

What does it mean to be educated in the 21st Century?

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Marie Glenn

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Foreword

Imma Tubella, Rector and Llorenç Valverde, Vice Rector for Technology
of the Universitat Oberta de Catalunya (UOC)

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If academia ever was an ivory tower, it is being chiseled open by the persistent hammer of technological, social and economic change. Far from being removed from the gritty realities of everyday, today's universities have been plunged into the thick, vibrant epicenter of global change. Tightly coupled global markets, the continual flow of real-time information and the availability of anywhere and anytime access have accelerated not only the pace of change but the immediacy of its impact.

That change is placing unprecedented demands on educators, administrators and students alike. Where content once was bound by time and place, it now pours freely from an abundance of sources, allowing students to shift their attention from ingesting factual data, to actively applying their knowledge to real life problems. What used to be a one-way conversation, teacher to student, has become a multi-party conversation, between teachers, students, outside peer groups and influencers.

The Universitat Oberta de Catalunya (UOC) is part of that extended conversation, not least because the very nature of an open university is one forever bent on trying to understand how to adapt, shape or create a learning experience that fits the footprint of the student and his or her academic needs.

Some, new to the concept of open education can make the mistake of seeing it only as a distribution channel, education served online versus through the physical classroom. And this is certainly one dimension. But open education as practiced is actually far broader. Its philosophical context is based on openness to people, places, methods and ideas, new and old, conventional and non-, in order to enable a learning environment that is both student-directed as well as academically rigorous. In a period of swirling change, the pursuit and practice of open education is a fascinating, if occasionally nail-biting adventure.

Fortunately, we at the UOC are not alone. We have learned to cleave as closely to our own personal learning networks as our students, faculty and peers do theirs. Thus, we knew that by bringing together a group of like and non-like minded thinkers to explore the intersection between pedagogy, technology and higher education we might strive to further our own learning. That notion led to our first ever Symposium on *What it Means to be Educated in the 21st Century*, convened in November, 2008 in Barcelona, Spain. We are deeply grateful for the valuable insight, challenging debate and rich community participants so generously offered.

One of the underlying precepts of Open Education is community. With that community comes a responsibility both to hear as well as contribute actively. Our hope is that through meetings and outputs such as these, we might continue to engage with a worldwide community of educators, administrators, and students interested in advancing 21st Century literacy through student-centered education – knowing that whatever role we may presently hold, we all share the common bond of being lifelong learners.

We hope you enjoy.

Executive Summary



As the first decade of the 21st Century draws to a close, the promise of student-centered learning is fast becoming a reality. High-bandwidth computing and online courseware have combined to put education in reach of many of those long denied access because of physical, logistical or economic constraints. A rich array of instructional media, technological tools and communication platforms allows students to engage more directly in constructing their own knowledge, an ingredient cognitive studies show is key to learning success. How this future will unfold is anyone's guess, but to paraphrase Confucius, a journey of one thousand miles begins by asking several questions.

In November, 2008, the Universitat Oberta de Catalunya sought to do just that by gathering 37 thinkers from across the educational spectrum to explore a range of perspectives on the characteristics and requirements of our new knowledge era. The discussion offered considerations on the dynamics shaping the 21st Century educational environment as well as ideas on how educators, administrators and students can best respond.

Major highlights of that discussion include:

Dynamics Shaping the 21st Century Educational Landscape

Traditional educational practices, once shrouded within the four walls of a university, are loosening, shaped by a bevy of external forces that are together altering the means, modes and measurements of learning. That future shows that education is opening up in ways previously unimagined.

- **Where the traditional educational business model was fueled by content, the new educational model rests on mentorship.** The economic model upon which traditional education has long been built is predicated upon the assumption that educational content is scarce. Today, that model is becoming outdated and, in some cases, obsolete. Putting this in economic terms, what is scarce today is not content, but sense-making. In the coming decades, mentorship and guidance will be our most valuable and limited educational resource, bringing with it wide implications for educators and students alike.
- **Student-centered learning is moving from an abstraction to a reality.** Greater end-user access, greater end-user empowerment, and greater end-user customization have combined to make student-centered learning a possible and powerful new educational paradigm. The ability to personalize the learning experience is the root of its power. Yet, personalization is not synonymous with comfortable. Constraints, in the form of competition, standards, and a proven application of knowledge will continue to provide a necessary tension as well as grounding.

- **The role of educators is shifting beyond instruction to sense-making.** As the currency of education moves from info acquisition to knowledge application, the challenge for teachers will be to help students apply the information swirling around them to the problems of the day. Where once a teacher's primary role was to disseminate content, today their task is to help students make sense of it. By extension, coursework, curricula and collaboration must become more active, participatory and fluid as students work to apply knowledge to practical problems.

- **Technology will remain a key enabler of change.** Mobiles, cloud computing, social networking, and other technologies are unleashing a wealth of possibilities, both inside the traditional classroom, and increasingly outside. Together, they will significantly shape current learning models, fostering wider access to education, more sensitive assessment techniques, and accelerating the rate of innovation.

Requirements to meet the educational demands of the next century

While students may have the means to direct their own learning, the requirements of our global marketplace require new literacies. To make sense of the world around them students, educators and administrators will need to learn how to product and extract knowledge from multiple sources, work with an expanding array of partners and influencers, and address problems that no-one has had to solve before.

- **New literacies will be needed.** As the currency of education moves from information acquisition to knowledge application, the challenge for students will be to find, filter and apply the swelling sea of information that surrounds them. This will place critical thinking and problem solving abilities at the forefront of needed skill sets. Fluency in the media forms of the day will also be critical if students are to participate fully in our tightly woven global economy.

