able to teach others" category, over the multiple survey administrations across all 48 survey items. This is important to consider when evaluating the likelihood of sustainability upon completion of state-sponsored funding of the IMPACT Model. If the teachers currently employed at the school are growing in their confidence, in that, they feel competent to teach others how to implement the national standards, it becomes more feasible for schools to address teacher turnover by training and re-training teachers new to the school, in future years.

Table 11. *Performance Standards for Inservice Teachers (NETS-T) survey – Percent of Responses in "Confidently" & "Able to teach others" Categories Combined, Across all 48 Items*

IMPACT Model	*Spring 2008*	*Fall 2008*	*Spring 2009*	*Overall Change*
IMPACT III- all levels	69.2%	68.4%	72.1%	+2.9%
Elementary	64.5%	61.6%	68.6%	+4.1%
Middle	76%	75.1%	74.2%	-1.8%
High	72.2%	76.6%	75.7%	+3.5%
IMPACT IV – all levels		69.4%	78.6%	+9.2%
Elementary	N/A	69.4%	77.8%	+8.4%
Middle	N/A	68.6%	78.5%	+9.9%
High	N/A	70.1%	79.1%	+9%

Table 12. *Performance Standards for Inservice Teachers (NETS-T) survey – Percent of Responses in Highest -- "Able to teach others"-- Category, by School Level, Across all 48 Items*

IMPACT Model	*Spring 2008*	*Fall 2008*	*Spring 2009*	*Overall Change*
IMPACT III-all levels	19.5%	18.2%	18.4%	-1.1%
Elementary	17.3%	15.8%	15.3%	-2%
Middle	21.9%	22.4%	20.6%	-1.3%
High	22.7%	18%	20.1%	-2.6%
IMPACT IV – all levels		19.3%	25.6%	+6.3%
Elementary	N/A	19.6%	23.4%	+3.8%
Middle	N/A	21.5%	27.1%	+5.6%
High	N/A	17.6%	25.8%	+8.2%

In IMPACT III schools, the relatively high percentages of teachers (68.4%) reporting confidence in their abilities to implement the national standards prior to a majority of the equipment purchases associated with the grant indicates teachers in these schools felt they were already equipped with some of the skills they would need to fully implement the IMPACT Model. Further, because the administrators in IMPACT III schools attended training throughout the 2006/07 school year, these schools were already implementing some parts of the IMPACT model (e.g. collaborative planning) with their existing resources at the time of the Spring 2008 survey administration. Another noteworthy finding examines the percent of teachers responding "Able to teach others" in reference to the implementation of the NETS for teachers. This level of confidence will contribute to sustainability of the model, and schools prefer their teachers become increasingly confident, to the point where they feel "able to teach others". Yet, within IMPACT III schools, during the first year of implementation, the percent of teachers responding in this highest category decreased very slightly, and this held true for all levels – elementary, middle and high.

In IMPACT IV schools, a majority of the equipment was purchased in July of 2008, and the initial survey administration took place in October of 2008. In Fall of 2008, results indicate a majority of the teachers (69.4%) felt confident in their ability to implement the national standards, which may reflect changes that occurred as a result of professional development received during the summer or the first two months of the 2008/09 school year. It is important to note that the percent of teachers responding in the highest ("Able to teach others") category increased 6.3% across IMPACT IV schools. When responses were disaggregated by school level, increases were observed in each, ranging from 3.8% to 8.2%. If this increase persists, it indicates teachers are becoming more confident in their skills, which will facilitate the sustainability of the model.

School Technology Needs Assessment (STNA) - survey

Roughly half of the items included on this survey assess teacher perceptions of the characteristics in their school environment found to be supportive of technology integration. This construct/factor, called "Supportive Environment for Technology Use" asks teachers to indicate

their level of agreement, on a scale of 1-*Strongly Disagree* to 5-*Strongly Agree*, regarding the prevalence of these characteristics.

Results from Fall and Spring administrations of the STNA indicated significant changes in teacher beliefs, based on a oneway ANOVA, for some of the IMPACT schools. Levene's test for homogeneity of variance was not significant for either cohort, and kurtosis ratios were calculated to verify normality of the distribution of responses within each survey administration, for this construct. In addition, a significance level of .001 was used in an effort to correct for inflated Type I error due to dependence of observations. Overall, in IMPACT III schools, there was no significant difference in the Supportive Environment for Technology Use ratings, $F(1,1043)=0.905$, $p=.342$. However, for the IMPACT IV cohort, there was a significant increase in the average ratings of Supportive Environment for Technology Use, $F(1,1186)=32.398$, $p=.000$. While there were no significant differences between the two IMPACT cohorts in responses on the Fall 2008 survey, $F(1,1120)=.310$, $p=.578$, the IMPACT IV cohort showed stronger growth in this construct between the Fall and Spring survey administrations, such that, Spring 2009 responses from the IMPACT IV schools were significantly higher for this construct than responses from the IMPACT III schools, $F(1,1110)=28.449$, $p=.000$.

Within the "Professional Development" construct, fifteen of the twenty-two items ask teachers whether or not they think they would benefit from training in a particular technology-related topic. These results are especially useful at the school level, in planning future professional development, though they are not a focal point of this evaluation, since aggregating the results of these items across all IMPACT schools is not likely to provide meaningful, evaluative information. The construct titled "Use of Technology for Teaching and Learning" contains 22 items, measuring frequency of technology-related activities used by teachers (15 items) and students (8 items). Responses, on a scale of 1-*Never* to 5-*Daily*, indicate how often teachers engage in these practices. The nine questions within the "Impact of Technology Use" construct measure staff perceptions of the outcomes associated with technology integration, indicating their level of agreement with the positive impact technology can have on both their teaching practices (4 items) and student behaviors (5 items). A detailed summary of responses to individual items is provided in Appendices I and J.

Table 13. *School Technology Needs Assessment - Supportive Environment for Technology Use Construct (Scale of 1-5)*

IMPACT Model	*N*	*Mean*	*Standard error*
IMPACT III			
Fall 2008	514	4.037	.023
Spring 2009	531	4.066	.021
IMPACT IV			
Fall 2008	607	4.054	.021
Spring 2009	580	4.223	.021

NSDC's Standards Assessment Inventory (SAI)

The SAI was administered to all IMPACT schools in Spring 2009, in an effort to measure the prevalence/intensity of practices found to be indicative of high quality professional development

programs, and reflective of the twelve standards for staff development outlined by the NSDC, which are used as a basis for the North Carolina Standards for Professional Development. (*citation.*…) A factor analysis was conducted, demonstrating the existence of four primary categories measured by this survey. (Wei, Darling-Hammond, Andree, Richardson, & Orphanos, February 2009) These include: Opportunities for Professional Development/Teacher Collaboration (20 items); School Leadership (10 items); Equity (9 items); and Teacher Influence on Decisions/Policies (5 items). Results from our analyses of IMPACT schools were consistent with results obtained from the larger national dataset used in the factor analysis, in that, average ratings for each factor differed significantly from each other within both of the IMPACT cohorts. In fact, significant differences were noted between all pairs of factors at the .001 level, with the exception of the School Leadership/Equity pair within the IMPACT IV cohort, in which no significant difference was observed (p=.235)

