

A Conversation with Kyle Peck On the Future of Education (Technology)

Kyle Peck is Professor of Education and Interim Associate Dean for Outreach, Technology, and International Programs, Pennsylvania State University, College of Education.

Circuit: *One-to-One Computing Initiatives have taken off like wildfire all over the country, despite the economy, and you seem to be fanning the flames.*

KP: I am definitely trying to promote it because I believe in it. I realize the need for more research but I'm trying to put the pieces in place so that it can happen well. We have always operated on the best information and insight we have available and that is how we are proceeding.

Circuit: *Why is one-to-one computing so important?*

KP: It allows us to get away from the group-based approach to education. Up to this point, the best we could do was to have someone who knew something

tell it to a group of people who presumably didn't know it. We were working one-to-many and there's great inefficiency in that. Once we get to one-to-one, we no longer need to be a one-to-many oriented educational system. One-to-one increases the possibility for meeting individual needs and so allows us to realize some decades-old visions of what education should be.

Circuit: *What does a one-to-one initiative do for us that some other technology strategy hasn't done or can't do?*

KP: One-to-one computing makes possible the engagement, the access to resources students wouldn't have otherwise, the empowerment and opportunity to develop the sort of

skills that go way beyond just the technology-related skills that really are what make people successful in life.

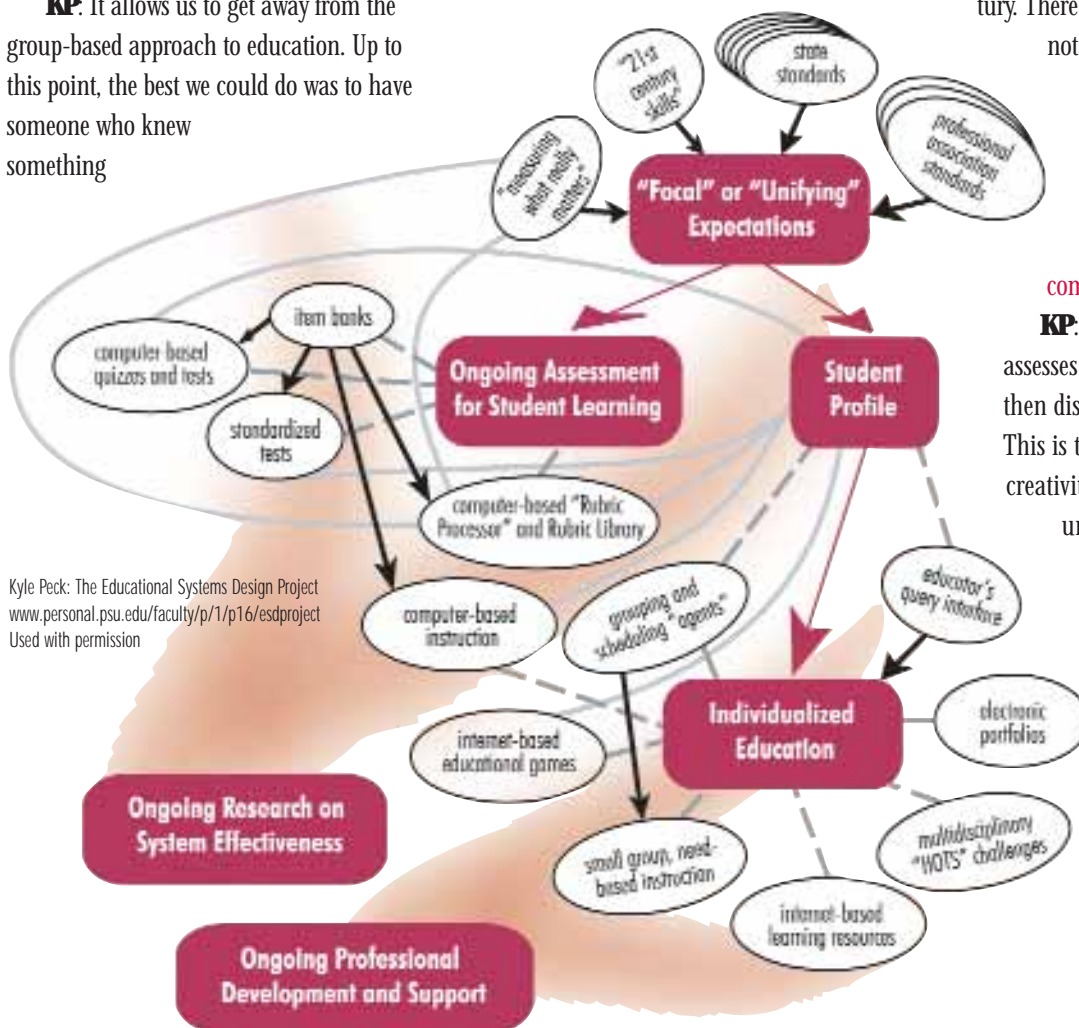
As Maine Governor Angus King said of the benefits when he first announced the state's laptop initiative: "Engagement first, resources second, then technology skills third." He talks about skills that are going to prepare someone for an appropriately competitive life and goes so far as to say, "Our nation's future is going to be determined by the quality of our workforce."