- **Institutional approaches must respond to today's challenges.** To compete successfully in our technology-enabled knowledge economy, institutions must shift from 'industrial-era' practices wherein students are grouped by age and moved along an educational assembly line to one that is capable of responding to a variety of inputs, competencies and question sets. Creating, producing and collaborating with an audience that may extend outside of the traditional classroom also brings with it new lessons in accountability, integrity and ethics. As instructional design evolves, notions of scholarship, stewardship and citizenship will co-mingle.

- **The educational community must reach for fewer, clearer and higher standards that translate across borders.** In an educational context, mastery over foundational knowledge creates the need for standards. Too many times, however standards get confused with standardization. The former grounds learning opportunities. The latter often limits them. Streamlined, consistent, international standards will create more certain footing for educators and a more even playing field for those seeking to move or grow their careers.

- **Technology must be aligned with learning needs.** Aligning educational content with the right delivery channel is a major challenge, particularly when the development lifecycle is so rapid. To resolve such issues, the academic community will need to encourage greater collaboration across the educational spectrum, from lower to higher education, and consider new forms of public-private partnership.

All told, this is an exciting time to be in education. Although significant challenges loom, the lessons of the first decade of the 21st Century are rich with promise. Embedding these more fully into our educational 'ecosystem' may well be the task for the next several years.

Introduction



In November 2008, 37 individuals from across the educational spectrum – professors, policy advocates, learning technologists, and university CIOs – gathered for a one-and-a-half-day symposium in Barcelona, Spain. Hosted by the Universitat Oberta de Catalunya, the meeting was in many respects an experiment. Where many educational conferences guide attendees through a mix of keynote speeches, panel sessions and breakouts, this symposium proposed none of that.

Instead, the Barcelona Symposium divided the group into four teams, shut them all in a room, and left them to spend the day brainstorming. Team A addressed the *Personalization of the Learning Process*. Team B addressed the *Learning Delivery of Content*. Team C addressed the *Future of Technologies at the Service of Learning*. And Team D worked on *Anytime, Anywhere Learning*. What came out of the session was a field of possibilities to help define, enable and support what it means to be literate and educated in the 21st century.

As intelligent, thought provoking, even sometimes humorous as the ideas generated that day were, far and away the larger outcome was the conversation itself. Such engaged ‘back and forth’ all too frequently fills only the margins of many educational gatherings, burbling up at cocktail receptions, or in side conversations. This paper is an opportunity to extend that dialogue. By harnessing the collective wisdom of the recent Symposium and the broader educational community, we hope this paper might catalyze a growing body of thought and greater awareness of the Open Education mission.

Learning in a technology-enabled knowledge economy

Yellow, Red, Blue
1925;
Oil on canvas, 127 x 200 cm;
Centre Georges Pompidou, Paris
Wassily Kandinsky



Frank Ponti, the creative moderator for the Barcelona Symposium placed a copy of this print on one of our meeting tables. Images from three separate artists adorned tables in other rooms. We raised our eyebrows. “Use these compositions to brainstorm ideas about your topic,” he said. Almost none of us did. We didn’t really see the point. So we grinned when Team D (*Anytime, Anywhere Learning*) flashed this artwork at the start of their closing presentation. But as Steve Wheeler, Team D’s appointed speaker and a member of the Faculty of Education at the University of Plymouth, explained how this painting served as a metaphor for the ying and yang of educational change, the whole day seemed to fall into shape. “As you look at the picture, draw an imaginary line down the middle,” said Mr Wheeler. “On one side you’ll see structure, the other chaos. One half shows us formal

composition, the other informal. One side is structured, the other unstructured. And there on the far right side is a curving line. We don’t know what that line meant to Kandinsky, but for us it might as well represent the winding road that is life-long learning.” We laughed as we were meant to, but acknowledged the point: the 21st Century requires new literacies that in turn demand new learning models, models that directly challenge many current practices.

Advances in technology, the shrinking of the digital divide, and liberalizing world markets have spurred not only an increase in the rate of change but also in the immediacy of its impact. What used to take weeks, now takes minutes. Today, people, processes and technology are more tightly coupled than ever before, influencing not only the speed with which information moves but all the nodes that

information touches along the way. The result is that we are moving from an information era to a knowledge era, one that is creating new forms of collaboration and business intelligence. Together, these advances fuel our current technology-enabled, knowledge economy.

This has enormous consequence for all organizations, but particularly the academic sector. As students gain the means to direct their own learning experience, institutional hegemony over instruction may morph into something more populist and personal. What used to be institution-led is becoming student-led.

While the dye is still wet on what shape the 21st Century learning model may take, some contours are emerging.

They include:

- Greater end-user access
- Greater end-user empowerment
- Greater end-user customization

To be successful in this environment, students, educators and administrators need to know how to produce and extract knowledge from multiple sources, collaborate with an expanding array of partners, and take accountability for solving problems that no-one has solved before.

That, of course, raises some interesting questions on the future of education. But as Vijay Kumar, senior associate dean and director of the Office of Educational Innovation and Technology at MIT, remarked in his closing comments at the Barcelona Symposium, “A futurist is one who makes possibilities more real for others.”

Observations

The following observations, culled from the Symposium, the Open-Education community and others, offer a variety of perspectives on the characteristics and requirements of our new knowledge era and its potential for education.

Scarcity versus abundance

The economic model upon which traditional education has long been built is predicated upon the assumption that educational content is scarce. Today, that model is becoming outdated and, in some cases, obsolete. In the time BG (Before Google) one learned many concepts by rote, things like, 'What was the Gunpowder Plot?' and 'What genes are involved in regulating insulin?' If not top of mind, hunting down the answers to such questions would otherwise take too much time and, in some cases, a librarian, leaving little mental energy for higher level thinking. BG we needed a teacher to disgorge content to us. Today, all it takes is an Internet connection.