Table 14. *Standards Assessment Inventory (SAI). Average Ratings by Factor (Scale of 0-4)*

IMPACT Model/Factor	N	Mean	Std. Dev.
IMPACT III			
Opportunities for Prof'l Devel/Tchr. Collaboration	484	2.836	.715
School Leadership	484	3.094	.677
Equity	484	3.201	.581
Tchr. Influence on Decisions/Policies	481	2.588	.772
IMPACT IV			
Opportunities for Prof'l Devel/Tchr. Collaboration	553	2.914	.681
School Leadership	553	3.152	.690
Equity	553	3.172	.565
Tchr. Influence on Decisions/Policies	550	2.623	.796

It is important to note that average ratings for the School Leadership and Equity factors were significantly higher than those for the other two factors. Again, this is consistent with the previously cited technical report, which included a sample of over 51,000 teachers in four other states, thus indicating our results are reflective of a more widespread phenomenon, extending beyond the schools in this project. These authors suggest that "the kind of job-embedded collaborative learning that has been found to be important in promoting instructional improvement and student achievement is not a common feature of professional development across many schools. In addition, teachers' lack of influence over school decisions means that teachers are less likely to be engaged in collaborative problem-solving around school-specific issues". (p.55)

Teacher Open-ended Survey - Spring

In an effort to gauge teacher response to IMPACT in their schools, the evaluation team asked a sample of observed teachers to answer three questions: (1) What, if anything, has the IMPACT grant changed about your teaching?; (2) What if anything, has the IMPACT grant changed about

the environment at your school?; and (3) What recommendations to you have about future grants that are similar to IMPACT? A total of 35 teachers responded (16 from IMPACT III schools, 19 from IMPACT IV), representing all seven districts. Responses were consistent with information obtained from focus group participants, reported previously.

(1) *What, if anything has, the IMPACT grant changed about your teaching?*
Teachers from both IMPACT III and IMPACT IV noted that IMPACT has provided them not only with more technology resources, but also with better access to existing resources. This increased access has allowed teachers to use technology more often, and invest their time and effort in teaching rather than locating technology. In the words of one teacher:

> *I have been able to incorporate technology into my lesson plans without having to leave my classroom. What I mean by that, is that I don't have to pack up my students (and room) and walk across campus to a computer lab that is rarely available. My students are comfortable in the classroom, and have all the necessary materials available.*

In addition to using technology more often, teachers reported that they are trying new techniques, using a greater variety of teaching strategies, and being more creative in their assignments, all of which may lead to differentiated learning for students. Again, these changes were reported by teachers in both IMPACT III and IMPACT IV schools. The biggest change in teaching techniques seems to be a trend toward a more student-centered, project-based classroom. A few teachers indicated that they are now more aware of how students learn best, and several described their current role as one of facilitator rather than lecturer.

(2)What has the IMPACT grant changed about the environment at your school?
The most commonly cited change in school environment, in both IMPACT III and IV schools, was that students are much more engaged and enthusiastic about their learning. Teachers reported that students of the "video age" are drawn in by the interactive digital boards, that technology-based projects create an eagerness to learn, and that students seem to be taking more pride in their schools. This enthusiasm is also evident among teachers. As three respondents described this increased level of engagement:

> *Students enjoy access to the technology, and I believe that the lessons I teach which include technology make the lessons more meaningful and real to the students.*

> *The increase in technology has greatly increased student engagement levels throughout the building. I think students are looking forward to coming to school more and more each passing day.*

> *We have students that are highly engaged and teachers that are challenging and empowering our students. It makes a wonderful learning environment.*

Another very common change, not surprisingly, was an increase in the use of technology throughout the schools. Several teachers, particularly in IMPACT III schools, noted that their schools have become much more technology-based, and even reluctant teachers have begun using technology more and more. In the words of one teacher:

> *I use to be one of a few who dared try new technology and strategies and now everyone is working together and using the new equipment.*

Several IMPACT IV teachers noted that collaboration within their schools has increased considerably as a result of the IMPACT grant, consistent with data collected from focus groups. In the words of an IMPACT IV teacher:

> *I believe the environment at our school is one of creativity and cooperation moreso than before. We have always had a great camaraderie here, but the IMPACT grant has helped us find ways to work together- cross-curricularly and collegially. If I am not sure how to use a particular program, I know one of my colleagues does and will give me a lesson. Students are working together in groups and creating projects that show their knowledge.*

Although most of the reported changes to school environment were positive, respondents from two different IMPACT schools reported that some teachers have become overwhelmed with the amount of new technology and required training. They noted that the grant has been too much too soon, with not enough time to try one new tool before another is introduced. The increased amount of staff development has also been a burden in some systems. One teacher wrote:

> *The teachers are more overwhelmed and stressed out this year than ever before in my memory. We are being sent to Staff Development too often to be able to incorporate and master what we've learned, Staff Development for Staff Development's sake. I believe we should be given time to master and implement new techniques before we are expected to learn another. We're inundated with technologies that take time to learn (that don't always work), we can't catch our breath. Sometimes it seems like we're meeting just to fulfill a line item that was written in the grant. It feels like we're expected to throw out the old instead of add the new to the old [things] that work.*

Some teachers in IMPACT III schools reported that they did not receive enough training, as the time frame for using professional development funds was very short. Because the grant required funds to be spent by the end of September, all professional development had to be front-loaded so there was no time for teachers to practice their skills between trainings. At least one teacher believed that this curtailed time frame led to shallow trainings and frustrated teachers. In this teacher's words:

> *Future grants should not force all of the professional development to be completed in such a short time frame. Many felt frustrated with training in multiple areas in such a short time frame. They felt that they did not get to feel real comfortable with one new device before being trained in the next. Because training was cut short, I feel our training only scratched the surface of what we can do with the technology that we implemented. Once funding [was gone] training ceased. The plan needs to include continued professional development.*

(3)What recommendations do you have for DPI about future grants similar to IMPACT?
The most common recommendation made by surveyed teachers was to continue making technology grants available to schools. Although this response was given by some IMPACT III teachers, it was nearly universal among those in IMPACT IV schools. Several teachers noted that students will be expected to understand technology in their future careers, so they need to learn using technology now. Teachers noted that schools without access to instructional technology are at a distinct disadvantage.

