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Students leverage the power of mobile devices through the Project K-Nect Mobile Learning Initiative in Onslow County

Prepared by Project Tomorrow® for Digital Millennial Consulting (July 2010)

"The smart phone is like a teacher in my pocket." – Project K-Nect Student

"I can't go back to the way I taught before Project K-Nect." Project K-Nect Teacher

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 disconnect for students in Onslow County Schools in North Carolina. The Project K-Nect pilot started in spring 2008 with a group of high school students in Algebra I represented by three school districts across the State of North Carolina with two schools represented from Onslow County. Since then many of the same students, as well as new students, use the smart phones as they progress through their sequence of courses in Geometry, Algebra II, pre-Calc and AP Calculus.

As part of the Project K-Nect classes, students are given smart phones with 24/7 Internet access which they can use at home or school. Students have full access to both the Project K-Nect curriculum, as well as the smart phone features including instant messaging, video and photo capabilities, calculators and Internet access. This report highlights the results of the program evaluation completed by Project Tomorrow, a national education nonprofit organization, during the 2009-2010 school year on behalf of Digital Millennial Consulting. The report highlights the benefits to both teachers and students of incorporating mobile devices in the classroom and the power these devices have to transform both teaching and learning for our students.

Mobile devices have the power to change the way teachers think about their teaching.

"I can't go back to the way I taught before Project K-Nect." Project K-Nect Teacher

Through interviews, the teachers reveal that mobile devices and the problem-based learning approach encouraged through Project K-Nect transformed the way they taught math. The teachers report they now rely more on **facilitation** and less on direct instruction, encourage **students to talk with and teach each other**, and **create relevance** for students by creating assignments that help them see math in their world outside of the classroom.   Teachers also report that some of the instructional strategies used with the smart phones were **transferable to other devices**. For example, when smart phones were not available in a particular class, the teacher asked students to complete their assignments using standard cell phones and flip cameras. Teachers also reveal that their change in practice occurred over time as they saw the direct impact on their students' participation in class and End of Course assessment results.

The technology coordinators who support the Project K-Nect teachers confirm that students are more engaged in the classroom and participating in more group work. They also observe that teachers use more Internet-based tools to manage their classes and transfer their newfound skills to other devices.

Project K-Nect demonstrates the value that teachers place on the use of mobile devices within instruction. Similarly, teachers across the nation who participated in Speak Up 2009 agree the most significant value of incorporating mobile devices within instruction is increased student engagement in school and learning (56%). Teachers also cite that mobile devices prepare students for the "world of work," improve communications and extend learning beyond the school day.

Mobile devices and 24/7 wireless access empower students to take responsibility for their learning.

The tools, curriculum and instructional strategies available through Project K-Nect empower students to take control of their own learning. For many students, learning before Project K-Nect was one-way and not engaging. Students felt "if you didn't get, you didn't get it" and once lost "there was no chance of catching up."

Students' want to use mobile devices to look up information on the Internet, communicate with classmates, receive alerts about homework and tests and work on projects with classmates (Speak Up 2009). Project K-Nect helps students realize this goal. When Project K-Nect students are stuck on a problem in class or at home, they ask for help and discuss problem-solving strategies with each other using instant messages and photos or videos they have taken. Students leverage their wireless mobile access to look up information on the Internet in class, at home or on the school bus. The smart phone serves as a "teacher in their pocket" as students personalized the use of the device for their specific learning needs.

Almost two-thirds of the students are taking additional math courses and over 50% are now thinking about a career in the math field as a result of participating in Project K-Nect.

For example, during class lectures students look up definitions for words they are struggling with, ask their peers to clarify a point the teacher is making or find their voice by sharing their own expertise or observations about how to solve problems. For these students mobile devices and Internet access empower them to fully participate in their learning in a more engaging, interactive and relevant way.

