Personalized Learning: The teacher-student connection in the age of technology

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It's a pleasure to come to London to see and be dazzled by the new learning technology on exhibit here at BETT. I came here to speak passionately in favor of personalized learning, which we at the Gates Foundation believe is the future of education. I've come especially to emphasize the pivotal role of teachers -- and the power of the teacher's expertise in designing technology that can start a revolution in student achievement.

Let me open, if I may, by telling you about my first experience with personalized learning, which came long before I knew there was a name for it. I grew up in Falls of Rough, Kentucky – a poor rural area in the eastern United States. I guess I could characterize the culture there in part by telling you that when I was 18 years old, my stepfather said to me: "If you go to college, your values are not our values." When I defied him and went to college anyway -- to Western Kentucky University 50 miles away -- my mother was afraid she would never see me again, and my stepfather was afraid he would.

My earliest childhood interest – more than running through the fields or swimming in the creek – was teaching school. I never wanted to play house; I always wanted to teach. It started when I got a little chalkboard. I still have a photo my mom took longer ago than I want you to know: I was wearing fuzzy pajamas with feet – and I had gathered every doll and every bear I owned, lined them up in front of the chalkboard, and I was teaching them.

Some dolls were big and some were small; some bears were brown, some black and some white. Some were smarter than average. That's where I learned how to demonstrate respect for diversity … and teach across a range of ability levels.

I had a calling to teach, and my first job after college was teaching special education. I worked with kids who were a few grade levels behind academically and behaviorally. That's where I came to see what the research shows and what we all know from personal experience: The heart of learning is the magic between teachers and students. That is the centerpiece of what happens in schools: a teacher-student bond that triggers a kid's desire to learn and guides it in the right direction.

I saw the power of that connection when I taught a 14-year old student named John Rains. John was a quiet kid, painfully shy. He had struggled in elementary school. When I got him, I just loved this kid. I could just feel there was a trigger in him, and that if I could find it and switch it on, he would just be fantastic.

But after six months of searching, I still couldn't find that switch. So I decided I'd go visit him at home. He happened not to be there – which turned out to be a good thing, because his mom took the opportunity to show me what made her boy special. This kid had figured out, in the tiny space where he slept, how to suspend his bed from the ceiling. He'd built drawers and storage spaces underneath it. He'd added all these clever shelves to the walls – all by himself.

I knew right then that we had to let this kid get his hands on stuff, so I got the principal to let me put him in this vocational program early, way ahead of what we'd normally do. So John took a set of welding classes. He ended up winning the Kentucky state championship in welding – if you ever knew there was such a thing. He got totally turned on and he wanted to know more about mathematics, more about

physics. We tied everything to his interests, and he kept learning as fast as he could to get better at what he loved. As he succeeded in class, he came out of his shell. He was the talk of the school. There was no sign of the guy who first came to me as shy. I trace some of my most powerful lessons as a teacher to this experience I had with John.

Years later, I learned that what he and I did together is called personalized learning – the teacher works with a student to figure out what lights him up – and then lets that motivate him, with the teacher activating and guiding that interest, but the student playing the lead role.

The breakthrough idea in personalized learning is the striking shift in the teacher-student team. In traditional learning, the teacher is the leader and the student is a mostly passive recipient. In personalized learning, the student is the leader, and the teacher is the activator and the advisor.

When the student is in charge of his own learning, a student's interest becomes the energy that *drives* the learning. Interest is energy. If schools are not using interest as energy, they're using less efficient fuels and kids will not get as far. The fear of failure, the threats of parents, the desire to please, the hope for success – none of these forces motivate students as powerfully as their own personal interest in learning something they like.

One teacher told me last month that a principal visited her classroom, saw a student he knew, and asked the teacher: "How did you get him to do any work? He's always in my office in trouble." The teacher said: "It was easy. I asked him what he was interested in, and how I could help him learn it."

Another teacher said: "We teachers want power and control. We want to say: "This is my classroom. You're going to do it my way." But once I realized that I could let go of some of that control, and I saw how much more engaged my students became, I said: "Okay. I get it. I no longer have to teach the causes of the Civil War from my 40-slide PowerPoint that I prepared when I was in graduate school with the milk of my thesis dripping from my lips."