Teachers also noted that technology grants will be unsuccessful if technical issues prevent the tools from being used successfully in the classroom. For that reason, they recommended that future grants continue to require technology facilitators at the school level, and provide funding for both infrastructure and tech support. In the words of one:

> *My main recommendation is to be sure that there are sufficient funds for infrastructure and for tech support (preferably in the form of a full-time on-site tech support person). Teachers don't have time to be burdened with making technology work; it needs to be "transparent" and dependable, like a pencil sharpener or a book.*

Some respondents from IMPACT IV schools suggested that grant leaders should help schools make informed decisions about technology purchases, so that they are buying *better* technology rather than simply *more* technology. This suggestion mirrors those from MTACS (see above) that schools be given venues for discussing technology purchases with other IMPACT schools. One teacher wrote:

> *I believe more careful thought and research should go into the use of the money - what should be purchased, how many, and what quality. For instance, every teacher at [our school] now has a document reader. However, they are poor quality and very difficult to use effectively. Consequently, few teachers use them. I would much prefer that the school owned just a few very good ones*

Several teachers, particularly those from IMPACT III schools, recommended that the grant focus more on training teachers to use technology effectively. Some suggested requiring more professional development, and others recommended that districts offer sessions more targeted to particular subjects or ability levels. In the words of one teacher:

> *Professional development needs to be the focus of the grant. Hardware and software are only as good as they are useable and understandable by faculty members.*
> *Lots of training on how to use the technology; some people are afraid of it and need to be guided along the way. There should be levels of staff development. Not everyone will need the basics.*

Classroom Equipment Inventory

In the fall of 2008, teachers in all IMPACT schools were asked to complete an Equipment Inventory regarding whether or not they "had permanent access to" certain types of equipment in their classroom. Specifically, teachers were asked about the following pieces of equipment: Laptop computer, desktop computer, document camera, interactive whiteboard, and overhead projectors. In addition, those who reported having the equipment were asked if it was "used regularly" or "seldom used". The only differences noted between IMPACT III and IMPACT IV schools were for document cameras and interactive whiteboards. For example, 64% of teachers in IMPACT III schools reported having document cameras in their room, compared to only 38.3% in IMPACT IV schools. Further, 79.6% of the respondents from IMPACT IV schools reported having interactive whiteboard, compared to only 66.4% of teachers in IMPACT III schools. Access to laptop computers was comparable in both IMPACT III and IV, with approximately two-thirds of respondents reportedly having access to them. (60.8% and 65.2% respectively). Within both cohorts, 93%-98% of teachers reported having access to a desktop computer in their classroom. In addition, approximately half of the teachers in each cohort

reported having an overhead projector in their classroom. (50.4%-IMPACT III and 49.3%-IMPACT IV). However, only 20.6% of IMPACT III teachers and 20.2% of IMPACT IV teachers reported they still regularly used these overhead projectors.

During the evaluation of IMPACT I, from 2003-2006, teachers consistently reported the necessity of a 'core classroom setup' involving particular pieces of equipment needed to create what they perceived to be a 21st Century classroom. (NCETC,2008) This equipment included a teacher computer (either laptop or desktop), an interactive whiteboard with projector, and a document camera. For this reason, we specifically examined the prevalence of these pieces of equipment in IMPACT III and IV schools, based on the Fall 2008 survey administration.

Table 15. *Teacher Equipment Inventory – Components of 'core classroom'*

IMPACT Model	*Yes, used regularly*	*Yes, but seldom used*	*No*
IMPACT III (N=559)			
Laptop computer	54%	6.8%	39.2%
Interactive whiteboard	59.4%	7%	33.6%
Document Camera	49.7%	14.3%	36%
IMPACT IV (N=603)			
Laptop computer	60.4%	4.8%	34.8%
Interactive whiteboard	72.8%	6.8%	20.4%
Document camera	26.5%	11.8%	61.7%

Teacher Turnover

One of the goals of the IMPACT III and IMPACT IV models is a reduction in teacher turnover, particularly as compared to similar schools that are not implementing an IMPACT model. Teacher turnover data for the 2008-09 school year is not yet available for analysis, and these analyses will be included in a subsequent addendum to this report. However, turnover data at IMPACT III and IV schools for the 2006-07 and 2007-08 school years, which will serve as a baseline measure, is included in Appendix K.

Student Surveys

Young Children's Computer Attitude Questionnaire

The Young Children's Computer Attitude Questionnaire assesses how students in Kindergarten, first, and second grade feel about using computers in school. The survey is designed to be read aloud to students in each classroom. Students raise their hands to indicate that they agree, disagree, or don't know how they feel about each item, and the survey administrator records the number of responses. The Young Children's Computer Attitude Questionnaire was administered to students at seven IMPACT III schools in September and October of 2009 and again in April and May of 2009. The survey was not administered at IMPACT IV schools because no IMPACT IV schools include grades K-2.

Students' responses to the items on the Young Children's Computer Attitudes Questionnaire were varied. Students' apprehensions about using computers at school seemed to decrease from

fall to spring. Fewer students agreed that computers are hard to use in school in the spring (16.3%) than the fall (23.4%), and fewer students agreed that working with a computer in school makes them nervous in the spring (17.8%) than the fall (24.0%). This may indicate improvement in the comfort level young students have with the use of technology, in that, use may have become more routine between the fall and spring surveys. However, slightly fewer students agreed that they like using a computer to learn in school in the spring (91.9%) than the fall (92.8%). Results from the Young Children's Computer Attitudes Questionnaire are presented in Table 16.

Table 16. *Percentage of students agreeing with statements on the Young Children's Computer Attitudes Questionnaire*

	Fall (N=1170)	Spring (N=1255)
I like using a computer to learn in school	92.8%	91.9%
I like playing computer games in school	95.1%	94.7%
I am tired of using computers in school	18.5%	15.0%
Computers are hard to use in school	23.4%	16.3%
I can learn many new things when I use a computer in school	93.5%	90.6%
I would work harder at school if I could use a computer more	82.4%	77.4%
Working with a computer in school makes me nervous	24.0%	17.8%
Knowing how to use a computer in school is very important	90.3%	91.6%

Technology Skills Checklist (TSC)

The Technology Skills Checklist 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 of students' technological skill (Cronbach's alpha= 0.92, Cronbach's alpha = 0.96, respectively) and as individual items to see what skills showed the strongest growth. The TSC was administered to most students in Sept/Oct of 2008 and again in April/May of 2009.

Technology Skills Checklist Grades 3-5

A summary score was calculated from the 30 items assessing students' technological skill. That summary score was then analyzed to determine if students experienced significant growth over the course of the two administrations of the TSC. The skewness and kurtosis ratios were calculated for each administration (Fall 08 and Spring 09), and neither indicated a lack of normality. Levene's test of homogeneity of variance was significant for IMPACT III, so Welch's test was run in the place of an analysis of variance. The average summary scores of students at IMPACT III schools grew from 3.60 (n = 1534, *sd* = .67) to 3.89 (n = 1611, *sd* = .62), which was significant ($F_{(1,3098)} = 154.67$, $p < .001$).

A one-way analysis of variance was conducted on summary scores of IMPACT IV students to investigate differences from the fall and the spring administration of the TSC. A significance level of .001 was used in an effort to correct for inflated Type I error due to dependence of observations. The average summary score of students at IMPACT IV schools grew from 3.52 (n = 1602, sd = .66) to 3.88 (n = 1619, sd = .67). ANOVA results show a significant effect for administration date $F_{(1,3219)} = 231.83$, $p < .001$, $\eta^2 = .07$).

Repeated measures ANOVA was conducted on responses matched by IMPACT identification number. Because not all students included this identifier, the RM ANOVA was conducted with a subsample (approximately half) of the original sample. Results were very similar to those obtained when using the entire sample. Summary scores of IMPACT III students increased from 3.52 (n = 1432, sd = .64) to 3.89 (n = 1432, sd = .66). ANOVA results show a significant effect for administration date ($F_{(1,1431)} = 506.85$, $p < .001$, $\eta^2 = .26$). Summary scores of IMPACT IV students increased from 3.51 (n = 839, sd = .64) to 3.86 (n = 839, sd = .58). ANOVA results show a significant effect for administration date ($F_{(1,838)} = 275.61$, $p < .001$, $\eta^2 = .25$).