According to students, the primary strength of the smart phone is the ability to connect with other students or teachers (within their Project K-Nect network) via instant messaging at anytime. Prior to

Project K-Nect and the use of the smart phone, students couldn't gain the same level of collaboration using their own cell phones, because they often did not have access to their classmates' phone number or IM address. Without access to other students or the teacher, students would often "give up" when they ran into a problem or couldn't figure out their homework. With the smart phone, students connect with their network of "experts" to complete the task at hand. Students report that this immediate access makes the difference between completing or not their homework and being prepared for the following day. Through the on-going communication, collaboration and teamwork with their classmates, Project K-Nect students are developing crucial 21st century skills that will serve them well in their future endeavors.

When asked to describe what they have learned about their learning process by using the smart phone, students tell us:

"I've become more patient and gained confidence getting to know other people. It helped me with public speaking. I've learned it's okay to be wrong."

"I've helped people when they had trouble and know they see me as an expert. I thought I only knew the basics but I just picked up more as I help people."

I've learned how to make a presentation – it feels good to know that your classmates depend on you."

"I've learned to be more trusting with others. There is a lot of teamwork in the project – I've learned to trust and be more dependable."

"I learn better when working with peers."

"Be brave enough to ask questions."

Teachers concur that as a result of their new approach to teaching and the use of Internet-connected mobile devices their students are demonstrating a greater responsibility for their learning and developing more collaborative learning skills. Students are more active in their class as both learners and peer tutors. This is especially significant for students who are normally shy or reluctant class participants due to disabilities or limited English proficiency.
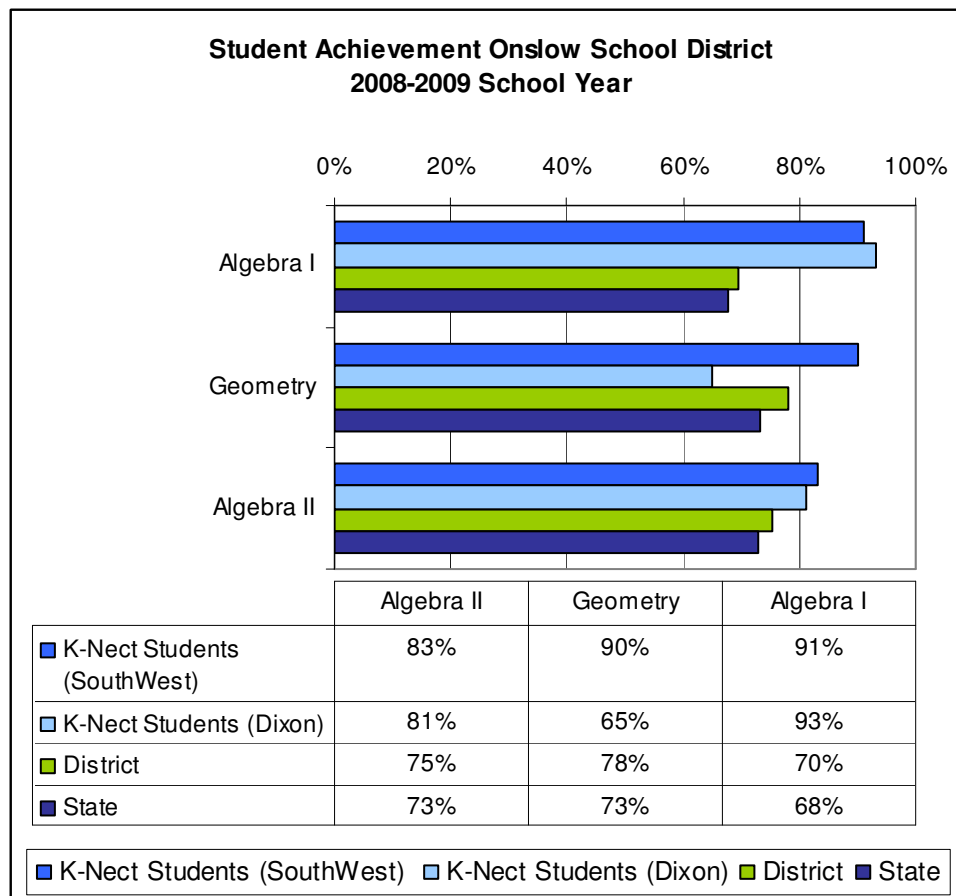
Students feel more successful in math and demonstrate higher levels of math proficiency.