Not long ago, information and the distribution channels that delivered it were largely proprietary. Now ordinary individuals can create and distribute unique content to parties the world over. Email, SMS, RSS, social-networking, websites, widgets, memes, these applications shroud us in data. Content acquisition is no longer the problem it once was. In fact, we're drowning in it.

Putting this in economic terms, what is scarce today is not content, but sense-making. As the currency of education moves from information acquisition to knowledge application, the challenge for students is to find, filter and apply the swelling sea of information that surrounds them. In the new century, mentorship and guidance will be our most valuable and limited educational resource.

This understanding may serve as the foundation of an emerging 'business model' for education. With students empowered to direct an increasing share of their learning experience, educators can be freed to supply foundational knowledge and nurture the critical thinking and problem solving skills that will allow students to make sense of the world around them.

Not surprisingly, these shifts bring tremendous complexity. Despite superb educators, superb facilities and superb administration, many educational institutions are designed to prepare today's students for yesterday's problems. Reversing that structure is an enormous undertaking.

Interview Karl Fisch

Director of Technology, Arapahoe High School,
Colorado, USA

A first person perspective

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A few years ago, I made a seemingly small decision to post a faculty presentation that I delivered onto my blog. That presentation, *Did You Know/Shift Happens* soon went viral. Today, best estimates are that somewhere between 15-20 million viewers have seen it. That a high school technology coordinator in the suburbs of Denver could spark a million conversations with a simple online PowerPoint would have been inconceivable a decade ago. Had I known, I might have checked my grammar a bit more.

That it happened at all makes me realize that we live in profoundly different times. It also makes me think that our schools should reflect this difference far more than they do. The reality, however, is that our educational system remains largely rooted in an industrial age model. We group kids by age, place them on an assembly line and use each grade to accomplish a set of tasks. After 12 years, they roll off the line as well-formed widgets.

Open Education is critical to sustaining quality education

Following the new knowledge economy logic discussed earlier, the Barcelona participants offered several thoughts about the instructional implications of content in a 21st Century context. Among them were:

- Content may no longer be king, but the ability to turn information into insight surely will be.
- Where one had to go to the well (physical institutions) for educational content before, many students can now simply turn on the tap (online/offline networks) for the content they need.
- By allowing the network to help in distilling content, educators can focus more on mentoring and supporting student scholarship.
- Exposing content promotes more learning. If you don't create it, someone else will, so there's little point in hoarding it (but that doesn't mean that enterprising institutions can't make money off it).

Open education taps into these dynamics. Speaking in broad strokes, the traditional educational model is 'closed.' That is to say, it is based on a service model in which the institution directs the learning experience. The open education model inverts this, or strives to at least, allowing the student to take charge of his or her own learning outcomes. In this setting, the teacher's role is to guide the student, help them ask the right questions, preserve the right context and develop the right frameworks and learning goals.

At Arapahoe High School, we have great students, great staff, a supportive community, and one of the top high schools in Colorado. But as great as our school is, it occurred to me that we were doing an excellent job preparing our kids for the wrong time period, 1985. That realization began an extended conversation among our faculty and our students. The question it surfaced, 'What does it mean to be an educated person in the 21st Century?' remains central to our approach today.

In addressing this question, Jason Ohler, a professor at the University of Alaska, offers a perspective that I like a lot. He says, "Literacy means being able to consume and produce the media forms of the day." For me, this thinking resonates with perfect pitch. Today's students need to understand and communicate with the world around them. They need to know where and what to absorb and how and what to produce. That is because the more knowledgeable one is about a medium, the harder it is to be manipulated by it. If you can construct it, you can also deconstruct it. In our media saturated world, true literacy requires understanding the language of our times.

At AHS, this recognition is now front and center in our consciousness. We approach things differently as a result. As best we can, we help our kids apply core skills to a variety of media." We know as do so many educators, that the ability to find, acquire and share knowledge will be key to our students' career and life paths. The implicit give-and-take in this leads to what is perhaps the biggest takeaway from my experience with *Did you Know/Shift Happens*, namely that 21st Century literacy is critical for shaping good citizens.

¹ Stephen Downes,
<http://flosse.dicole.org/?item=future-of-flosse-interview-with-stephen-downes-part-category=interviews>

Interview

Joel Greenberg

Director of Strategic Development,
Learning & Teaching Solutions, Open University

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Back in 1970, Great Britain's Open University was the first of any significant scale to take what was then a discredited form of education, correspondence college, and turn it into something widely respected. This form of education became known as distance learning. Some early academics rolled their eyes at the concept originally and one senior opposition politician called the idea that one could teach university level subject matter to the unqualified 'a blithering nonsense.' But as Joel Greenberg, the University's Director of Strategic Development, Learning & Teaching Solutions remarks, "The irony now is that recent surveys rank Open University at or near the top when it comes to employee satisfaction with our graduates."