The percentage of students agreeing with the item "Using a computer made learning the subject/doing the project easier for me" increased in both cohorts. The percentage of IMPACT III students who answered "Usually true for me" to the item grew from 62.4% in the fall to 70.1% in the spring, which was significant, $\chi^2(1, N = 3103) = 20.40$, $p < .01$. The percentage of IMPACT IV students who answered "Usually true for me" grew from 61.5% in the fall to 71.2% in the spring, which was also significant, $\chi^2(1, N = 3181) = 33.32$, $p < .01$.

The percentage of students who agreed with the item "Using a computer made learning the subject/doing the project more interesting for me" decreased for the IMPACT III cohort and increased for the IMPACT IV cohort. The percentage of IMPACT III students who answered "Usually true for me" dropped slightly from 74.2% in the fall to 73.6% in the spring, although that difference was not significant, $\chi^2(1, N = 3103) = .136$, $p > .05$. The percentage of IMPACT IV students who answered "Usually true for me" grew from 67.1% in the fall to 76.7% in the spring, which was significant, $\chi^2(1, N = 3179) = 36.34$, $p < .01$.

Technology Skills Checklist Grades 6-8

The TSC for grades 3-5 is a subset of the questions used in the TSC for grades 6-12. The TSC for grades 6-12 includes 37 items assessing students' technological skills which were averaged into a summary score. For the purposes of greater differentiation of the data, the data from students in grades 6-8 was analyzed separately from the data collected from students in grades 9-12. Levene's test of homogeneity of variance was significant for IMPACT IV, so Welch's test was run in place of an analysis of variance. The average summary scores of middle school students at IMPACT IV schools grew from 3.80 (n = 2834, *sd* = .64) to 4.16 (n = 2417, *sd* = .57), which was significant ($F_{(1,5235)} = 13.49$, $p < .001$).

The summary score of middle school students at IMPACT III schools grew from 3.91 (n = 1771, *sd* = .59) to 4.00 (n = 1472, *sd* = .59). ANOVA results indicated a significant, though very slight, effect for administration date ($F_{(1,3241)} = 13.49$, $p < .001$, $\eta^2 = .004$).

The results from the item "Using a computer made learning the subject/doing the project easier for me" are mixed. The percentage of IMPACT III students who answered "Usually true for me" to the item decreased from 79.3% in the fall to 78.4% in the spring, although that decrease was not significant, $\chi^2(1, N = 3213) = .36, p > .05$. The percentage of IMPACT IV students who answered "Usually true for me" to the item grew from 76.5% in the fall to 82.1% in the spring, which was significant, $\chi^2(1, N = 5207) = 24.89, p < .01$.

The percentage of students who agreed with the item "Using a computer made learning the subject/doing the project more interesting for me" grew from the fall to the spring administrations. The percentage of IMPACT III students who answered "Usually true for me" grew very slightly, from 82.6% in the fall to 83.0% in the spring. The difference was not significant, $\chi^2(1, N = 3215) = .07, p > .05$. The percentage of IMPACT IV students who answered "Usually true for me" grew from 78.7% in the fall to 83.3% in the spring, which was significant, $\chi^2(1, N = 5207) = 17.67, p < .01$.

Technology Skills Checklist Grades 9-12

Because of variations in the survey administration procedures between middle and high schools, student survey results from grades 6-8 are evaluated separately from results obtained from students in grades 9-12. The average summary scores of students at both IMPACT III high schools changed from 4.28 (n = 836, *sd* = .57) to 4.40 (n = 845, *sd* = .51). The average summary scores of students at the four IMPACT IV high schools changed from 4.25 (n = 2081, *sd* = .58) to 4.34 (n = 3278, *sd* = .55).Very few high school students (only about 15%) included the IMPACT identifier with their survey responses, thus it was not feasible to conduct a repeated-measures ANOVA with this part of the sample.

The results from the item "Using a computer made learning the subject or doing the project easier for me" indicate no significant change from the fall to the spring administration. The percentage of IMPACT III students who answered "Usually true for me" to the item grew from 74.4% in the fall to 78.8% in the spring, which was not significant, $\chi^2(1, N = 1664) = 4.53, p < .05$. The percentage of IMPACT IV students who answered "Usually true for me" decreased from 78.1% in the fall to 77.2% in the spring, which was not significant, $\chi^2(1, N = 5287) = .61, p > .05$.

The percentage of students who answered "Usually true for me" to the item "Using a computer made learning the subject/doing the project more interesting for me" did not change significantly from the fall to the spring. The percentage of IMPACT III students who answered "Usually true for me" to the item grew from 76.5% in the fall to 79.3% in the spring, which was not significant, $\chi^2(1, N = 1664) = 1.93, p > .05$. The percentage of IMPACT IV students who answered "Usually true for me" to the item decreased from 81.6% in the fall to 79.9% in the spring which was not significant, $\chi^2(1, N = 5285) = 2.40, p > .05$.

Further, on the spring survey, 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. Using a retrospective design, one question on the spring survey asked students in grades 6-12 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 responses 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.

Student Achievement

*Student Achievement Outcomes – **IMPACT III***

There were 7,244 students included in these analyses, who took an End-of-Grade test while enrolled at an IMPACT III or matched comparison school in 2009. The groups included 3,793 enrolled at IMPACT III elementary or middle schools, and 3,451 students enrolled in comparison schools. The comparison schools were selected because their demographics and achievement were similar, at baseline, to the IMPACT III schools. The table below illustrates the primary variables on which they were matched.

Table 17. *Demographic characteristics of IMPACT III and comparison elem/middle schools in 2009 (gr.3-8)*

	IMPACT III	Comparison
Total number of students enrolled in 2009	3,793	3,451
Demographics-		
White	45.4%	46.9%
Black	39.8%	34.1%
Other	14.8%	19%
Economically Disadvantaged	57.5%	59.1%
Students with Disabilities	14.4%	10.9%

Changes in Reading achievement in Years 1-3

The null/fully unconditional model was conducted to partition the variance between each level of the model and to ensure that there was sufficient variability at Level 1 and Level 2 to warrant continuation with analyses. (Raudenbush & Bryk, 2002) Only the dependent variable, Reading scale score, was entered in this model. Results from this analysis indicated that 76% of the variability in Reading scale score was between-students (τ_{00} = 112.63, z = 49.21, $p < .0001$) and 24% was within students (σ^2 = 36.44, z = 66.71, $p < .0001$). Therefore, the null/fully unconditional model indicated that there was sufficient variability to warrant further analyses.

A subsequent model was used (Means-as-Outcomes regression) to measure the relationship between the school in which a student was enrolled (IMPACT school v. comparison school) and their Reading scale score. Specifically, this model measures whether there were any between-student differences in Reading scale scores. Also, it measures how much between-student variability is accounted for by knowing whether the student attended an IMPACT III school or a comparison school. There was a significant relationship between whether students were enrolled at an IMPACT III or comparison school and their average Reading scale score. On average, students in IMPACT III schools scored higher than students in comparison schools. (γ_{01} = 2.382, t=8.64, p<.0001) However, this model accounted for only 1% of the between-student variability in Reading scale score.

