CALLING ALL INNOVATORS

Five essential practices to give students the skills they need to change the world | *Tony Wagner*

In their recent book *That Used to Be Us*, Thomas Friedman and Michael Mandelbaum argue that to succeed in the new global knowledge economy, all young people must learn to be innovators. U.S. workers who cannot bring innovation will see their jobs increasingly off-shored or automated. Policymakers, economists, and business people fiercely debate which specific approaches will solve the current worldwide economic crisis, but most of them agree on this: A nation's long-term economic health depends on innovation.

In the last few years, I have explored the question of how U.S. schools can educate young people to become innovators. I've interviewed scores of highly innovative 20-somethings and studied the parental, educational, and mentoring influences that they told me were most important in their development.

I found that many young Americans in this millennial generation have a strong desire to do meaningful work and make a difference in the world. But I also discovered that even the most prestigious high school and college students have most often become innovators in spite of their schooling, not because of it. The reality is that the overwhelming majority of U.S. high schools and colleges are not preparing students to become innovators.

Education for Innovation: Five Essentials

Despite this generally bleak picture, some extraordinary high schools, colleges, and graduate schools are doing an outstanding job of educating young people to be innovators — places like High Tech High in San Diego, California; more than 80 New Tech high schools in 16 states; Olin College in Needham, Massachusetts; the Institute of Design at Stanford University; and the Media Lab at the Massachusetts Institute of Technology. The culture of learning in these highly successful and popular programs is radically at odds with the culture of schooling in most classrooms. Here are five essential differences.

1 Collaboration Versus Individual Achievement. Conventional schooling in the United States celebrates and rewards individual achievement while offering few meaningful opportunities for genuine collaboration. Students are ranked and sorted according to their levels of achievement as measured by tests and grades. Serious and sustained collaboration is not a real expectation, either for students or for faculty.

Not so at the programs mentioned earlier, which understand that collaboration is essential for innovation. Every class requires teamwork and collaboration, and learning to collaborate is one of the most highly valued outcomes. For example, at High Tech High, a 9th grade requirement is for teams of students to develop a new business concept — imagining a new product or service, writing a business and marketing plan, and developing a budget. The teams must then present their plans to a panel of business leaders whom the school invites to assess students' projects.

2 Multidisciplinary Learning Versus Specialization. Expertise and specialization will always have an important role, and learning for its own sake has enormous value. However, innovation requires knowing how to apply an interdisciplinary approach to solve a problem or create something new. Judy Gilbert, the director of talent at Google, told me that learning to solve problems across disciplinary boundaries is one of the most important things that schools can teach students to prepare them to work at companies like Google.

High schools and colleges that create a culture of innovation know this, so most of their courses focus on answering a question or solving a problem using multiple academic disciplines. At Olin College, one-half of the students create their own interdisciplinary majors.

3 Trial and Error Versus Risk Avoidance. The most innovative companies celebrate failure. At IDEO,

a design and consulting firm that is consistently recognized as one of the most innovative companies in the world, the motto is, "Fail early and often." Most high school and college classes penalize failure and thus discourage students from taking intellectual risks. In contrast, schools with a culture of innovation teach students to view trial and error — and failure — as integral to the problem-solving process.

One Olin college student told me, "We don't talk about failure here. We talk about iteration." Students at Olin often become interested in a particular problem and begin working on a possible solution in a class, and then complete some kind of prototype or version 1.0 as a project for the course. They then continue to study the problem and evolve the project in succeeding classes, with feedback from their peers and teachers.

4 Creating Versus Consuming. Students' experiences in most high school and college courses focuses on acquiring knowledge by passively listening to lectures. In contrast, in schools with a culture of innovation, the primary goal is to acquire knowledge and develop skills while solving a problem, creating a product, or generating a new understanding. Students are creators, not mere consumers. They acquire knowledge on an as-needed basis, as a means to an end.

The range of projects I found in the schools mentioned above was stunning. For example, at High Tech High, I interviewed a young woman who had created an elementary curriculum for teaching about the ecology of the San Diego Bay. At Olin, I talked to a team of 10 students who had designed and built a remotely controlled model sailboat for an international competition. These students understand and retain far more of what they learn because they have studied and used the knowledge in an applied context.

5 Intrinsic Versus Extrinsic Motivation. Conventional academic classes rely on extrinsic incentives as motivators for learning. Although many teachers may espouse the value of learning for its own sake, they nevertheless rely heavily on traditional carrots and sticks to ensure that students come to class and learn the material.

Perhaps the most important finding of my research is that young innovators are not primarily motivated by extrinsic incentives. Even those who come from families that have struggled economically are intrinsically motivated. As a consequence, the programs that do the best job of educating young innovators focus on intrinsic motivations for learning through a combination of play, passion, and purpose: playful, discovery-based learning leads young people to find and pursue a passion, which eventually evolves into a deeper sense of purpose.

INNOVATIVE LEARNING IN ACTION

For an example of the kind of innovative, collaboration-based learning described in this article, see "Putting Their Skills to the Test" on page 10 featuring the Ozaukee-Oostburg High School underwater robotics team, which took first place at an international competition this summer.

Creating Innovation-Driven Schools

To motivate today's students and prepare them for a world that will require them to innovate, educators must be far more intentional in designing cultures of innovation that foster the skills that matter most. But we cannot mandate that teachers or school systems develop such cultures. The education environment must inspire and encourage educators to innovate.

Policymakers need to promote the development of more authentic, performance-based forms of assessment, such as digital portfolios that follow students from first grade as a record of their progressive mastery of the skills and dispositions of innovators. Schools need to provide focused professional development that enables teachers to create hands-on, project-based, interdisciplinary courses. Larger school districts and states should establish laboratory schools that can pioneer these new approaches to teaching, curriculum, and assessment. As we create many more transparent models of success, the skeptics will better understand both what is possible and what is necessary for a better future, thus creating more demand for innovation in classrooms.

The education profession has traditionally been risk-averse, and current punitive accountability systems have greatly exacerbated this tendency. Do we have the courage and sense of urgency needed to make a radical break from the old ways and create schools with the cultures of innovation that our students want and our economy needs? Can many more educators become innovators? Can we work together to ensure that all students graduate from high school innovation-ready? ■

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CONVENTION 2013

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Tony Wagner, author and innovation education fellow at the Technology and Entrepreneurship Center at Harvard University, will deliver one of the keynote speeches at the 92nd State Education Convention. His work on topics such as creating innovative learning environments for schools and students has garnered him an international audience. Tony has been referred to by many as a highly motivational and inspirational speaker who effectively engages diverse audiences with a unique lecture/conversation style.

The 92nd State Education Convention will take place January 23-25, 2013, in Milwaukee. Registration opens November 1. Visit wasb.org and click the "Convention" button for the latest information. □