Dr Greenberg has been with the University for the past 32 years. In that time, he has witnessed much change in the field of open education. "My favorite statistic is that in 1979, we had 19,000 students online. And this was long before the development of the personal computer and the internet of today," he says. Instead,

By definition, open education is open to people, places, methods and ideas. Underlying the modern approach is the notion that the "network provides." For those of us with piles of books stored in our basements, Stephen Downes, the Canadian educator and open source advocate says, says 'get rid of them.' "We have to view information as a flow rather than as a thing. It's like electricity or water. We get a glass of water when we need it, we don't store glasses of water in case we need it." ¹

Putting it all together, if open networks provide content and community, what then do open universities provide? The Universitat Oberta de Catalunya (UOC) offers a good starting point. At 15 years old and with 47,000 students from around the world, it is certainly one of oldest and largest online universities. Llorenç Valverde, the UOC's Vice Rector of Technology says, "What makes UOC's model different is not just that we are one-hundred percent online. It's that our learning model is based on placing students at the center of their own academic program. Five hundred years after the introduction of the printing press, we have moved from the platform where professors give lectures to a

platform where students pull the knowledge that they need directly. As a university, our focus and challenge now becomes how to provide the best type of mentorship for our students."

In meeting these challenges Vijay Kumar suggests in his book, *Opening Up Education* that he co-edited with Toru Iyoshi, that the future will rest upon three pillars: open technology (and the primacy of design); open content (how community can and should engage in the design); and open knowledge (how to build transference within those communities to share and extend the knowledge gained).

For many in the open education movement, one of the greatest complexities in realizing this future state rests in aligning educational content with the right delivery channel, particularly when the development lifecycle of new media and related technologies is so rapid. Dr Valverde notes, "If we can think about that sort of world, where the computer is not the primary medium, then the challenge becomes how to deliver content effectively across all channels."

² http://portal.unesco.org/education/en/ev.php-URL_ID=18845&URL_DO=DO_TOPIC&URL_SECTION=201.html

³ "Making Minds Less Well Educated Than Our Own," Roger Schank, Lawrence Erlbaum Associates, 2004.

students tapped into 290 terminals scattered among various colleges and universities around Great Britain. "We had very low data rates, but our students were accessing bibliographic records from the U.S. Library of Congress," says Dr Greenberg.

But while the technologies may have changed, the University's core mission hasn't. Unlike traditional universities, the Open University has no entrance prerequisites, putting the prospect of a university degree within reach of many more than would otherwise be able to attend. Students can also decide how far they want to go in a given subject. A hobbyist can dabble in one or two short courses; an employee can obtain professional certification; and degree candidates can pursue their studies up to the Masters level. Learning materials are differentiated accordingly and tutors are available to offer support.

Most of the course materials are written in-house. "We still publish about 30,000 pages a year," says Dr Greenberg, "but that is fast becoming an old model." As for where the Open University is headed as it completes its fourth decade, Dr Greenberg says, "We will increasingly get out of the content business and instead leverage social-networking and other online tools and learning resources, both for fee and free. Universities like ours will continue their mission of providing support and accreditation, but the way in which we carry out that mission will change dramatically in the coming years."

Access as a human right

If knowledge is the seat of wisdom and wisdom the key to peace, then it stands to reason that educating the world's citizenry represents a fairly solid investment in our collective security and advancement. Many would agree with UNESCO's statement that "Achieving the right to basic education for all is thus one of the biggest moral challenges of our times."²

If education is an essential human right, then ensuring access to education must also be considered in the same light. Yet, the question of whether one has a right to education is far easier to address, of course, than how to provide it. Programs like One Laptop per Child take on the challenge of putting information in reach of the world's poor, but fundamental issues such as bandwidth remain. Mobile technology offers significant potential, particularly since the development of wireless infrastructure is well advanced in many of the developing countries that leapfrogged the prior wave of wired infrastructure. Yet, these governments need the encouragement and support of the international community to expand mobile capabilities and remote access.

Access is not just a developing world issue, however. Within established markets, there are other challenges. Educational resources may exist but without some construct for finding them, many students and educators often cannot avail. Discoverability and a means of managing unstructured information are essential for access to have value.

Standards versus standardization

The question of access is not just practical. It is also philosophical. In the United States and many other countries, constitutional and other laws mandate free and compulsory education. This is a good thing to be sure. But if education is to be free and compulsory, how do we incorporate student centrality within that context? How do we make something compulsory while at the same time according freedom of choice?

In an educational context, mastery over foundational knowledge creates the need for standards. Too many times, however standards get confused with standardization. The former grounds learning opportunities. The latter often limits them.

In the U.S., core curricula can cover pages, yet still fail to establish measures that support the desired learning outcome itself. In his book, *Making Minds Less Well Educated than Our Own*,³ Roger Schank states:

"...Learning objectives are one of the main evils in the school system. Learning objectives seem like a good idea for the basis of curriculum design... 'At the end of the course, the student will know X.' Sounds good. The problem of course is that when you decide that any student who takes a given course should come out knowing X, it is very tempting to test to see if they do in fact know it. To make sure they know it, a teacher tells it to them a lot, makes them read about it, gives them short quizzes about it, and finally examines them to see if in fact they know X.

Interview Paula Nirschel

Founder of the Initiative to Educate
Afghan Women

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“When you educate a woman, you educate a village,” says Paula Nirschel founder of the Initiative to Educate Afghan Women (IEAW). She began her organization in 2002 after learning how Afghan women were denied education during the Taliban’s seven-year reign over Afghanistan. “It was haunting to see such oppression,” she says. Determined to find a way to expand educational access, she created a program to secure four-year scholarships at U.S. universities for some of Afghanistan’s highly motivated young women.

“Education is critical because it opens minds,” says Ms Nirschel. But she had to open a few minds of her own just to get the program started. She spent weeks talking to administrators and diplomats in central Asia, Afghanistan and the United States to overcome diplomatic, logistical and financial obstacles. Finally, a panel, including a U.S. State Department official, a member of Afghan President Hamid Karzai’s administration and Kabul University’s president gained the necessary agreements, interviewed each candidate and

In the confusion about learning objectives which tend to be stated rather factually (the student should know X), there is always the underlying hope that the student might come away from the experience being able to do something he couldn’t do before. No one is interested in actually having the students spouting X. But having that as one’s explicit objective tends to make sure that the goal is uppermost in everyone’s mind.

