

Students develop aptitude for taking advanced math courses through the Project K-Nect Mobile Learning Initiative in Onslow County School System

Prepared by Project Tomorrow® for Digital Millennial Consulting (March 2011)

“...it is a major accomplishment for these students to have grown academically, emotionally and socially to undertake the course load that an AP Class involves.” ~Project K-Nect Teacher

“..It allows students to connect with their classmates... to help them with problems, and it gives them a familiar device to work with... you can pick up the smart phone and IM your teacher and or classmate... or you can look at a video that your former classmate posted to help you understand what you’re doing wrong...” ~ Project K-Nect Student

Background

Project K-Nect, developed by Digital Millennial Consulting and funded in part through Qualcomm’s Wireless Reach initiative, is designed to increase student achievement in math and close the digital access gap for students in Onslow County School System in North Carolina. This report highlights the current findings from August 2010 through January 2011 and serves as a continuation of Project Tomorrow’s program evaluation of Project K-Nect conducted September 2009 through May 2010 (http://www.tomorrow.org/docs/Project_K-Nect_EvaluationReport_Final_Jul7.pdf).

As Project K-Nect entered its third year of implementation in Onslow County School System, the fall 2010 cohort was comprised of 59 students and three teachers from Algebra I, Algebra II and pre-calculus courses at Dixon High School and Southwest High School. The participating teachers have a long-standing relationship with Project K-Nect and an understanding of the value that smart phones and the Project K-Nect tools provide to their students. Project K-Nect continues to serve as a demonstration project highlighting the curricular uses of smart phones to increase student achievement and decrease the digital access gap amongst students.

Students in Onslow County School System are required to complete four credits in math for graduation (Algebra I, Geometry, Algebra II and one other math course). Participating teachers have integrated Project K-Nect and the smart phones into a course sequence comprised of Algebra I (semester), Geometry (semester), Algebra II (semester) and pre-calculus/Advanced Placement Calculus (year). Project K-Nect is included in the pre-calculus/Advanced Placement Calculus class at Southwest High School only. Students typically complete the Project K-Nect course sequence in five semesters and meet both their high school graduation and college admissions requirements. The district measures student proficiency in math through the state-administered end-of-course assessments for Algebra I, Geometry and Algebra II. Students participating in Advanced

Placement Calculus and Advanced Placement Statistics have the option to take Advanced Placement exams upon completion of their course.

Participating Project K-Nect teachers use many of the standard features of the smart phone, as well as algebraic problem sets and a mobile-enabled suite of tools for sharing student work, facilitating collaboration between students and assessing student activity and growth. To help students master math concepts, teachers are encouraged to create problem-based lessons and activities that utilize the features and functionality of the smart phones as well as the Project K-Nect environment. Teachers have the flexibility to select the Project K-Nect components that best meet their instructional needs in the classroom and, as such, students have a variety of experiences and utilize the smart phones and tools to varying degrees. During their participation in the Project K-Nect classes, students are given a smart phone with a data plan that allows for 24/7 access to the internet and Project K-Nect environment enabling them to be online and connected with their teacher and other students anytime in or out of school. This report highlights the power and promise of mobile learning initiatives where students can be connected anywhere, anytime to internet resources, their teacher and classmates.

Findings

Project K-Nect empowers students to be successful in math

As Project K-Nect entered its third year of implementation in Onslow County School System, the first cohort of students completed their AP Calculus course and exam, as well as their SAT exams. As one Project K-Nect teacher noted, **“...it is a major accomplishment for these students to have grown academically, emotionally and socially to undertake the course load that an AP Class involves.”** Participating students continue to report they are more motivated to learn math, more comfortable learning math and more likely to pursue advanced math coursework. Additionally, their increased confidence is translating to demonstrated proficiency on the North Carolina end-of-course assessments for Algebra I and II.

Students report they like using the smart phone to learn because:

“..I find it helpful because students can IM each other to get help with a problem in class...”

“...sometimes it is easier to learn when another student explains it...”

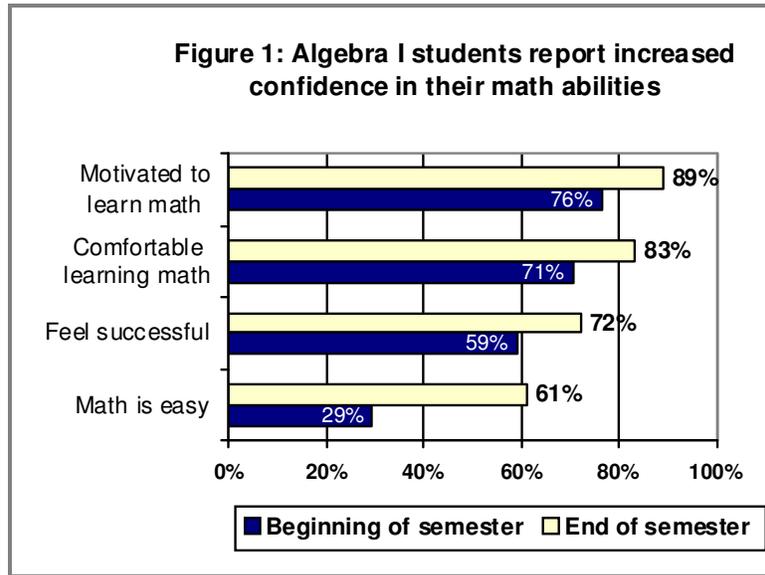
“..it’s easier to get the help you need in order to complete your assignment...”