When students get a taste of the excitement that comes from directing their own learning, they're much more engaged, and they never want to go back to the old way. One teacher says: "If I ever slip back into trying to teach 30 students the same thing at the same time, they get mad at me. They're like, "Why? I don't need this right now. This is not what's best for me. I know what I need."

A movement to personalized learning can be like moving from the horse to the car – it can give us a stunning jump in performance. But to meet its promise, there is one thing we absolutely must understand: the right relationship between teachers and technology.

I want to make one point very clear: In personalized learning, the teacher-student bond doesn't matter less; it matters more.

One student in a California school told us: "Ever since we started the new system, my relationship with my teachers has been so much closer. Before I would go to class and receive instructions from the teachers. I wouldn't have much of a relationship with them. Now I am in charge of my own learning so I don't wait for them to give me instructions. I have most of my teachers' emails. I have most of their phone numbers. I text them if I need their help."

Personalized learning creates deeper teacher-student bonds because the teacher has to know the student to customize a program and offer advice. This kind of relationship isn't possible in a traditional system when everyone studies the same thing from the same book at the same pace. When each

student's path is different, conversations between teachers and students *have* to be different. They *have* to be personalized. That creates a relationship that is based on the student's skills, goals, interests, and progress – a relationship that is unique to that student, cannot be copied, and is motivating, nurturing, supportive and significant in the life of that child.

Technology can bring students and teachers closer together – but only when it's used wisely – only when we observe this cardinal rule of the relationship between teachers and technology: First, teachers improve technology, then technology improves teaching. When teachers get a chance to help design the technology it makes their teaching better.

That's what leads one teacher to say: "I feel like I have such a deeper relationship with my students than I ever did before because I know so much more about how they're doing, what they're doing well, what they're struggling with."

Another teacher said: "I know what they're working on. And I'm able to keep them accountable and celebrate their success quickly because I have that constant feedback on how they're doing."

Of course, technology improves teaching in ways beyond tracking the students' work and measuring their progress.

Technology can make it easier for students to find their interests. It can bring in immersive experience that a traditional classroom can't deliver. It can connect students to technical expertise that a teacher may not have. Technology is not just a way for kids to *pursue* their interests; it is way for them to *discover* their interests.

Technology absolutely can transform teaching and learning in ways that shatter old beliefs about what students can accomplish in school.

But if we're going to make the most of what technology can do, we have to understand what technology cannot do.

Technology alone cannot form a bond with students, find their interests, guide their projects, design their classrooms, or figure out what's going on when students are not thriving.

Technology alone cannot teach students to listen, to persuade, to argue, to plan, to inspire, to charm. It can't teach kids to show empathy, defuse anger, read emotions, form coalitions, bargain, negotiate, persuade, collaborate, or deal with sharp disagreements. Technology by itself cannot teach students these skills – and if it takes students away from people, technology can keep students from *learning* them.

These skills are learned in relationship – teachers working with students, students working with each other, teachers and students working together with outside experts. If too much instruction is left to technology, students will not learn these skills, and these skills are part of every great success in society.

Technology can be a miracle accelerator of gains in education as long as it's understood that technology must not be elevated above its purpose – which is to improve teaching and learning.

It might surprise some people to hear the Gates Foundation issue a caution against over-reliance on technology, but it *shouldn't* be a surprise. Last June, Bill and Melinda Gates gave the commencement address at Stanford University. In the talk, Bill told a story of one of his first philanthropic gifts in Africa, which he said became, "an early lesson in how naïve I was". Microsoft had donated computers to a

community center in Soweto. When Bill arrived at the center to speak, he was stunned by the poverty he saw, and he instantly knew what no one had been willing to tell him: personal computers were not going to help the community meet its most pressing needs. Bill said that his unspoken message at the community center in Soweto was: "We're not focused on the fact that half a million people on this continent are dying every year from malaria. But we're sure as hell going to bring you computers."

In a talk he gave in Silicon Valley in 2006, Bill said: When you're putting technology at the service of humanity, "you don't start with technology; you start with human needs, and then you find out if technology can meet those needs in a cheaper, more efficient, or more expansive way."