*What did the writers of the previous objectives mean when they said:
A. Student will be able to identify effective communication skills.*

You know and I know that they meant there would be a test. But what would the test be about? Well, it would pretty well have to be about the list of effective communication skills that were given to the student. So you see the problem here. It isn’t that there will be a test to see if the student knows X. It is that the curriculum now has to have some explicit statement about X that may not be so important to learn. Do we in fact learn to communicate by being able to say a set of rules about effective communication? I don’t think so. I doubt that teachers that have to teach this think so either. Communication involves actually communicating, not saying stuff about communicating.”

Teachers understand this dilemma very well. Vicki Phillips, the Education Director of the Bill & Melinda Gates Foundation, says, “Teachers everywhere are eager for clearer, more compelling standards that take the mystery out of what they’re supposed to be teaching.” ⁴

In light of globalization, other standards also need to be addressed. Those wishing to transfer their degrees and accreditations to avail of cross border opportunities often meet several hurdles. The ability of the international community to agree trans-national qualifications would be a significant step in allowing those who live in small states to compete more equitably with peers from larger states. Open coursework may be one small step in this direction, but the larger issue will rest with government, international agencies and licensing boards.

The question of educational access comprises each one of these dimensions, from the practical to the philosophical. Finding a means of addressing them will likely be a key element of 21st Century learning.

Personalization

We talk a lot about student-centric learning, but what does it mean? For those gathered in Barcelona, personalization of the learning process embraced several dimensions: individual methods of learning, personal learning speed, and interaction between learning processes and technology. In our technology-enabled world, Web 2.0 applications offer students a powerful new educational platform, to enrich and inform their learning experiences.

At Karl Fisch's Arapahoe High School, 9th grade teachers Maura Moritz and Anne Smith assigned their class a book project this past January, one that entailed reading and discussion as well as an essay paper. The book was Daniel Pink's non-fiction work, *A Whole New Mind*. While discussion of good literature is nothing new, what made this class different from many other 9th grade English classes is the way that Arapahoe leveraged technology to expand the scope of discussion. Karl Fisch explains.

"During class, teachers break the students into two groups, an inner circle of six-to-eight kids and an outer circle comprising the rest of the students." The inner circle leads a discussion on a particular part of the book. Two to three "remote bloggers" join this conversation through a webcam and also take part in a live blog with the students in the outer circle. In addition, twice during the unit students talked directly with Daniel Pink, the author, through the internet phone service, Skype, asking him to expand on, and occasionally even challenging, this thinking.

submitted the finalists for the IEAW's review.

With the IEAW's help, what began as an entering class of four has now grown into a tight-knit group of 46 women in 20 different American colleges and universities. Nearly seven years into the experience, Ms Nirschel remains as committed as ever. "These Afghan women are incredible. They're strong. They're bright, and they're remarkably accomplished."

The mission is as much cultural as it is educational. In addition to stocking the fridges at Ramadan, the Institute ensures that the women gather regularly during the year to form connections and grow as a group. This past year, they met in North Carolina's Outer Banks. Most had never seen an ocean and came from a country where female sports were banned. "So in North Carolina, we made up for lost time and did everything from yoga to swimming to badminton," said Ms Nirschel. For women deprived of the freedom to wear something as simple as a bathing suit or the sensory pleasures of curling bare toes in the sand, it proved an emotional experience.

The women all return to Afghanistan at the end of their studies where Paula Nirschel hopes they will serve as role models for other girls. "My dream is that educated women will help progress the country of Afghanistan." The program's first graduates have already begun that journey. One now works for Afghan President Hamid Karzai. Two others joined Afghan-based

non-profit organizations, and a few have returned to the U.S. to continue their graduate studies. "Forty years ago Afghan women had access to education and the country was in much less turmoil. Since then, the voice of half of the country's populace has been silenced. My belief is that Afghanistan will only grow stronger when the voices of all of its people are heard."

In all, over 30 professionals from around the world added their insights to the book discussion. “As we go through different chapters, we bring in people from different places,” says Mr Fisch. Parents and others can also tune in from wherever they happen to be since Arapahoe broadcasts the class through a UStream connection. “Last time,” says Mr. Fisch, “about 49 or 50 people dropped in to see what our kids were talking about. A few even jumped into the live blog that the kids were doing.”

What was the result of weaving these technologies into their class? Teachers say that the students, whose essays on the book are submitted in print and online form through a class wiki, became far more aware that they were producing work for a different, and often much larger, audience than they were used to. This set expectations and personal accountability higher. “It’s one thing to do a bad job on a paper that only your teacher is going to see,” says Mr. Fisch. “But when your paper has the potential to be seen by anyone, that really makes you think about the quality of your work.” Several students

stayed with the project even after they had received their final grade. “Why? Because their work is out there; it’s a much more authentic and meaningful audience,” says Fisch.

Openness, access and the ability to personalize the learning environment are the gateway to student-centered learning. As the Arapahoe example illustrates, students are wasting no time leaping through.

Tools for Tailoring

Blogs are far from the only medium expected to have a large impact on learning, research and creative expression. The *2009 Horizon Report* announced six emerging technologies that they predict will significantly shape instruction and personalized learning over coming decade.⁵ They include mobiles and mobile device applications; cloud computing; geo-based applications (i.e., applications with embedded GPS applications); the personal and semantic web, and smart objects. We spoke with Susan Metros, the project’s chair.