The next model attempted to determine if the change in Reading scale score over three years was dependent on students' project school enrollment. Results showed no significant project school enrollment x administration year interaction, such that the change/growth over time in Reading scale score was unrelated to the students' project school enrollment (Υ_{11}= -0.0585, *t*= -0.61, *p*=.5424).

An additional model controlled for whether students were considered economically disadvantaged when examining the relationship between project school enrollment and change in Reading scale score over time. There was no significant interaction between year x project school enrollment x free/reduced lunch status, such that the relationship between project school enrollment and growth in Reading scores over time was unrelated to a student's free/reduced lunch status (Υ_{13}= -0.3046, *t*= -1.50, *p*=.1326). A similar pattern was observed with students with disabilities (SWD), included as a dichotomous variable reflecting which students had been diagnosed with a disability and which had not. There was no significant year x project school enrollment x SWD interaction, such that the relationship between project school enrollment and growth in Reading scores was unrelated to students' SWD status. (Υ_{13}= -0.4289, *t*= -1.15, *p*=.2481)

Does the relationship between project school enrollment and Reading scale score depend on the level of the school in which the students are enrolled – elementary or middle? How much within- and between- student variability is explained by school level and project school enrollment? There was significant growth in Reading scores over three years (Υ_{10}= 8.67, *t*=33.36, *p*<.0001). Both project school enrollment (Υ_{01}= 2914.1, *t*= 4.01, *p*<.0001) and school level (Υ_{02}= 5279.2, *t*= 17.72, *p*<.0001) were associated with average Reading scores. In addition, growth in Reading scores over time was dependent on both project school enrollment (Υ_{11}= -1.45, *t*= -4.01, *p*<.0001) and school level (Υ_{12}= -2.62, *t*= -17.69, *p*<.0001). Furthermore, the growth in Reading scores over time simultaneously depended on project school enrollment and school level (i.e. school level x year x project school enrollment:Υ_{13}= .8539, *t*= 4.18, *p*<.0001). The largest average change in Reading scores was among students enrolled in IMPACT middle schools (i.e. older students). Specifically, middle school students in IMPACT III schools showed more growth in Reading scores (avg. increase of 7.45 pts) than middle school students in comparison schools (avg. increase of 5.61 pts). This model accounted for 50% of the within-student variability and 8% of the between-student variability. This may indicate the effects of instructional technology on Reading achievement are more pronounced with older students, but further investigation is required.

Table 18. *Average Reading scale score, by school level, from 2007 to 2009*

		2007	2008	2009	Increase
IMPACT	Elementary	345.08	349.05	352.08	7.0
	Middle	353.44	357.26	360.89	7.45
Comparison	Elementary	343.9	347.42	350.45	6.55
	Middle	352.05	355.12	357.66	5.61

Because the Reading test was revised between 2007 and 2008, the percent of students passing dropped considerably, for all populations, from 2007 to 2008. For this reason, changes in

passing status were analyzed from 2008 to 2009. Looking at change from 2008 to 2009, IMPACT III students' were 22% more likely then comparison students to improve their status from not passing to passing in Reading (OR=1.244, p=.02). Further, the data was analyzed to determine the odds that students at IMPACT III or comparison schools would improve their performance level (Level 1, 2, 3, or 4) on the Reading EOG test from 2008 to 2009. The outcome variable was dichotomous – did students increase their performance level or not? Results showed students at IMPACT III schools and students at comparison schools were equally likely to increase their performance level on the Reading EOG test from 2008 to 2009 (OR = 1.098, p = .161).

Changes in Math achievement in Years 1-3

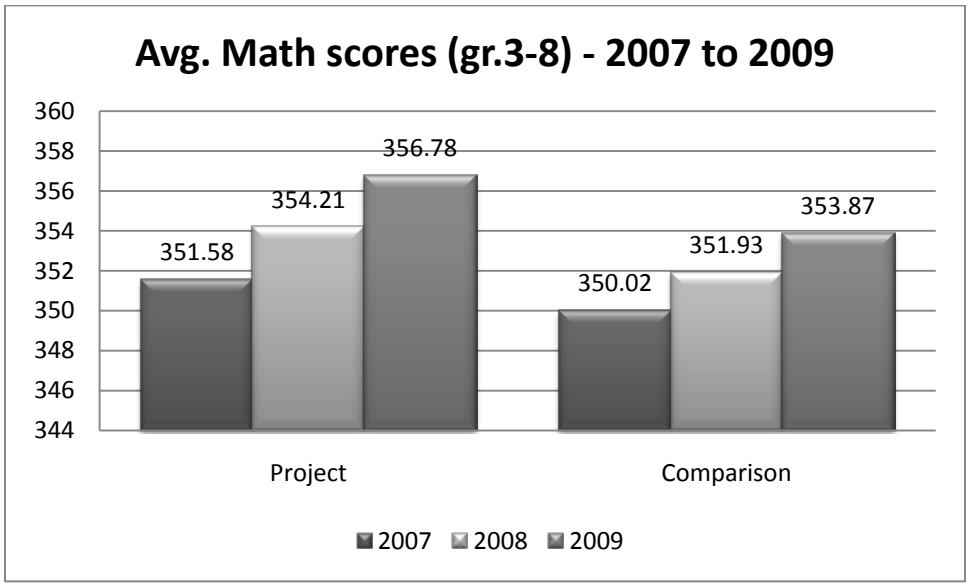
The null/fully unconditional model was conducted to partition the variance between each level of the model. Only the dependent variable, Math scale score, was entered in this model. Results from this analysis indicated that 72% of the variability in Math scale score was between-students (τ_{00} = 84.932, z = 48.27, p < .0001) and 28% was within students (σ^2 = 32.744, z = 67.31, p < .0001). Therefore, the null/fully unconditional model indicated there was sufficient variability to warrant further analyses.

The next model used Year, entered at Level 1, to determine how much variability in Math scale scores was accounted for by time. There was a significant increase in Math scale score over the course of three years (Υ_{10} =4.011, t = 85.52, p < .0001), and 53% of the within-student variability in Math scale score was accounted for by linear time. Because students varied significantly in their rates of change (τ_{11}=1.763, z=6.23, p<.0001) the β_1 slope was allowed to vary across students in subsequent analyses.

A subsequent model was used (Means-as-Outcomes regression) to measure whether there were any between-student differences in Math scale scores, based on their enrollment in an IMPACT III school or a comparison school. Also, it will measure how much between-student variability is accounted for by knowing whether the student attended an IMPACT III school or a comparison school. There was a significant relationship between their school enrollment (IMPACT v. comparison) and their average Math scale score. On average, students in IMPACT III schools scored higher than students in comparison schools. (Υ_{01} = 2.364, t=9.78, p<.0001) However, this model accounted for only 2% of the between-student variability in Math scale score.

