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The Learning Factory

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K-12 classrooms irrelevant to today's environment.

By David Warlick.

There is a commonly told story, usually attributed to Massachusetts Institute of Technology's Seymour Papert. It states that if a doctor from the 1890s were to suddenly be time-warped into a modern twenty-first century hospital, he would not recognize how patients were being healed. The same would be true of office workers, farmers or most other professional or occupational environments. However, if a schoolteacher from the 1890s were to step into many of today's classrooms, he or she could easily pick up where she left off.

This is a bit of an exaggeration, since most classrooms today are equipped with at least one computer, printer and access to the Internet. A growing number of classrooms now feature permanently mounted LCD projectors.

Yet, even in classrooms where each student walks in with a laptop under his or her arm, the model of teaching and learning continues to be largely unchanged. The teacher lectures and the students use their laptops to take notes.

They memorize the answers for the tests which they practice, performing to expectations and according to standards, and they move along the path of formal education.

Our schools and classrooms continue to reflect an industrial model. Our children move along an assembly line, from kindergarten to Grade 12, where we install math, reading, science, and social studies – in compliance with government standards – blueprints that define and sequence what our students should be taught during their years of formal education. At the end of each year, they pass through quality control, where we use precision instruments to measure each student, assuring that they know the same things and think the same way.

Education still reflects the industrial model.

In the industrial environment that gave rise to today's education system, when a majority of students followed schooling to manufacturing jobs, we needed a workforce of people who knew the same things and thought the same way.

But in a time of rapid change and globalization, the value we bring to our endeavors comes not from what we know that is the same as everyone else. Today, value comes from what we know that is different and how we think that is different.

A new model for schooling is desperately needed. But, most of the teachers and principals in today's schools grew up in the twentieth century. According to the Digest of Education Statistics: 2007 (latest data available), 55 percent of public school teachers in the U.S. had at least 10 years of experience. At best, they received their professional education when DOS was still a prevailing computer operating system. A quarter of U.S. teachers had at least 20 years of experience.

These, the most experienced and influential teachers in their schools, learned their profession when personal computers were still a rare and exotic technology for the elite. The same report indicates that school administrators have an average of 21 years in the education field. Although there are

isolated pockets of creative and forward-thinking practices, the prevailing spirit of formal education is to maintain old and comfortable models, rather than innovate.

We now find ourselves facing increased evidence that the education experiences of our children are not preparing them for the challenges of today's and tomorrow's workplaces and lifestyles. In 2008, The Partnership for 21st Century Skills, a coalition of almost 40 corporations, commissioned a survey of employers from across the U.S. to identify the skill sets that entry-level employees need for today's workplace.

Asked to rank the skills in order of importance, they indicated that professionalism, oral and written communications, teamwork and critical thinking now trump reading comprehension. Certainly this does not mean that reading is less important than it was. The opposite is true.

What it indicates is a dramatic shift in the workplace, which now values the employee's ability to self-direct, communicate effectively, collaborate and innovate. Yet, these skills continue to be unvalued in our schools.

At best, we are doing a better job of preparing our children for the 1950s.

Perhaps the greatest barrier to retooling classrooms is the landmark legislation, No Child Left Behind. The law attempted to assure that all children learn basic reading and math skills by requiring states to test all students – and by labeling schools that fail to reach government-defined expectations.

With the greatest and most honorable intentions, the law has demoralized teachers, and de-emphasized and reduced funding for other subject areas – not the least of which are physical education and the creative arts. At best, we are doing a better job of preparing our children for the 1950s.

Three converging conditions have emerged over the past 10 to 20 years, conditions that education, as an institution and its governance have largely ignored. Understanding this convergence is crucial to retooling our classrooms.

Condition #1: A new future

It is difficult to find an aspect of our culture today that hasn't changed dramatically in the past 30, 20, or five years. Advances in information and communication technologies (ICT) have changed how we accomplish our goals. Computers have advanced from great behemoths, locked away in climate-controlled rooms, to the small and lightweight notebook I use to write this article while sitting in a coffee shop. These changes have occurred since the day I entered the classroom as a history teacher more than 30 years ago.

One consequence of personal computing is the sheer volume of information that surrounds us. A 2000 study, by the University of California – Berkeley, found that in one year (2000), the world produced between one and two exabytes of unique information, which is roughly 250 megabytes for every (person) on earth. By comparison, printed documents of all kinds comprised only 0.03 percent of the total.

Just two years later, an update found that the world's production of information increased to five exabytes, with only 0.01 percent of that information being printed. It would require 37,000 Libraries of Congress to hold that much information.

But in 2007, the IDC was commissioned to conduct a similar study. They found that in 2006 161 exabytes of information had been generated. This represents three million times the information in all the books ever written.

The amount of information that constitutes today's environments of work and play are only part of the changing landscape. But it leaves us with a future that we can not clearly describe. For the first time in history, we are educating children who will live and work in a world that is unknown to us.