Interview Susan Metros

Associate Vice Provost for Technology Enhanced Learning, Deputy Chief Information Officer, and Professor of Design Practice and Clinical Education at the University of Southern California (USC)

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As a former visual design professor and now Deputy CIO at the USC in Los Angeles, Susan Metros has spent a lot of time exploring the intersection between technology and education. With so many emerging tools, Ms Metros understands their lure but cautions, “One needs to use those tools for their inherent capabilities and not just for the technology itself.” She laughs, adding, “So far, I’ve learned it’s not too easy.”

As chair of the *2009 Horizon Report*, Ms Metros has an unusually good vantage point to assess which technologies are likeliest to have the greatest impact on student-centric learning. In evaluating them, she returns to what has been a focal point of her thinking for some time. When it comes to literacy, she and her colleagues are convinced that while the ‘Three Rs’ of reading, writing and arithmetic will remain foundational, ‘Three Fs’ will top the list for the next generation of students. “*Finding* the information that one needs, *filtering* out what is useful, and *focusing* on how best to apply that information,” she explains.

She relays this story from her early days of teaching. “Many years ago, I was preparing to test my students on a typography formula that they were supposed to have memorized. Just before class started, I stopped by a veterinary science lecture that a professor was giving on the subject of feline anemia. Now, I wasn’t the slightest bit interested in this subject, but the word was that he was using computers. And, since this was the era before even Macintosh, I went over to see what it was all about. The professor opened his talk by saying, ‘What’s important is not what you know, but rather knowing where to find it.’ He then proceeded to show a very simple database that housed a large set of materials on feline anemia, a resource that saved his having to remember everything. Afterward, I went back to my class and said ‘You have two choices. You can write down the copysetting formula or you can tell me where you’d go to learn how to do it.’ Although I still don’t know the first thing about feline anemia, that professor’s notion of learning drastically changed the way I taught.”

In today’s ubiquitous information environment, knowing where to find the answer can be challenging in itself. “We need to kick the habit of supplying students with all the information we think they’ll need and instead give students a framework for piecing together what it is they must learn and why.” While acknowledging institutional and other constraints, she believes that “We are at the precipice of great change. I look forward to seeing it unfold.”

Community and constraints

As one Barcelona participant humorously remarked, “Learners not only need to learn to learn, they must also learn to realize that they are learning.” This may be where institutions come in.

Although education is becoming more open, multi-faceted and malleable, personalization is not, nor should be synonymous with comfortable. Left to our own devices in a purely self-directed world, one is less likely to be stretched and challenged. Constraints in the form of competition, standards and a proven application of knowledge provide a necessary tension as well as grounding.

If critical thinking and problem solving skills are foundational for success in the 21st Century, then the role of the university might well be to teach scholarship. That could mean putting an old-fangled notion into a new-fangled context. The word university is derived from the Latin *universitas magistrorum et scholarium*, roughly meaning “community of teachers and scholars.” For its ability to marry content with context, it is perhaps the ultimate community.

Yet, the very discipline inherent in teaching scholarship may be its greatest value. Student-centric learning may function best within the necessary constraints of institutional expectations and academic requirements. As Lev Gonick, the CIO at Case Western Reserve University and Barcelona participant observed, “When architects look for where they can make a breakthrough in design, they don’t

look at the structure. They look at the cracks and interstices. Real insight, real brilliance often comes from within those openings. That is because constraint is an impetus for learning.” The same might be said for education. Subversion occurs in the joints, but you still need the structure.

People who are truly lifetime learners may have made that connection. Their formal learning through educational institutions gives them a foundation that they can apply throughout their lives. They recognize that there is value in both the self-directed and institutional dimension to learning. Sometimes, the temptation is to place the formal and informal instruction at odds with each, when the real question may not be which one is better, but how can the two worlds best affect and shape each other.

The need for deeper and better partnerships

Human nature is resistant to change. Academia is no exception. Too often, culture, funding, legal requirements, assessments, legacy systems and customary ways of doing things, combine to fend off new strategies. Too often as well, there can be little incentive for educators to innovate instructional methods.

To resolve some of these issues, partnerships need to deepen across the educational spectrum. Today, there is often a gap. Higher education has led significant advances in open courseware and its applications. Yet, there is often little linkage with primary and secondary schools. If we are to be truly student-centric, we must

Interview Michael Horn

Co-founder and Executive Director of Innosight Institute. In 2008, he along with Clayton Christensen and Curtis Johnson co-authored *Disrupting Class: How Disruptive Innovation Will Change the Way the World Work*

Disrupting Class

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The book extends Clayton Christensen's theories on disruptive innovation. Unlike sustaining innovations, which improve a company's existing product or market position, disruptive innovations come in from the side, usually with a simpler and more affordable product that often isn't quite as good as the original. As such, it tends to take root in markets that are underserved and less demanding. Over time, the disruptions typically improve, often quickly, and become able to handle more complicated problems. At that point, they converge on the mainstream market and supplant older ways of doing things.

Mr Horn and his colleagues believe that computers will change how people learn. Among their findings are that customized learning will help many more students succeed in school; student-centric classrooms will increase the demand for new technology; and disruptive innovation may ease roadblocks that have traditionally impaired educational reform. "Such changes are already underway," says Mr Horn. "By the

recognize that while time is fixed in the formal education environment, the amount of learning that takes place can vary widely. Better partnership across the educational sector and between public and private entities is one means of addressing this. Indeed, the ability to partner with others invested in leveraging technology for the advancement of learning may be where the biggest breakthroughs will come in forcing systemic change.