So how do we apply that lesson to the classroom? How do we assess the needs and make sure technology is targeted to *meet* those needs?

The most important thing to do … ask the teachers.

When we survey teachers, most are enthusiastic for the future. But they tell us that education technology is not yet living up to its promise of being easy to use, creating big gains, and fitting into their workflow in ways that don't demand more time.

Time is *the* scarce resource in the life of a teacher. Even the most ingenious innovation in education technology will fail if it demands too much time from teachers.

One technology officer working in K-12 schools said: "We found that our teachers were spending a lot of time trying to make sense of the data even before they could make any academic decisions. We tried a couple things on the market hoping we could fix the problem, but we couldn't. The companies basically told us what tools to use based on what was easy for them to scale and integrate."

In one example, a teacher describes using a system that seems oblivious to the needs of the teacher. She says: "There is no teacher log-in to see what the students are seeing. So unless I go sit behind one of my students, I cannot see the lessons or the questions. And, I just get *"This is the score."* I don't even know what their errors were."

This is not an easy problem to fix because the teacher often has no input. He or she can't call the vendor and say: "Here is what we need." In the eyes of the company, the teachers are not the customers because they don't pay the bills – it's the school officials who pay the bills, but they often don't know what the teachers need.

This is a dangerous disconnect. If technology is going to work in schools, designers need to understand the problems the teachers are trying to solve."

The need for ed tech companies to listen to teachers is a bigger issue than it might seem. Harvard researcher Richard Elmore has written that educational reform movements in the past have failed because they over-emphasized "plans, processes, curricula, and materials" and they under-emphasized "what might cause a teacher to teach in new ways."

In other words, Elmore argues that the movements failed because nobody talked to the teachers. The reformers didn't include teachers. They didn't consult with them. They didn't ask them: 'how can we invent tools to help you help your students?' Instead, the new initiatives were designed without teacher input, so they didn't spread – and after the early adopters burned out, the movements died. This happens all the time.

An analysis of the move to computers in education makes a similar critique. In his book "Oversold and Underused," Larry Cuban argues that reformers rushed to computerize schools without attention to classroom conditions, without a clear understanding of how computers would change and improve instruction, and without respect for expertise teachers bring to the task.

Many countries represented here have seen some form of the same story -- school officials buy technology without talking to teachers and with no plan for how it will help students learn and teachers teach.

All these stories led to failure, and all the failures came from the same flaw: People saw technology as a *goal* instead of a *tool*.

This is why our Foundation invests heavily in technology-enabled tools *while also insisting on teacher input.* Our funding priorities emphasize personalized learning initiatives that bring in teachers as designers – and allow them to customize the way the programs are used in the classroom.

Let me offer an example. We have invested in a non-profit called Educurious to help show what emerging technology and personalized learning can do together to help teachers design engaging projects for students.

One of the projects took place in Southern Illinois, in the Midwestern United States. The environmentally-aware city manager in the town of Danville built a green LEED-certified parking lot, and – because he would be building more parking lots in the coming years – he wanted to analyze the value of his investment. So the local high school biology teacher who works with Educurious, a man by the name of Doug Mathias, decided to partner with the city manager to have his students evaluate the investment.

Educurious connected the biology teacher to the foremost authority on green LEED-certified parking lots – an environmental engineer employed at a university in Texas. The Texas engineer and the Illinois teacher decided that the students should compare the runoff from three different parking lots in the town: the green LEED-certified parking lot, an ordinary paved parking lot, and a gravel parking lot.

Doug then reached out to biology teachers in the national network formed by Educurious. Using the power of community made possible by technology, they worked together to complete the design of the parking lot study. The students then began to collect water from the three different parking lots and analyze the data.

Educurious then connected the students to environmental scientists of two corporations who reviewed their draft lab reports and gave them feedback on their data analysis. The students presented their findings to the Board of Education, the city manager, and the city council.

The students started off their presentation with a photograph of three jugs of water, each capturing runoff from one of the parking lots. They asked the city council members, "Which of these are you willing to drink? Which are you *going* to drink?" In that meeting, the council voted to change city policy. So now, no parking lot will be built in Danville that's not green LEED-certified.