We have always been able to confidently describe the lifestyles and work settings for which we were preparing our children.

Consequently, mapping the knowledge and skills needed to prosper in that world was not a challenge. That we cannot today clearly describe our students' future has profound implications in terms of what and how they learn.

Inept attempts to create different games and social networks to serve existing educational standards is viewed as "a creepy treehouse."

Condition #2: A new generation of learner

A number of books have been recently written that describe what is often called the Millennial generation. But anyone with children younger than 30 can attest to a dramatically new kind of generation.

They are the "baby-on-board," IM, MySpace generation who carry their conversations in their pockets and play in the virtual fields of The Sims, Halo, and World of Warcraft.

Marc Prensky, in a 2001 paper, called today's students "digital natives," while he characterized their parents and teachers as "digital immigrants." Our children's native information experience is so different and foreign to that of their parents that it seems we grew up in an entirely different era.

Many schools are starting to recognize these distinctions and are attempting to adapt by integrating secure social networks and educational video games into their instruction. But simply replicating our students games and social networks only produces what they call, "a creepy treehouse."

It is more important that we try to identify and understand the unique and fundamental qualities of student experiences and integrate those into our classrooms. Among the qualities of the native information experiences are that they:

- **Provoke communication**

- Social networks and networked video games are played through rich webs of conversation. In the traditional industrial classroom, the learner is quiet, listens and follows instructions.

- **Are fueled by questions**

- The top 10 Web sites on the Internet, according to Alexa Internet, Inc., include Google, Yahoo, Windows Live, Wikipedia and Baidu.com (Chinese language search engine). They surf the Web to answer questions. In their classrooms, however, it is the teacher who asks the questions, and students are expected to be their own Google.

- **Are responsive**

- Video games are built around responsive information experiences. But social networks are about writing – with the full expectation that your ideas will be responded to by peers. In school, students write what they think the teacher expects to read and only for a grade.

- **Demand personal investment**

- Even though video games seem to be about instant gratification, our students are eager to invest hours, days, even weeks into achieving the level or wealth that is their goal. They work, learn and perfect their technique so they can accomplish that goal. In their classrooms, their question is not, "How do I do my best?" Instead, it is "How many pages?" Their technique is about finishing – not achieving.

- **Value safely made mistakes**

- It's one of the defining qualities of most video games, that when you make a mistake, you get to back up and try it again – carrying a new piece of knowledge with you. In classrooms, all answers are graded with little opportunity to go back – with little opportunity to make "good mistakes."

- **Rewarded with audience and attention**

– Social networks are about attracting attention and earning response. In classrooms, the expected best work of our children is seen only by their teacher.

Condition #3: New information environment

The enormous and unprecedented growth of information, discussed already, indicates a new information environment that not only facilitates this kind of unimaginable growth, but also fuels it.

Consider how our information experiences have become social. We no longer merely read the newspaper in our own quiet. Instead, we read it, email a story of interest to our friends, attach our comments, and read and respond to comments left by other readers. In some instances, stories are ranked based on how much attention we are paying as readers.

Because of this new digital and networked information environment, we can do things with information that were impossible only a few years ago. Consider the two tag clouds painting a picture of the Democratic Primary Campaign debates of [Barack Obama](#) ^[1] and [Hillary Clinton](#) ^[2].

Because the information is digital, it can be analyzed, compared, arranged and rearranged in ways that add value to the content, putting a new lens on the information. An information landscape where all information (text, images, sound, video) is digital, makes information a raw material, not just a consumable.

Continuing to treat students as empty vessels to be filled with government-defined curriculum is irrelevant to today's children and their future.

Conclusion

Each of these converging conditions forces us to struggle with important questions.

- How do we teach a generation of networked learners?
- How do we address and leverage a dramatically new information landscape?
- What do our children need to be learning to be ready for an unpredictable future?

The traditional schools and classrooms that most of us attended were fashioned during an industrial era based on an industrial design. Today's schools and classrooms must reflect a different time and a different environment – one not based on in-line repetitive performance of distinct tasks, but on an increasingly global and rapidly changing economy where communication, collaboration and innovation are the fuel for success, both personally and in the market place.

Continuing to treat students as empty vessels to be filled with government defined curriculum is irrelevant to today's children and their future. Although there are certainly critical essentials that all students must learn, schools should respect and empower learners as equal partners in their education. Teachers must become facilitators of learning, creatively crafting and cultivating powerful learning experiences for their students rather than lecturing and worksheeting them into submission. We know what the alternative looks like and the research supports it.

Books about the Millennials

- *Millennials Rising* (2000) by Neil Howe and William Strauss
- *Don't Bother Me Mom – I'm Learning* (2006) by Marc Prensky
- *Growing up Digital* (1999) and *Grown Up Digital* (2008) by Don Tapscott
- *Born Digital* (2008) by John Palfrey and Urs Gasser of the Berkman Center for Internet & Society at Harvard Law School

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