Disruptive innovation and organizational change

During the Symposium in Barcelona, Linda Roberts, on the Board of Directors for Curriki, said that when it comes to driving change, it is often too easy to get discouraged by the question, 'How do you make a difference on a large scale given the limitations of the tools or systems that we have now?'

Roberts said, "In 1968, I was part of the team that developed Sesame Street, a program intended to help US kids get ready for school. In designing the

show, many experts advised 'you can't teach young people anything if they are not on your lap or in a classroom.' But then we thought about it. We knew that TV was admittedly a fairly primitive technology, but we also knew that we had this amazing opportunity to reach children who might otherwise not have access to preschool education. As it turned out, the program succeeded beyond our wildest dreams in reaching this goal. I learned then that while our resources may be limited, our ideas do not have to be."

The same can be said of 21st Century educational models. If they are to undergo a seismic shift, as some suspect, many new ideas will be needed. Forty years after the launch of Sesame Street, Ms Roberts is still exploring new ways for technology to improve the reach of education. Roberts points to the Curriki Project and the creation of open and shared curriculum resources with educators across the globe, linked together by web 2.0 technology. She believes that Curriki and other efforts could transform opportunities for learning. To give us a taste of what else is in store, we thought it might be helpful to speak to someone familiar with disruption.

year 2019, 25% of U.S. high school students will take classes online.”

Even though much of *Disrupting Class* is focused on the K-12 environment, Mr Horn believes the concepts are relevant to higher education as well.

“We see far more disruptions occurring in the higher education space than we do in the K-12 arena because there is less regulation and more freedom of movement.” He is particularly passionate about online education, which he considers a major innovation and one central to lifelong learning. “Community colleges were disruptive to state universities and now online universities are disrupting both. I hope it continues to migrate to a more individualized student experience. That part of the equation,” he says, “remains untapped.”

Disruption may also take aim at the traditional four-year branded degree program. In fact, Clayton Christensen and Michael Horn have both told Harvard Business School (of which they are a professor and an alumni, respectively) that it is being disrupted. “HBS still doesn’t believe it,” says Mr Horn, “but at some point you become the student and say ‘do I want to pay \$200,000 for two years of business school when I can work for a top company and get a better education for what I need?’”

“The reason that some top tier educators are reluctant to embrace some forms of open coursework is the same reason that incumbent organizations get disrupted in every

other marketplace,” says Mr Horn. “They are the last ones to recognize the potential disruption and make a meaningful new business model from it.”

Ultimately, Mr Horn sees online education and the rise of corporate universities as major forces of change. In the U.S., loans and financial aid allow consumers to make tradeoffs they wouldn’t normally be able to make. “That’s one of the artificial constraints that prevents online learning from blowing up completely in the higher education space,” he said. The current economic malaise may change this equation. “We have already seen a spike in online enrollments as people start thinking about these tradeoffs.”

Conclusion: An invitation to action

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As the first decade of the 21st Century draws to a close, a few irrefutable dynamics are taking shape. The learning process is changing faster than institutional readiness. Required skillsets are changing. Societal, cultural and economic factors are changing. And, of course, technology is changing. This environment is reshaping pedagogy. Means and modes of instruction are opening up, becoming more transparent, dynamic, multi directional and, above all, student-led.

Significant challenges confront all of us, students, teachers, and the community at large. Yet, we are reminded that real brilliance often only emerges in the midst of turmoil. Nicholas Negroponte, the well-known MIT futurist, said that the 'next big thing' comes "*...Not [through] bandwagons, fashions or [individual] fields - but [through] working at the edges, and in the intersections of disciplines.*"

We hope this paper encourages many conversations at the edges of things. Although excited by the ideas expressed in this report, we know that there are considerations we must surely have missed, ideas that may well be superior and concepts that have yet to be properly explored – perspectives that are in your own head or come from your own experience. We can't wait to hear them.

We leave you with these few questions and invite your comments on how to upgrade the education 'value proposition' for the 21st Century.

Valuing and evaluating education. If insight is the currency of our technology-enabled knowledge economy, what is a good education

worth? Will this answer have bearing on current tuition models, particularly in countries such as the United States where skyrocketing prices and the global economic downturn have made university unaffordable for many? If pricing models do change, who will set the price?

Standards across borders. New international standards and trans-national qualifications need to be developed and agreed among the developing world and the G20. Right now, board certifications and accreditation requirements can vary widely across the world. This can place undue burden on those with degrees from emerging markets wishing to transfer those skills to jobs in the developed world.

Personalized learning networks. Will personalized learning foster new forms of assessment and credentialing? Can we envision a time when students and employees use micro-credits to establish certification in niche vocational areas? If so, who will lead that development?

Open education. Is education ready to open up? Who needs to be engaged in the discussion if meaningful change is to happen?

Making change happen. Taking on board Michael Horn's and Clayton Christensen's *Disruptive Innovation* precepts, the most successful attempts at radical change occur from the outside-in. What does this mean for the educational community? What might serve as the best pilot projects?

Who took part in Open EdTech 2008?

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Advisory Committee

Begoña Gros, Vice Rector for Innovation, Universitat Oberta de Catalunya (Open University of Catalonia, UOC).

Vijay Kumar, Senior Associate Dean, and Director, Office of Educational Innovation and Technology, MIT.

Julià Minguillón, Associate Director, Internet Interdisciplinary Institute (IN3), UOC.

Rafael Macau, Director, IT, Multimedia and Telecommunications Department, UOC.

Albert Sangrà, Director, Education and ICT programme, UOC, and EDEN (European Distance and E-Learning Network) Executive Committee member.

