

Self-Test

A student evaluates the change in his academic progress after receiving a PDA—and then tests his peers.

Several years ago, upon entering eighth grade, I was given a Microsoft iPaq Pocket PC as a birthday present. After using it for several months, I noticed a distinct improvement in my grades. During the rest of the school year, I noticed that the improved academic achievement continued. I wondered if my experience was a mere fluke or whether personal digital assistants (PDAs) in general—and Pocket PC devices in particular—could improve Millburn High School students' academic achievement. I knew that the only way to confirm or refute this observation was to conduct a controlled scientific experiment that would produce empirical evidence. After four semester-long trials, my preliminary results show that Pocket PCs positively affect academic achievement.

My research attempted to answer three questions: Does the mere possession of the Pocket PC device increase academic achievement? Does Pocket PC usage increase academic achievement? Does software-specific usage of the Pocket PC devices increase academic achievement?

First I obtained necessary approval from Millburn High School. I then

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determined that the number of students currently possessing Pocket PCs was statistically insignificant. A simple random sample determined which students would be offered the 12 Pocket PC devices I acquired through the largesse of the Microsoft Corporation. After all necessary parties signed consent forms, students were given Pocket PCs to use for a semester. Participants were asked to upload usage data several times during the semester and occasionally asked to comment about their Pocket PC experience. At the end of the semester the students returned the Pocket PCs. I received anonymous information about their academic performance from the school administration.

The improvement in achievement was very evident. I looked to make sure there was no significant difference between the random group of students and the rest of the students in their grade level before they received Pocket PCs. Following this, I compared the achievement of each individual student to their previous achievement: relative to previous performance, did they improve during the semester with a Pocket PC? Finally, I examined if there was a relative improvement compared to the rest of the grade level—that is, did the sample group improve more or less than the rest of the class?

Before receiving Pocket PCs, the randomly selected group had similar grades to the rest of the students in their class. Afterwards, their performance increased 11% compared to the entire grade level. When com-

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pared to their previous performance as a group they increased 14%. This meant that a hypothetical Pocket PC user with a GPA of 2.5 (corresponding to a C+) would increase to approximately a 2.75 (or B-) by the end of the semester.

Although my data about the ways in which students were using their devices was based on personal surveys and was far from comprehensive, it was intriguing to hear about and observe the many ways in which the devices were used. Many participants used their devices' organizer capabilities, including Pocket Tasks and Pocket Calendar, to keep track of their assignments and projects in much the same way they would use a student organizer. Some participants took notes using Pocket Word and then e-mailed them to friends who were absent from class. Others entered data from their science labs into Pocket Excel for instant analysis. Only a few of the participants admitted to playing games or listening to music on their devices, although I suspect that the number was higher.

The students as a whole had a positive experience with their Pocket PCs. Many were loathe to return the devices at the end of the semester and wanted to be included in subsequent trials. One student found her device too complicated and returned it after half a semester.

This year I hope to conclude my project by conclusively answering the third question in my work—does specific application usage improve academic achievement? Over the summer I wrote two Pocket PC software applications that will help me answer this question. The first is an improved version of my usage tracking software. The program will record what applications the student used



and the amount of time spent using the application. The data will be submitted over the Internet anonymously to a server where it will be analyzed. The first version of the usage tracking software had issues with data loss because the user would occasion-

ally reset their device between data collections, erasing the data.

The second application is a survey data collection application. When a student synchronizes his device with his computer, the "SurveyClient" program will connect to a server (using a Visual Studio.Net XML Web service) and download a new XML survey. The student can then take the survey when he or she has a free moment and does not have to be connected to the Internet. The next time the student synchronizes his or her device, the student's response to the survey is submitted to the Web service. This allows fast and convenient data collection that is easy to analyze.

In my senior year, I plan to conclude my study by deploying my new custom software and analyzing the data. I also hope to extend my project in size and scope by working with schools that have already distributed Pocket PC devices to their students. I hope to use my custom software to enable both the other schools and me to understand how Pocket PCs are being used in school.



Alex Bick is a 16-year-old junior attending Millburn High School, located in northern New Jersey. He has been helping students and teachers with technology since he joined the Computer Peer Leader program in seventh grade. He is being mentored by Dr. Chris Dede, a professor at Harvard University. Bick will be presenting a Student Showcase of his work at NECC 2005 in Philadelphia, and an online version of his research can be found at <http://www.millburn.org/science/pdal>.