The next model assessed whether the change/growth in Math scale score over three years was dependent on students' project school enrollment. Results showed a significant school enrollment x year interaction, such that the change/growth over time in Math scale score was dependent on the students' project school enrollment. (Υ_{11}= 0.4223, t= 4.72, p<.0001) Specifically, students enrolled in IMPACT schools showed slightly stronger growth (avg. increase of 5.2 points) in Math scores than students enrolled in comparison schools (avg. increase of 3.85 pts).

Figure 3. Change in EOG Match scale scores for IMPACT III and comparison schools, 2007-2009



To further illustrate this difference, binary logistic regression was used to measure differences in the odds of passing or scoring above grade level between IMPACT and comparison students, in 2007 (baseline) and 2009 (Year 2). The outcome variables were dichotomous – pass (Level 3-4)/fail (Level 1-2) and Level 4/ Level 1-3. While IMPACT and Comparison students were equally likely to pass the Math EOG in 2007, IMPACT students were significantly more likely to pass, and score above grade level on the Math EOG in 2009.

Table 19. *Performance on EOG-Math, IMPACT III v. comparison in 2007 & 2009*

Year	*Outcome*	*p-value*
2007	IMPACT & comparison students were equally likely to pass the Math EOG	.115
	IMPACT students were 15% more likely than Comparison to score above grade level (Level 4)	.020
2009	IMPACT students were 12% more likely to pass	.000
	IMPACT students were 30% more likely to score above grade level (Level 4)	.000

Looking at Math achievement levels (I – IV) revealed that IMPACT students tended to show more improvement than their comparison counterparts. This is consistent with previously reported findings from multilevel analyses. Looking at the change in achievement level from 2007 (baseline) to 2009, we see that IMPACT III students were 43% more likely to increase achievement levels. (OR=1.593, *p*=.000) This finding, in particular, is consistent with findings

from the IMPACT I cohort, including only elementary schools from 2003 to 2006, in which it was observed that IMPACT students were 37% more likely to increase performance levels in Math from baseline to the second year of implementation. (Osborne, et al., 2007) Additional analyses sought to determine whether students in IMPACT III school were significantly more likely to improve their status from not passing (in 2007) to passing (in 2009). This variable was coded as "1" if a student failed Math in 2007 and passed in 2009, and was coded as "0" if a student failed both years, passed both years, or decreased from passing in 2007 to failing in 2009. It was encouraging to observe that IMPACT III students were 46% more likely than comparison students to improve their status from not passing to passing in Math (p=.000). Further, when examining only the subgroup of economically disadvantaged students, IMPACT III students in this subgroup were 54% more likely than their comparison counterparts to improve their status from not passing to passing in Math from 2007 to 2009 (p=.000).

High school Algebra I and English I End-of-course tests

The IMPACT III cohort included three high schools. One of the three high schools is similar to a "school within a school" format, in that, it is located on the campus of a larger IMPACT III high school in western North Carolina, and enrolled approximately 100 students. For this reason, only two comparison high schools were selected, rather than three. In order to evaluate program effects on student achievement within these schools, End of Course Test scores will be used to measure change in school performance. Since students typically only complete these tests once, upon completion of the course, it is not possible to measure student growth over time. Rather, changes will be analyzed in terms of school growth/improvement. As a result, these analyses will include all students completing these tests in 2007, 2008 and 2009. The Algebra I and English I EOC's were selected as indicators because they are administered in courses all students are required to complete prior to graduation, which provides a representative sample of students enrolled in IMPACT III high schools in 2007, 2008 and 2009.

Table 20. *Percentage of **total** **students enrolled** in these courses in IMPACT III and comparison schools passing the Algebra I and English I EOC tests, 2007-2009*

		2007	2008	2009	Net Change
Algebra I	Comparison	49.3%	63.3%	61.1%	11.80%
	IMPACT III	53.9%	55.7%	50.3%	-3.60%
English I	Comparison	73.0%	76.5%	71.4%	-1.60%
	IMPACT III	79.4%	76.8%	80.2%	0.80%

Overall, no significant changes were observed in student performance on either the Algebra I or English I EOC tests in IMPACT III high schools. The percentage of students passing the Algebra EOC decreased from 2007 to 2009 at IMPACT III schools, while increasing for comparison high schools. The percentage of students passing the English EOC decreased slightly at comparison schools, and increased a fraction of a percent at IMPACT III schools.

Further analysis involved an examination of changes in the percent of economically disadvantaged students passing the Algebra I or English I EOC's at IMPACT III high schools. Again, the percent of students passing Algebra I increased for the comparison schools and declined slightly for IMPACT III high schools. However, the percent of economically

disadvantaged students passing the English I EOC in IMPACT III schools increased from 60.8% to 66.1% from 2007 to 2009. A slight decrease was observed in the English I pass rates for the comparison schools.

Table 21. *Percentage of **Economically Disadvantaged** **students** in IMPACT III and comparison schools passing the Algebra I and English I EOC tests, 2007-2009*

		2007	2008	2009	Net Change
Algebra I	Comparison	37.6%	43.0%	56.7%	19.10%
	IMPACT III	40.5%	40.3%	39.1%	-1.40%
English I	Comparison	55.6%	61.4%	53.3%	-2.30%
	IMPACT III	60.8%	58.3%	66.1%	5.30%

*Student Achievement Outcomes – **IMPACT IV***

There were 9,427 students included in these analyses who took an End-of-Grade test while enrolled at an IMPACT IV or matched comparison school in 2009. The groups included 4,977 enrolled at IMPACT IV elementary or middle schools, and 4,450 students enrolled in comparison schools. The comparison schools were selected because their demographics and achievement were similar, at baseline, to the IMPACT IV schools. The table below illustrates the variables on which they were matched.

Table 22. *Demographic characteristics of IMPACT IV and comparison schools (gr.3-8)*

	IMPACT IV	Comparison
Total number of students enrolled in 2009	4,977	4,450
Demographics-		
White	44.6%	50.4%
Black	31.2%	24.4%
Hispanic/Latino	18.6%	18%
Economically Disadvantaged	65.8%	65.4%
Students with Disabilities	12%	11.3%

Changes in Math and Reading achievement – Year 1 to Year 2

The percentage of students passing both the Math and the Reading EOG test grew slightly among both IMPACT IV students and comparison students from 2008 to 2009. The pass and fail rates for both comparison and project schools can be found in Table 23.

Table 23. *Percentage of IMPACT IV and comparison students passing the EOG test, 2008-2009*

		2008		2009	
		Fail	Pass	Fail	Pass
Math	Comparison	34.2 %	65.8%	32.8%	67.2%
	IMPACT IV	41.1%	58.9%	39.6%	60.4%
Reading	Comparison	50.8%	49.2%	49.2%	50.8%
	IMPACT IV	53.7%	46.3%	51.0%	49.0%

The percentage of students exceeding standards on the EOG (by achieving Level 4) changed by only a fraction of a percent from 2008 to 2009 for both groups. The percentage of students exceeding and not exceeding standards on the Math and Reading EOG can be found in Table 24.