Basically, if people have the ability to evaluate the quality of their own work, and the ability to do good research and create through the attributes of tenacity, stick-to-itiveness, and initiative, they are prepared for the 21st century. There are so many benefits that we are

not measuring. One of the things I want to accomplish is to expand the measures of educational outcomes.

Circuit: *How would you expand the measures of the outcomes of education?*

KP: You are doing this when a child assesses her own work using a rubric and then discusses its quality with the teacher. This is teamwork, problem solving, and creativity that can't necessarily be measured numerically. Rubrics help us to describe and discuss our work in ways that enhance it. I'm a big believer in well-designed rubrics. I remember someone saying to me that one part of genius is apprehending differences in quality that the rest of us don't see. I think that we can help people understand differences in quality.



Kyle Peck: The Educational Systems Design Project
www.personal.psu.edu/faculty/p/1/p16/esdproject
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On the Future *(Continued from page 13)*

You can see what happens when teachers and students start to use those types of measures to assess the quality of work. First, the teachers' expectations go from being vague, ill-defined, and low to being much more precise and higher. And, students ask themselves, "What do I really care about in this essay?" Or for that matter, what does the student care about in any complex data? They become more precise and raise their expectations. Students go from not meeting lower, ill-defined expectations to meeting or exceeding the higher, precisely defined expectations. Everybody wins.

Circuit: What is the role of technology?

KP: Without the technology, you can't really send students off into tasks that they will find interesting and give them the autonomy and the independence that will be required to have them come in every day excited about what they are doing, knowing that everyone is doing something meaningful all the time.

Circuit: Where are we headed in education today?

KP: We are being challenged to do things differently than ever before. We have to creatively recombine our elements and this is what we are seeing in the one-to-one computing initiative. Look at the Educational Systems Design Project site at <http://www.esdproject.org> This rather complicated diagram depicts where I think we are going (see p. 13).

First there are certain focal or unifying expectations like state and professional association standards, 21st-century skills initiatives, and measuring what really matters. We need to identify a subset of all those things we care enough about to track in school to know if kids know and can do what is important.

And then those things ought to be recorded in a student profile, an online record of what students know and can do. Dentists have X-rays that provide a chart of your teeth and they can

track the ongoing developments in your dental health. We need the same kind of data on kids based on those things we care enough about to track.

Of course, to maintain a student's profile we need an ongoing assessment of what the student knows and can do. You can't just use a standardized test once a year. All the tools, activities, and resources that students interact with—which include teachers, rubrics, tests, quizzes, and educational games—all those sources must be writing data into the student profile. And, some of these tools, activities, and resources must be operating based on data extracted from the student profile. All the levels attained in computerized games, for example, when a student sits down to play the mountain climbing game, could go into the profile and determine that the student had not yet mastered long division. It would give some simple division problems. There would be an interaction among elements. There would be new elements added to the chart and they would all interact. This is the main change that I see coming.

Circuit: How would this play out in the teaching and learning environment?

KP: The result is individualized education. I think a typical day will be spent engaged in multidisciplinary "higher order thinking skills" challenges that are designed to challenge the student, like the Ocean Module. Modules that give the student things to do that involve the use of multimedia, online research skills, and creative writing through the creation of multimedia presentations. This is not what kids have traditionally done.

So basically, most of the student energies are spent in this multidisciplinary pursuit of using cool tools and creating things of value outside the classroom. And of course, they'd have electronic portfolios. We'd give students many Internet-based learning resources like

online databases and educational games and ClipArt files to work with.

Then we would provide small-group instruction tailored to address specific needs, called out of this rolling multidisciplinary work that they are doing. The teacher would know that there are seven kids who know how to add, subtract, and multiply but who don't know how to divide. This would come directly out of the students' electronic profile. There would be "Grouping and Scheduling Agent" software that ties into the electronic portfolio that would inform teachers when the students are ready to learn division.