“I was able to ask other people how they solved a problem when I didn’t have a clue.”

“I found the blogs helpful because you could look at other people’s blogs to see how they solved a problem.”

By the end of the fall 2010 semester, 89 percent of the Algebra I students reported they are more motivated to learn math compared to 76 percent at the beginning of the semester. The majority of students reported they are also more comfortable learning math (83 percent), felt more successful (72 percent) and better prepared

to take the end-of course exam (72 percent). By the end of the semester, the number of students who thought, “math is easy” doubled indicating a greater confidence in their ability to be successful in math (figure 1).



Students report greater confidence in their ability to talk about math

During the course of the semester, the Project K-Nect teachers help students develop their confidence in math first by encouraging the students to ask questions and talk about math and then by encouraging them to help their fellow classmates. As a result of this focused-approach, by the end of the semester, 83 percent of the students reported they could explain how they solved a math problem compared to 72 percent at the beginning of the semester. Furthermore, about three-quarters of the students reported they are comfortable discussing solutions and felt confident talking about math. By the end of the semester students reported an increased level of confidence and were more likely, to work with other students on math problems (89 percent) compared to the beginning of the semester (65 percent)

Students demonstrate proficiency on End of Course Exams

Ninety percent of the Project K-Nect students in Algebra I and 100 percent of the Algebra II students demonstrated proficiency on their end of course exams. Furthermore, in spring 2010, the first cohort of Project K-Nect students achieved another major accomplishment by successfully completing the college level AP Calculus college curriculum and taking the AP exam. This cohort of students “has grown academically, emotionally and socially to undertake the course load that an AP class involves,” shared Mr. Kliever, AP Calculus Teacher.

Students express an increased interest in college and math related degrees and careers.

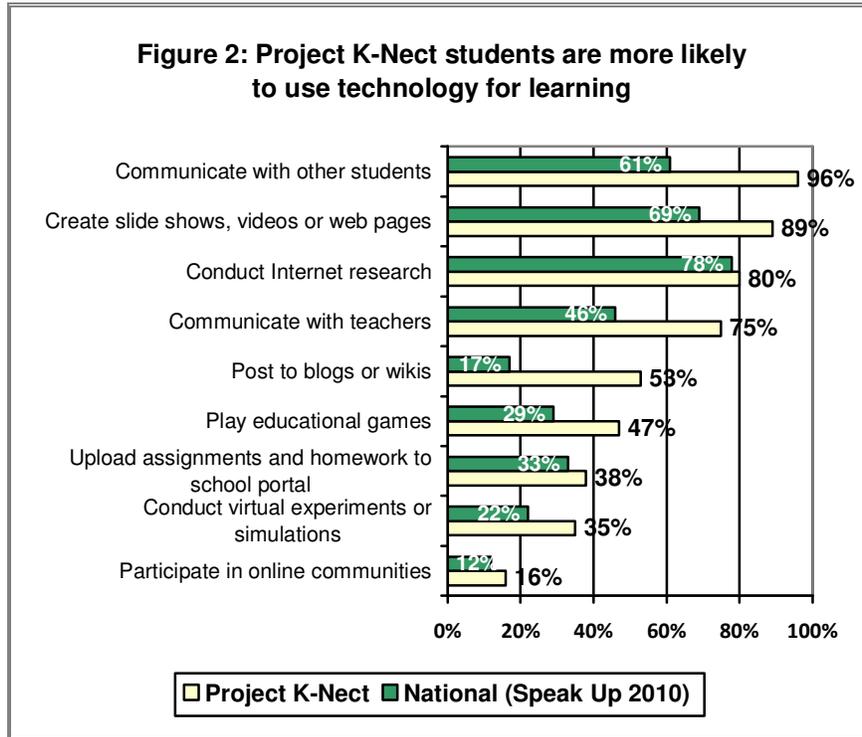
Not only is Project K-Nect achieving its goal of increased student achievement, but it is also inspiring students to continue their studies in math. One-quarter of the Algebra I students expressed an interest in taking

additional math classes, including Advanced Placement courses. Additionally, these same students reported they are more interested in attending college (56 percent) or pursuing a degree or career that would use their math skills (33 percent). The top career picks for Algebra I students included science related fields (including healthcare), engineering/technology or math related fields, entertainment and military, fire or law enforcement.

