New Developments: Education and Technology

New directions in the use of technology in schools.

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I want to thank my friends and colleagues at World ORT for giving me the opportunity to be here with you and my distinguished co-panelists.

As an education organization living in a technological world we ought to be "vigilant" of the scientific trends shaping social and economic life and how these may impact our view of what and how should people learn and more specifically how we organize our schools to teach them.

ORT owes much of its worldwide reputation for having been "ahead of the educational establishment" several times in the previous century in recognizing how new technologies, from mechanics to electronics to IT would change the world of work and how we should organize our schools to meet those challenges. Thus, as an organization we have to ensure that we keep maintaining this proactive, forward-looking attitude in the 21st century. In other words we have to make sure we keep strengthening continuously our capacity to learn as a prerequisite for having the capacity to teach,

So, what are the new technologies that are heading our way? This is a tricky question. As Eisenberg said, "making predictions is difficult, especially about the future". My main point today is not to try to guess which specific technologies we will have to use in the next few years. It is to argue that we may be approaching a historical tipping point in how schools use technology in general.

For this I would like to share with you a rather startling observation. Schools (especially secondary schools that are the main focus of ORT) are possibly the only social institutions that have remained basically unchanged for the last 100 years. If you look closely at it, the main core of school functions has been largely untouched by new technologies. Electricity was the last technology to permeate schools and even in that case its impact has been mainly logistic rather than educational. For schools the 20th century have been "100 years of solitude".

My point here is not that schools have not changed at all; my point is that while hospitals, communications, entertainment, banks or transportation have been fully redesigned by new technologies, schools remain uncannily similar. A 1900 teacher could easily find his way in an average secondary school today. But could you imagine a surgeon of 1900 operating now without extensive re-retraining? A pilot? A movie editor?

Schools have incorporated little new knowledge about its basic mission. Hospitals have changed by using the new biological advances and keep changing. The same can be said for energy, transportation or most other activities. But schools? Educational and psychological research has shown for some time how we can improve learning. Learning styles, active learning, collaborative learning, constructivism we know much more than 50 years ago. But our schools remain the same.

Not even radio or TV with their huge social impact have been incorporated into schools in any meaningful way. The only technologies that have really permeated schools widely are "spectator, on-site technologies" such as electronic projectors or blackboards.

There are many reasons for this and we do not have time today to delve in depth into this complex issue. However one of the main reasons in my view for the immutability of schools is that there were designed to teach large numbers of students with limited resources. The basic assumption is that for society is better to have millions of literate people than 5 or 6 Galileos. In sum secondary schools were designed following an industrial paradigm. All the traits are there to see of "production line thinking": all students of a same age are treated equally regardless of learning styles interest or abilities. Focus is in production (teaching) rather than learning outcomes. Error is equated with failure and "faulty products" have to re-attend the same course.

I am arguing here today that this industrial paradigm may have served more or less adequately the needs of society in the 20th century. However the knowledge economy needs citizens with different skills, "Industrial teaching" emphasizes memorization, rote learning and length of content. A knowledge-based society will require schools that promote creativity, collaborative learning and depth of learning. In sum, it is time to change for schools because society will demand it not least to ensure the long term employability of graduates. The real competitive advantage of organizations and countries in the future will be the capacity to learn quickly and use effectively that knowledge.

So, coming back to the starting point. Which technologies should we be monitoring and assessing its educational potential?

E-learning has been a failure as a substitute to formal education. Alternative worlds such as Second life are fast losing traction.

Search technologies, the semantic web and could computing are redefining the way knowledge is stored and accessed. But schools are still uneasy about students using these technologies (less need for memorizing and cataloging, plagiarism) let alone using them productively.

In the short term, many people are excited about the educational potential of mobile computing technologies. Mobile phones are becoming computers and laptops being reduced to mobile sizes. Many people believe these will open the doors for much more field-based learning, and anytime, anywhere communication between students

themselves and their teachers. Maybe. I am personally a bit of skeptic but we certainly have to look into this innovation that is happening today. The famous one-laptop-per-child (OLTP) project promoted by MIT is infused with this philosophy.

Just a bit further away I believe there is interesting transformative potential in the social technologies based on the Internet. Today, our attention is monopolized by the rather frivolous use of these technologies in Facebook, My Space or the endless matching services. However, interesting educational applications based on communities of practice and project-based learning are emerging that may add significant value to learning systems.

In the not so distant, the Internet will encompass all our senses. Today we can see and hear. We will have olfactory and tactile capabilities in a virtual reality environments. These could be real "killer applications" for schools. Imagine being able to teach about animals or plants by actually "touching" them or manipulating dangerous ingredients in labs that could be impossible ever to visit by secondary school students.

Linguistic and artificial intelligence research have repeatedly disappointed us in the past. But they remain the "last frontier" in educational technology. Once we can understand natural language or assess student written work we will usher a new era in tailoring educational systems to individual students.

Last but not least, research is breaking new ground into what some people call "biocomputing". It is not clear yet where might this lead us but the potential is staggering when you consider the fusion of IT and biology. We could speak of "growing" computers instead of building them…

As I said at the beginning, from my perspective we are reaching a point in history in which schools, as the last redoubt of the 19th century will be forced to change and redesign themselves, retool themselves to serve the needs of a society where knowledge and creativity are the key resources. ORT could be a leader in this epochal change as it has been in the past assuming a leadership role a test bed for new, radical school redesigns using new technologies. The challenge is on us.

Thank you for you attention.

Learning Models

Learn from Collocation
Do it

Learn from Collaboration
Discuss it, Practice it with Others

Learn from Interaction
Examine it, Try it, Play it

Learn from Information
Read it, See it, Hear it

Experience Based Learning

Collaborative Learning

Simulation and Games

Reference Materials