In general, Project K-Nect students feel more successful in math (85 percent). The Project K-Nect tools and environment help students gain confidence in their abilities with math, as they become more comfortable learning math (94 percent), talking about math (82 percent) and explaining their solutions (85 percent). When compared against students who participated in Speak Up nationwide, Project K-Nect students (61 percent) also have a greater self-perception that they are succeeding academically then their peers (39 percent) and believe that they are being better prepared for success (55 percent) than other students (45 percent).

Students are demonstrating that the ability to discuss problem-solving strategies and teach each other math translates into success on their North Carolina End of Course assessments. Project K-Nect

students are more likely to achieve proficiency in Algebra and Algebra II then students in their school, district or state as highlighted in Figure 1: Student Achievement 2008-2009 school year. Overall, a greater number of Project K-Nect students at Southwest High school demonstrated proficiency on the End of Course exams in Algebra (91 percent), Geometry (90 percent) and Algebra II (83 percent). Likewise, at Dixon High School more students in Algebra I (93 percent) and Algebra II (81 percent) achieved proficiency than the district or state. Furthermore, Project K-Nect Geometry students at Dixon High School (65 percent) were more likely to demonstrate proficiency on their End-Course-Assessments then students in a comparable class without smart phones (40 percent). End of Course assessment data and AP Calc results for the school year 2009-2010 will be available later this summer.

Figure 1: Student Achievement 2008-09 School Year

**Student Achievement Onslow School District
2008-2009 School Year**

	Algebra II	Geometry	Algebra I
■ K-Nect Students (SouthWest)	83%	90%	91%
□ K-Nect Students (Dixon)	81%	65%	93%
■ District	75%	78%	70%
■ State	73%	73%	68%

■ K-Nect Students (SouthWest) □ K-Nect Students (Dixon) ■ District ■ State

As students become more engaged in their learning and demonstrate to both themselves and others that they "get" math they are beginning to take more advanced math classes and to think about math-related careers. Project K-Nect students are no longer thinking about "just getting by", but rather, they are seeking out more advanced math classes. Almost two-thirds of the students report taking additional math courses and over one-half are thinking about careers that require math. On an even broader

scale, Speak Up 2009 data reveal that Project K-Nect students (32 percent) are more likely to be very interested in a job or career in science, technology, math or engineering then high school students nationally (19 percent).

Project K-Nect demonstrates that mobile devices can have a meaningful role in education and that the students' success is dependent upon the curriculum and instructional strategies, as well as the students' ability to collaborate and personalize their own learning experience.

Methodology

This evaluation report represents the views of the 78 students and 4 teachers who participated in the Project K-Nect program between August 2009 and Jan 2010. For comparison purposes, national data from Speak Up 2009 is also included. The evaluation team collected data through onsite classroom observations, focus groups with students (pre and post semester), interviews (pre and post semester) with teachers, and interviews with principals and technology coordinators. As appropriate, the evaluation team photographed and videotaped the classroom observations and recorded the focus groups for subsequent transcription.

Students participated in both the Speak Up 2009 survey, as well as a specific project post survey. Survey response rates for the Project K-Nect students varied. Over one-half of the Project K-Nect students participated in the Speak Up 2009 survey, primarily representing Southwest High School. About 75 percent of the students participated in the project specific post survey.

Project Tomorrow collected and summarized available data from the end-of-course exams for Algebra I, Algebra II, and Geometry. End of Course Assessment data for the 2009-2010 school year will be available late summer 2010. The project does not have a post-assessment instrument for Pre-Calculus, nor does the state administer end-of-course assessments for the class. Student achievement in Pre-Calculus and AP Calculus will be determined based on the AP Calculus exam administered in May 2010.

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 over 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.

Each fall, Project Tomorrow facilitates the Speak Up National Research Project to inform federal, state and local policymakers, program developers and funders on the role of emerging technology within K-12 education. Data collected through its Speak Up project is included in this report. Since 2003, over 1.85 million students, teachers, parents and administrators have share their views through annual Speak Up online surveys and the Speak Up dataset represents the largest collection of authentic, unfiltered data from educational stakeholders. For more information, visit http://www.tomorrow.org/

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