Project K-Nect helps close the digital access gap and helps students develop their proficiency with technology

Project K-Nect continues to provide a critical link to the internet for many of the participating students. While 100 percent of the Algebra II students report they have fast internet access at home, about 30 percent of the Algebra I students still do not have this same level of access. For these students, Project K-Nect continues to provide a crucial connection to the internet, their teacher and fellow classmates.

Additionally, the Speak Up 2010 survey reveals that Project K-Nect students are more likely than their peers to use technology to support their learning (figure 2). For example, Project K-Nect students are more likely, than high school students nationally, to use communications tools (via email, IM, text or chat) to communicate with students or teachers. They also are more likely to create slide shows, videos or webpages, post to online blogs or wikis, play educational games or conduct virtual experiments or simulations. For many of the Project K-Nect students, the smart phone provides a much needed connection for help and support, first with the teacher, and subsequently with other classmates; as well as access to additional resources to support their learning. This is especially critical for students who have not previously felt successful in math, according to Mrs. Kliewer, Algebra I teacher.



Project K-Nect students' increased use of technology is not limited to school; they are also more likely to use technology outside of school compared to their peers nationally (Speak Up 2010). For example, they are more likely to communicate with others through email, IM or text message, communicate via Web 2.0 tools, such as discussion boards, social networking sites, chat or online communities, upload/download videos, podcasts or photos to the Internet, participate in online games, or write or contribute to a blog. Students increased use of and familiarity with technology through Project K-Nect helps students easily integrate the use of technology to other curricular areas.

Project K-Nect provides valuable lessons for incorporating mobile devices into instruction

For educators who are considering mobile learning initiatives in their own school or district, Project K-Nect teachers and students provide valuable insights for lesson development, instructional strategies and learning activities that are realistic and relevant for students. For example, teachers facilitate collaboration through blogs, instant messaging and email. Students use the digital photo and video capabilities of the smart phone to capture their problem-solving strategies and then post them to the Project K-Nect website for subsequent discussion and review. In Algebra I, students also have the opportunity to use their smart phone to learn key algebraic concepts as they solve unique problem sets from the Project K-Nect library. Instant messaging and instantaneous access to the internet are "must-haves" for many students who use their smart phone as a learning tool. For example, students may look up the definition of a word used in class, search for additional information to support the current lecture, or access online textbooks or other resources while in transit before or after school.

As this report demonstrates, Project K-Nect continues to offer insights into the value of benefits of mobile learning initiatives.

Methodology

This evaluation report represents the views of the 59 students and 3 teachers who participated in the Project K-Nect program between August 2010 and January 2011. For comparison purposes, national data from Speak Up 2010 is also included. The evaluation team collected data through onsite classroom observations, focus groups with students new to the Project K-Nect program (pre and post semester), and surveys (pre and post semester). The focus groups were audio taped for subsequent transcription.

Online pre and post surveys were administered by the participating teachers during class. Thirty five of the thirty-nine Algebra I and Algebra II students participated in the pre-survey (90 percent) and thirty four participated in the post survey (87 percent). The Calculus students who were new to Project K-Nect did not participate in the pre or post surveys. Additionally, fifty-six 9th-12th grade students participated in the Speak Up survey (95 percent of the Project K-Nect students).

Project Tomorrow staff collected and summarized available data from the end-of-course exams for Algebra I, and Algebra II. Student achievement in Pre-Calculus and AP Calculus will be determined based on the AP Calculus exam administered in May 2011.

About Project Tomorrow

Project Tomorrow®, the national education nonprofit organization dedicated to empowering student voices in education discussions, prepared this program evaluation for Digital Millennial Consulting. Project Tomorrow® has 15 years experience in the K-12 education sector and regularly provides consulting and research support to school districts, government agencies, business and higher education about key trends in K-12 science, math and technology education.

Data collected through its Speak Up project is included in this report. Since the project's inception over 2.2 million students, teachers, parents and administrators have shared their views through annual online surveys. The data represents the largest, authentic, unfiltered dataset from educational stakeholders.

About Digital Millennial Consulting and Project K-Nect

Project K-Nect was designed and implemented by Digital Millennial Consulting. The initiative represents a successful reference design for mobile learning in the United States. The initiative delivers managed instructional activities (a comprehensive Algebra I curriculum and resources) and support services to teachers and students via smart phones and wireless Carrier 3G network infrastructure.

Implemented in several North Carolina school systems Project K-Nect has yielded significant academic gains for student participants and has had a 'transformative' impact on teachers involved in the program. For more information, please visit www.projectknect.org

About Qualcomm Wireless Reach

Qualcomm believes access to advanced wireless voice and data services improves people's lives. Qualcomm's Wireless Reach initiative supports programs and solutions that bring the benefits of connectivity to underserved communities globally. By working with partners, Wireless Reach projects create new ways for people to communicate, learn, access health care, sustain the environment and reach global markets. For more information, please visit www.qualcomm.com/wirelessreach