In making the scheduling decision, the teacher would determine which of the students work well in small-group instruction and work with them together. Some of the other students might do better with computer-based instruction that the teacher would find for them and they would learn division that way. The software would set an appointment for the small group with the best division teacher, at a time when all are available to work together for 20 minutes. Our calendaring programs would set up these meetings.

So kids would come into school at the beginning of the day all ready to work on a big project with four other kids. Then at 10 a.m., perhaps, one would drop out to work on skill lessons as needed while the other kids continue what they are doing. This is really what our adult workday is like. We have big projects that we are working on but our days are punctuated by meetings where we have to work together with others to accomplish common goals. For students there would be opportunities to work with others to accomplish big projects that are all about higher order skills and that are assessed using those rubrics. They wouldn't be working on rubrics for qualities that don't exist because they would have to define creativity and problem solving. They

would work collaboratively on real problems that exist and also have time to work alone on specific, individual tasks.

In our schools today, because of the focus on basic skills, we are pushing kids into an isolated, out-of-context kind of drill that is taking the joy out of school. We need to do the opposite: most of the day should be spent doing important, multidisciplinary, higher order activities. Then we pull them out for something they are ready for but haven't yet mastered in a short burst. Here again the software would touch things up and they would return to the classroom when they finished. The bulk of the school day would not be them sitting through what they already know or be expected to do something they couldn't possibly accomplish. The efficiency we gain from providing small-group, need-based instruction within the context of multidisciplinary work

would open up all kinds of time to do important, higher order activities.

Circuit: *How long before we realize what we know needs to be done?*

KP: I think this is all going to happen within 20 years. I think we are going to make it happen. It seems like the U.S. is headed toward an economic struggle over the next decade. With the outsourcing of work previously done by American workers and the improvement in the quality of other nations' education to the point that they can compete with us in a lot of different ways, I think we are beginning to see an impetus to devote more resources to education. People who are well-educated for the 21st century will be flexible and pliable in their thinking and skill sets. Once we change the course of education, our pertinence to the world will change, too. ■

Kyle Peck, Ph.D., is a professor of education at Pennsylvania State University in State College, PA. He is a member of the board of directors of the International Society for Technology in Education (ISTE) and the organizer of the official One-to-One Computing Conference at Penn State in April 2005. Contact Dr. Peck at kpeck@psu.edu or 814-865-2525. For more information about Dr. Peck visit www.personal.psu.edu/faculty/p/1/p16/

For more information about the One to One Computer Conference visit <http://1to1.ed.psu.edu/conference05.htm>

Project Inkwell Initiative: A Possible Future of Technology in Education

Based on the supposition that technology is a catalyst for positive change and innovation in K–12 classrooms, the Project Inkwell Initiative intends to accelerate the deployment of appropriate technologies onto K–12 desktops worldwide by establishing standards for computing platforms in PK–12 education.

Member companies, including Intel, Microsoft, Red Hat, SanDisk, CSG Systems, Alpha Smart, and SMART Technologies, are collaborating to expand the size and effectiveness of the education technology market by driving industry consensus around minimum technology standards requisite to unite, and accelerate, the K–12 demand for technology.

Underlying the focus and direction of this initiative are some basic assumptions about the

value of technology to K–12 education, such as:

- Technology engages students in the learning process, which promotes academic success and the lifelong skills needed for prosperity in an information-rich society.
- Technology accommodates classroom diversity, enabling teachers to manage and synthesize myriad instructional strategies to provide student-centered, one-to-one instruction.
- Technology strategies such as one-to-one teaching and learning environments yield improved student performance and test scores, reductions in student disciplinary problems, improved student/teacher attendance and teacher retention.

The initial “work product” anticipated from Project Inkwell is a functional specifica-

tion for a one-to-one-centered hardware platform with the relevant utility, uniformity, and upgradeability that will enable the very best technology-based education for all students. In a one-to-one computing initiative, every learner and teacher has always-on, real-time access to personal learning technology like a wireless enabled laptop or hand-held device.

Launched in November 2004, functional and technical specifications for one-to-one computing in August 2005, prototypes in May 2006, and commercial products in November 2006. For information about membership or operations, contact Bruce Wilcox, Project Inkwell CEO at bwilcox@projectinkwell.com or visit <http://www.projectinkwell.com>