**Integration Computing Across the Curriculum**

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**Introduction**

The goal of Integrating Computing Across the Curriculum (ICAC), a 60-month multi-method, multi-disciplinary project, is to develop and test a program to increase the number of students in the Science, Technology, Engineering, and Math (STEM) pipeline by providing teachers and students with curriculum training and skills to enhance STEM education in elementary schools. Specifically, ICAC will increase computer proficiency, science and mathematical skills of 4th and 5th grade students and teachers, and inform parents about the opportunities in STEM careers.

**Background**

- Since 1995, concerns about the “digital divides” in technology usage have increased
- Students in poor, urban areas have lower levels of technology usage than those from more affluent areas
- Individuals who lack technological skills will be less likely to fully participate in society
- Students lacking technological skills will also be less likely to take advantage of the academic and future employment opportunities technology can offer

**Context**

- Plan to decrease the digital divide in Birmingham and prepare children for the future
- The City of Birmingham spent $3 million to purchase 15,000 XO laptops, which were distributed to students and schools
- Minimal training on how to use the XO laptops was provided to teachers and staff

**Characteristics of Birmingham City School (BCS) District**

- 97% African American students
- High poverty school district - 82% free/reduced lunch
- 10,437 students in 1st - 5th grades
- 30 elementary schools

**Goals and Specific Aims of Project**

1. Conduct a formative assessment with teachers to determine the optimal intervention to ensure productive subject, principal, teacher, and student participation
2. Implement a structured intervention aimed at teachers, students, and families that will enhance the students’ understanding of STEM fundamentals by incorporating laptops into an inquiry-based educational process
3. Assess the effects of ICAC on student STEM engagement and performance, teacher and student computing confidence and utilization, student interest in technology and STEM careers, and parents’ attitudes toward STEM careers and use of computers

**Methodology**

**Design**

- Multi-phase intervention, scaling up over time
  - Year 1: 2 pilot schools
  - Years 3 – 4: 10 new schools per year
- Activities:
  - Professional development sessions
  - In-class observation and support activities
  - Teacher institutes and student workshops each summer
  - Lesson plan development and dissemination
  - Administrator meetings
  - Yearly showcase event, Scratch Day
  - Teacher, student, and parent surveys to assess ICAC impacts
  - Observation and field notes from professional development activities

**Participants (to date)**

- # Teachers: 250
- # Students: 960

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**Results: Teacher Institutes**

**XO Training, Skill, and Comfort Levels**

![Graph showing results of Teacher Institutes](image)

- 60% of teachers participated in Teacher Institutes
- 70% of teachers were satisfied with the workshop
- 90% of teachers reported being more comfortable using the XO in their classroom.

**Conclusion**

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**Conclusions**

- Selected Successes To Date
  - Over 150 hours of classroom observation, Year 1
  - 52 lesson plans created and revised
  - 29 teachers participated in Teacher Institutes, Summer 2010
  - 36 students participated in summer camps, Summer 2010
  - 743 students surveyed (94% of Year 2 students), Fall 2010
  - Multiple professional development and in-class sessions held
  - Much more positive attitude towards XOs and ICAC in Year 2

**Study Challenges**

- Recruiting students for summer camps, Summer 2010
- Change in Birmingham City School administrators
- Communication with school system
- School scheduling and schedule revisions for professional development and in-class sessions
- Teacher buy-in at one Year 2 school
- Issues with XOs in need of repair
- Future funding for XOs remains unknown

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