Table 24. *Percentage of students exceeding standards on the EOG test, 2008-2009*

		2008		2009	
		Does not Exceed	Exceeds (Level 4)	Does not Exceed	Exceeds (Level 4)
Math	Comparison	81.7%	18.3%	81.4%	18.6%
	IMPACT IV	85.7%	14.3%	85.4%	14.6%
Reading	Comparison	87.6%	12.4%	87.0%	13.0%
	IMPACT IV	88.7%	11.3%	88.3%	11.7%

The non-normal distribution of data and differences in variance prevented the use of ANOVA to analyze the significance of changes in scale score among both comparison and project schools. Instead, binary logistic regression was used to determine whether enrollment in a project school, as opposed to a comparison school, resulted in a greater likelihood of students passing the EOG test in both Reading and Math. IMPACT IV and comparison schools were analyzed separately to determine growth in passing rates from Year 1 to Year 2. The outcome variable was dichotomous – pass (Level 3 or 4) or fail (Level 1 or 2). Further analyses were conducted to determine whether enrollment in a project school resulted in greater likelihood of exceeding standards on the EOG. This outcome variable was also dichotomous – Exceeds (Level 4) or Not exceeds (Levels 1, 2, or 3). These analyses were performed with the sample population as a whole, and also with the subgroup of students identified as Economically Disadvantaged (ED). Additionally, the relative risk was calculated to adjust the magnitude of the effect size and to make the results more interpretable. (Osborne, 2006) The relative risk, or the risk ratio, is the ratio of the probably of an event occurring in the group of interest compared to the probability of the event occurring in a control group.

The odds of passing the Math EOG test did not change significantly from 2008 to 2009 for either IMPACT IV schools or their matched comparison schools. However, in Reading, students at IMPACT IV schools were significantly more likely to pass in 2009. This same pattern was not observed in comparison schools. Specifically, IMPACT IV students were 7% more likely to pass Reading in 2009 than they were in 2008. The odds ratios, relative risks, and p-values for both groups can be found in Table 25.

Table 25. *Odds of passing the EOG test in 2008 and 2009 for IMPACT IV & comparison schools*

		Odds Ratio	Relative Risk	p-value
	Comparison	1.054	1.02	.261
Math	IMPACT IV	1.074	1.03	.105
	Comparison	1.058	1.03	.204
Reading	IMPACT IV	1.133	1.07	.004

The odds of scoring a Level 4 on either the Math or Reading EOG test did not change significantly from 2008 to 2009 for either IMPACT IV or comparison schools. Basically, students in both groups were equally likely to score at Level 4 in 2008 and 2009. The odds ratios, relative risks, and p-values for both groups can be found in Table 26.

Table 26. *Odds of scoring Level 4 in 2008 and 2009 for IMPACT IV and comparison schools*

		Odds Ratio	Relative Risk	p-value
	Comparison	1.063	1.05	.290
Math	IMPACT IV	1.061	1.05	.341
	Comparison	.941	0.95	.355
Reading	IMPACT IV	.950	0.96	.439

Findings suggest that, to date, the IMPACT IV model seems to have had a more noticeable impact on Economically Disadvantaged (ED) students. Specifically, the odds of an ED student at an IMPACT IV school passing the Math EOG increased significantly from Year 1 to Year 2 ($p = .007$). In fact, IMPACT IV students were 10% more likely to pass Math in 2009. The odds increased slightly for comparison students, though the increase was not significant. The same pattern was observed in the passing rates on the Reading EOG for IMPACT IV schools ($OR = 1.192$, $p = .002$). Specifically, ED students in IMPACT IV schools were 9% more likely to pass the Reading EOG in 2009 than they were in 2008, but the odds of passing Reading did not increase significantly for ED students in comparison schools. The odds ratios, relative risks, and p-values for both groups can be found below.

Table 27. *Odds of ED students passing the EOG test at IMPACT IV and comparison schools*

		Odds Ratio	Relative Risk	p-value
	Comparison	1.117	1.07	.053
Math	IMPACT IV	1.156	1.10	.007
	Comparison	1.095	1.04	.111
Reading	IMPACT IV	1.192	1.09	.002

Additional analyses examined whether students at IMPACT IV schools were more likely than their comparison counterparts to increase their status from non-passing to passing. This variable was coded as "1" if a student failed in 2008 and passed in 2009, and was coded as "0" if a student failed both years, passed both years, or decreased from passing in 2008 to failing in 2009. Results showed that both the IMPACT and comparison groups were equally likely to improve their status from non-passing to passing from Year 1 to Year 2, and this was true for

both Reading and Math EOG tests in grades 3-8. In addition, it was important to determine whether students at IMPACT IV were more likely to increase their performance level (1-4) than students at comparison schools. Changes in achievement levels were analyzed from 2008 to 2009. The outcome variable was dichotomous – did students increase their performance level or not? Students at both IMPACT IV and comparison schools were equally likely to increase their performance level on the Reading EOG test from 2008 to 2009 (OR = 1.056, p = .319). However, in math, students at IMPACT IV schools were 11% more likely than comparison students to increase their performance level from 2008 to 2009 (OR = 1.141, p = .022).

High school Algebra I and English I End-of-course tests

All of the high schools included in this evaluation operate within a block schedule, in that, students completed four courses in the Fall, and four different courses in the Spring semester. The EOC data for the 2008/09 school year does not denote the semester in which the student completed the course. For this reason, it is important to note that students who completed the Algebra or English I course in the fall of 2008 may have not had the same benefits of technology integration experienced by students who completed the courses in spring of 2009 since most high schools were still getting equipment purchased and installed, and were training teachers on the functionality of the equipment throughout the fall semester. IMPACT IV schools did not receive their funding until July of 2008. The Algebra I and English I EOC's were selected as indicators because they are administered in courses all students are required to complete prior to graduation, which provides a representative sample of students enrolled in IMPACT IV high schools in 2008 and 2009.

Overall, no significant, positive changes were observed in student performance on either the Algebra I or English I EOC tests in IMPACT IV high schools. The percentage of students passing the Algebra EOC decreased from 2008 to 2009 at both IMPACT IV schools and their comparison schools. The percentage of students passing the English EOC grew by a small amount at both IMPACT IV and comparison schools, but these differences were not significant. The pass rates can be found in Table 28.

Table 28. *Percentage of IMPACT IV and IMPACT IV comparison students passing the EOC test, 2008-2009*

		% passing		% scoring at Level 4	
		2008	**2009**	**2008**	**2009**
Algebra	Comparison	57.4%	53.6%	26%	15.7%
	IMPACT IV	62.9%	55.6%	23%	13.8%
English	Comparison	63.1%	65.8%	20.3%	19.6%
	IMPACT IV	68.9%	70.0%	24.7%	21.6%

The non-normal distribution of data prevented the use of ANOVA to analyze the significance of the growth among both comparison and project schools. Binary logistic regression was used to determine whether enrollment in a project school, as opposed to a comparison school, resulted in a greater likelihood of passing the EOC test in both Algebra and English. IMPACT IV schools and comparison schools were analyzed separately to determine growth in passing rates from Year 1 to Year 2. The outcome variable was dichotomous – pass (Level 3 or 4) or fail (Level 1

or 2). Further analyses were conducted to determine whether enrollment in a project school resulted in greater likelihood of exceeding standards on the EOC. This outcome variable was also dichotomous – Exceeds (Level 4) or Not exceeds (Levels 1, 2, or 3). These analyses were performed with the sample population as a whole, and also with the subgroup of students identified as Economically Disadvantaged (ED).