Llorenç Valverde, Vice Rector for Technology, UOC.

Participants

Rob Abel, Chief Executive, IMS Global Learning Consortium.

Marc Alier, Professor and Developer of open-source solutions for education and mobile devices, Technical University of Catalonia.

Magí Almirall, Director, Office of Learning Technologies, UOC.

Xavi Aracil, ComuniLab, Office of Learning Technologies, UOC.

Elena Barberà, Psychology and Educational Sciences Department, UOC.

Giovanni Bonaiuti, Researcher, Learning Technology Laboratory, Education Science Department, University of Florence.

Mark Bullen, Associate Dean, Curriculum and Instructor Development, BCIT Learning and Teaching Centre, British Columbia Institute of Technology.

Tom Caswell, eduCommons Project Manager, OpenCourseWare Consortium.

Susan D'Antoni, Programme Specialist, Open Educational Resources Project, Division for Education Strategies and Capacity Building, Education Sector, UNESCO.

Claudio Dondi, President, European Foundation for Quality in E-Learning (EFQUEL), President of SCIENTER, Research and Innovation for Education, and Member of the Board of the MENON Research and Innovation Network EEIG.

Antonio Fini, Electronics and Telecommunications Department, University of Florence.

Muriel Garreta, Labs for Learning, Office of Learning Technologies, UOC.

Lev Gonick, Vice President, Information Technology Services, Chief Information Officer, Case Western Reserve University.

Joel Greenberg, Director of Strategic Development, Learning and Teaching Solutions, Open University, UK.

Begoña Gros, Vice Rector for Innovation, UOC.

Organisers

Universitat Oberta de Catalunya
(Open University of Catalonia, UOC)
<http://www.uoc.edu>

Office of Learning Technologies
[http://learningtechnologies.uoc.edu/
openedtech@uoc.edu](http://learningtechnologies.uoc.edu/openedtech@uoc.edu)

Montse Guitert, Director, Digital Literacy Area, IT, Multimedia and Telecommunications Department, UOC.

Mara Hancock, Director for Educational Technologies, UC Berkeley.

Larry Johnson, Chief Executive Officer, New Media Consortium.

Paul A. Kirschner, Professor of Psychology and Lifelong Learning, Department of Psychology, and Programme Director of Research on Lifelong Learning for Professional and Personal Development in the Netherlands Laboratory for Lifelong Learning, Open University of the Netherlands.

Debby Knotts, Director, New Media and Extended Learning, University of New Mexico.

Vijay Kumar, Senior Associate Dean, and Director, Office of Educational Innovation and Technology, MIT.

Brian Lamb, Manager, Emerging Technologies and Digital Content, Office of Learning Technology, University of British Columbia.

Eva de Lera, Senior Strategist, Office of Learning Technologies, UOC.

Susan E. Metros, Associate Vice Provost and Deputy CIO, Professor of Design, Roski School of Fine Arts, University of Southern California.

Julià Minguillón, Associate Director, Internet Interdisciplinary Institute (IN3), UOC.

Sugata Mitra, Professor of Educational Technology, Newcastle University.

Ismael Peña, Lecturer, Public Policies for Development, Law and Political Science Department, UOC.

Linda G. Roberts, Board of Directors, Curriki, and Former Director of Educational Technology, Clinton Administration 1993-2001.

Albert Sangrà, Director, Education and ICT programme, UOC, and Executive Committee Member, European Distance and E-Learning Network (EDEN).

Francesc Santanach, Chief Architect, Office of Learning Technologies, UOC.

Neil Selwyn, Senior Lecturer, London Knowledge Labs, University of London.

Jutta Treviranus, Director, Adaptive Technology Resource Centre, University of Toronto.

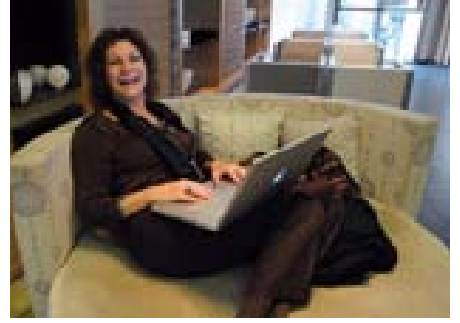
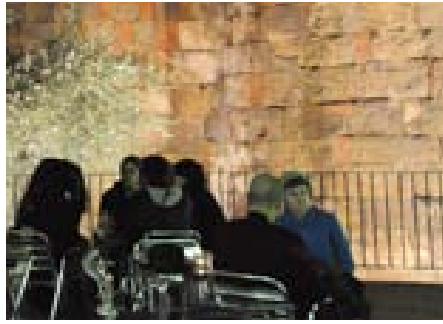
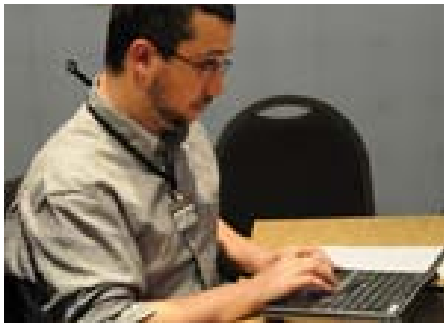
Llorenç Valverde, Vice Rector for Technology, UOC.

Lluís Vicent, Blended Learning Coordinator and Faculty Member, Ramón Llull University.

Paul G. West, Director, Knowledge Management and Information Technology, Commonwealth of Learning.

Steve Wheeler, Lecturer in Information and Computer Technology, School of Continuing Professional Development, University of Plymouth.

David Wiley, Associate Professor of Instructional Psychology and Technology, Brigham Young University.





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