That was only one of the results of this project. Here are others:

- The students learned about environmental science and biology.
- Some students now want to be environmental scientists.

- The students became part of a network of experts.
- Doug went back to the other teachers across the country and said, “Here’s a citizen- science water quality project you can adapt to your town.”
- The local reporter asked the students to test water quality elsewhere in the city … and they found there was too much mercury in the high school swimming pool.
- Finally, Doug, who’s been in the classroom 31 years, decided not to retire, saying: “This is why I got into teaching in the first place.”

The heart of the story is a committed teacher who works with students to define a problem that needs to be solved – a problem that incorporates key elements of the biology curriculum, connects students with a network of professionals, and absolutely cannot be solved without inventive technology. In years past, you could never have a Dow Chemical environmental scientist reviewing the work of students who attend school in a small town. You could never have teachers across the country collaborating on the project. You could never have students using the tools that a real environmental engineer uses. You could never have had the analytics of the learning management system, which lets a teacher know what the kids learned, which concepts they grasped, whether they learned water tables, chemical cycles, filtration, pollutants and all of the things he needs them to know.

I’m telling you a story about a Danville, Illinois high school because it’s a remarkable story and *shouldn’t* be. The fact that the story is rare suggests the pattern that researcher Richard Elmore described -- that reform movements spread to a few fortunate students and schools, but then stall and recede before they reach scale. We need to overcome that history, and the way to overcome it is for companies to engage teachers, find out what they need, and co-design with them unforgettable learning experiences driven by the students’ interests.

Right now, some companies ignore teachers because teachers are not the buyers. So they talk only to school officials and produce something that hasn’t been designed by teachers. Fortunately, the incentives to change this practice are rising.

The history of education publishing -- pre-technology – was dominated by mega companies who assembled textbook packages that they sold to states and schools. They competed for big contracts. But at no point did they have to validate that their product was good. They never had to prove that they helped kids learn.

Those days are ending. In our new world, we're going to have data on whether educational products improve student performance. And if companies are not listening to teachers, not asking about their needs, not thinking about student outcomes, those companies will fail.

As you can see from the exhibits here at BETT, there are a lot of new products competing in the marketplace – many of them brilliant. So if you want people to *choose* your product, *use* your product, or *pay* for your product, you have to prove the *value* of your product in the performance of students.

I hope that the leading companies here spend more time listening to teachers, trusting teachers, and seeking designers among teachers. I hope that teachers say to school officials: “Don’t talk to the vendors without having them talk to us.” I hope *vendors* say to school officials, “We can’t talk to you without also talking to teachers.” Greater collaboration will make a striking difference in the value of education technology.

We need education technology – education technology that lets teachers know what students are

working on, how they're doing, what they should do next. This allows more quality one-on-one time, and builds the teacher-student bond.

We need education technology that is evidence-based so teachers know what approaches are working well -- and what approaches are not. If teachers and students are going to be evaluated, the technology should be evaluated as well.

We need education technology that is bold – that does not just seek minor improvements with marginal adjustments. It should build on a child's hunger to discover – and shatter the limits that slow down learning.

Education technology is indispensable to personalized learning. And the argument for personalized learning is simple: It's how human beings were born to learn.

Consider everything that students learn in school -- from geometry, to the periodic table, to great literature. Where did that knowledge come from? It came from people finding something they loved and exploring it with all their hearts. That model is responsible for everything our great thinkers have learned. So why don't we use that model to help our students learn as well?

The opportunities are astounding, but they can't be seized without collaboration between teachers and technology innovators. Teacher input is one value we always insist on when we make our investments. So let me close with this input from a teacher: (quote): "Personalized learning is going to make a huge difference for my students. But if the kids are going to get every advantage they can from it, then teachers have to be designing and testing and perfecting it. We have the knowledge. We have the passion. We're the ones who are there with the kids. So we need to be at the drawing board."

She's right. Teachers are the experts on what works in the classroom. They need to stand at the center of the new designs. So I ask the technology innovators here today: As you imagine the breakthrough that will trigger the next advances in our schools, talk to the people who can make it come alive for the students. Talk to the teachers. Thank you.