Analysis of passing rates on the English EOC tests determined that students in both groups were equally likely to pass the English EOC in both years. However, the odds of a student at an IMPACT IV high school passing the Algebra EOC test decreased significantly from Year 1 to Year 2 ($p = .002$). In their respective comparison schools, students were equally likely to pass Algebra in both years (p=.172).

The percentage of students achieving Level 4 on the Algebra test dropped at both IMPACT and comparison schools from Year 1 to Year 2. Analysis of the rates of exceeding standards on the Algebra EOC test determined that students at both IMPACT IV and comparison schools were significantly less likely to score at Level 4 on the Algebra EOC in 2009 than in 2008 (p=.000). In 2008 and 2009, students in both IMPACT4 and comparison schools were equally likely to score at Level 4 on the English EOC in both years. Although both IMPACT and comparison schools saw slight increases in the passing rates of Econ. Disadvantaged students from Year 1 to Year 2, analysis of the data determined that these changes were not statistically significant for either the Algebra or the English EOC test for IMPACT or comparison schools.

Student attendance and discipline

Another measure being monitored as part of the IMPACT evaluation is student attendance rates. Student attendance data for the 2008-09 school year is not yet available for analysis, and will be included in a subsequent addendum to this report. However, attendance data for the 2006-07 and 2007-08 school years, which will serve as a baseline measure, is included in Appendix L.

Based on the feedback from teachers and administrators at IMPACT schools, the utilization of technology in the classroom may reduce the need for disciplinary action in the classroom. Some focus groups explained that discipline has become less of an issue since implementing the IMPACT model because students do not want to lose their access to the technology. To that end, the suspension rate at each IMPACT III and IV school is being monitored. Suspension data is not yet available for the 2008-09 school year. The short-term suspension rates for the 2006-07 and 2007-08 school years (baseline data) are included in Appendix M.

VI. Discussion

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. Overall, the two IMPACT cohorts presented here exhibit many similarities in terms of their staff perceptions of implementation, and are experiencing common challenges with various aspects of the IMPACT Model. The district and school administrators' feelings toward IMPACT are generally positive, with an eagerness to continue implementation in future years. At the same time, schools at different levels seemed to experience different challenges. These two cohorts were the first to

implement IMPACT district-wide, and the first cohorts to include high schools. One aspect of the IMPACT Model that was particularly challenging for high schools was the implementation of frequent, structured collaboration. This was difficult not only because scheduling during planning times was problematic, but also because there seemed to be more resistance from high school teachers with collaborating across subject areas. It was sometimes rare for teachers of the same subject to have common planning times, so high school teachers and administrators were tasked with developing a way for teachers of different subjects to share their knowledge and experiences with each other in a meaningful way.

The aspect of the IMPACT Model most challenging for elementary schools was the requirement that library and technology resources (e.g. computer labs) could not operate on a fixed schedule, but rather, should be available for teachers to use when it fit with their lessons/units. This flexible access required creativity on the part of the school administrators when they were trying to schedule planning periods for each grade level. However, the benefits were realized through increased use of these resources. Implementing flexible scheduling and collaboration was an easier process for most of the middle schools. A majority of the middle schools already operated with a "team" structure, which facilitated the collaborative planning. In addition, most middle schools already had flexible access to their media center and computer labs.

Focus groups reported varying success in terms of the technical professional development that was offered. Suggestions for improving the usefulness of professional development included differentiating technical professional development by the audience's level of skill with technology, as novice users tended to feel lost and advanced users felt bored in some the of sessions. Additionally, groups that had professional development in the summer prior to the beginning of the school year found the timing to be beneficial. Some groups that did not participate in summer professional development opportunities reported feeling as though they were struggling to learn and implement the new technology in a timely manner. Working technical professional development into the schedule prior to the start of the school year appears to help teachers prepare for the infusion of technology before they become overwhelmed with other beginning of the year stressors.

The IMPACT Model appears to have increased teachers' level of skill and comfort with technology. The percentage of teachers who felt confident with or able to teach other specific technological skills increase by 2.9 percentage points among IMPACT III teachers and 9.2 percentage points among IMPACT IV teachers. The administrators at IMPACT III schools were participating in technical professional development at the time that the baseline survey was administered, so it is possible that the baseline scores for the IMPACT III scores are slightly higher than they would have been prior to this professional development.

Overall, student achievement in IMPACT III schools is exhibiting a promising trend toward improvement in Reading and Math, over and above what was observed in comparison schools. Students at IMPACT III middle schools, especially, experienced greater gains in Reading than students at comparison middle schools. It is possible that the IMPACT middle schools experienced more growth due in part to the ease with which they were able to adopt the collaboration and flexible scheduling aspects of the IMPACT Model. Few differences were noted between IMPACT IV schools and their comparisons, but those that were observed favored IMPACT students. Economically disadvantaged students, in particular, experienced significantly more growth at IMPACT IV schools than they did at comparison schools. It should be noted that

the baseline year for IMPACT IV schools is 2008, so these changes observed in Reading and Math scores represent only one year of growth.

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. Since the primary goal of this project is to produce technologically literate students equipped with the knowledge and 21st Century skills necessary to become productive members of their communities, these results should be helpful to practitioners, as well as researchers. Further, improving technology integration in educational settings is of critical importance, and knowledge of how to best evaluate these types of programs may be very useful to many educational evaluators.

This evaluation is expected to continue through the 2010/11 school year, and findings will be expanded throughout the coming year to include changes in college attendance/performance for graduates of IMPACT high schools. Specifically, all high schools in the IMPACT III and IV cohorts have received additional funding to purchase teacher and student laptops in Spring 2010. The K-8 schools in these cohorts have received funding to purchase teacher laptops for everyone, and upgrade existing equipment.

VII. RECOMMENDATIONS

- High school structure does not easily lend itself to the IMPACT model. The biggest obstacle is the scheduling of same-subject collaboration, as well as collaborative planning within a grade level.
- Technology Facilitators and Media Coordinators need more training for their new roles, and teachers need a better understanding of what roles the TF and MC will be playing.
- Technology Facilitators need support (i.e., an assistant) so that their role is instructional, not just "fix-it."
- Strong leadership is crucial, both from the principal and from central office.
- Planning ahead is important; this requires time. Such as, what equipment to order, and when; how to install equipment in time at all schools; when to train teachers
- It may be advisable to implement technology in phases, so that teachers do not become overwhelmed. Rolling out new equipment slowly reduces pressure on the installers, requires less training for staff, and can increase buy-in from staff because they have time to learn one new technology before trying another. Starting with simple equipment (e.g., document cameras) worked well for some schools, because it was simple to use and less likely to have problems, which also helped with teacher buy-in.
- Including stakeholders at all levels (K-12, TF, MC, principal…) in training is effective.
- Coordination among schools in a district is good. When all schools have the same technology, students experience consistency as they move up.
- Schools needed more support from DPI on issues such as clarifying what can be purchased with IMPACT funds and training on how best to implement instructional technology.

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