

New learning models

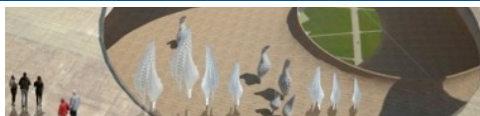
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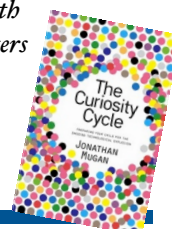
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The future of education



The Association of Professional Futurists exists to promote the value of futures practice and of applied futures thinking. And what better way to do this than to apply it to a live public question—of the future of education in general, and universities in particular?

In this special edition—an APF first—members of the organization, and one guest, offer a range of perspectives to help sharpen views on the future of education.

Cindy Frewen, Chair, APF

The future of education is a recurring theme in the discussions on the APF's listserv. In part this reflects the organisation's connections to futures studies courses, in part it is because the sector itself is clearly on the cusp of change.

One U.S. report has projected, with only a hint of technological determinism, that half of all American colleges and universities will have closed within 50 years. Similarly, an EY paper suggests that in Australia "the dominant university model ... will prove unviable in all but a few cases over the next 10-15 years."

Such claims have become the litany of educational futures over the past few years; at the very least they deserve examination. *Compass'* call for articles on this theme was a reflection of the level of interest among members in the prospects for the education sector, even if it was initially intended to fill

a section of the regular quarterly newsletter.

But the number of contributions, and their quality, quickly made it clear that the collection of articles would work better as a standalone edition—an innovation for *Compass*.

Since education systems tend to reflect their societies, and since there's a slight American bias in the contributions, some of these articles sometimes make culturally specific points. In general, though, there is much here that applies cross-culturally. The emphasis is on higher education, but not exclusively.

In this themed edition of *Compass*, you will find trends analysis, scenarios, models of change, reviews and provocations. Some articles are drawn from client work, some have been specially written. Together they make up a rich set of perspectives that go beyond the received wisdom.

Andrew Curry, Editor, *Compass*.

The emerging learning model

by Hardin Tibbs

The first university in the world opened in Bologna in 1088, almost a thousand years ago. It offered a general philosophical education based on the classical texts of Greece and Rome and became the model for the pre-industrial university.

Just over 700 years later, the university morphed into its present form. In Berlin in 1809 Wilhelm von Humboldt pioneered a new model that was in effect the first university of the industrial era, based on the principle of linking teaching and research in the work of individual scholars and scientists.

In 1858, Cardinal Newman's influential book *The Idea of a University* further

refined the model. He saw the secular role of the university as being to educate "the intellect to reason well in all matters", a concept which shaped the university for the following 100 years. What fared less well was his view that while the university must be free from religious censorship, it should nevertheless respect and promote religious values.

The 19th century university, in its various forms, culminating in the vast expansion of higher education in the late 20th century, represented a "phase shift" in the idea and nature of higher education.

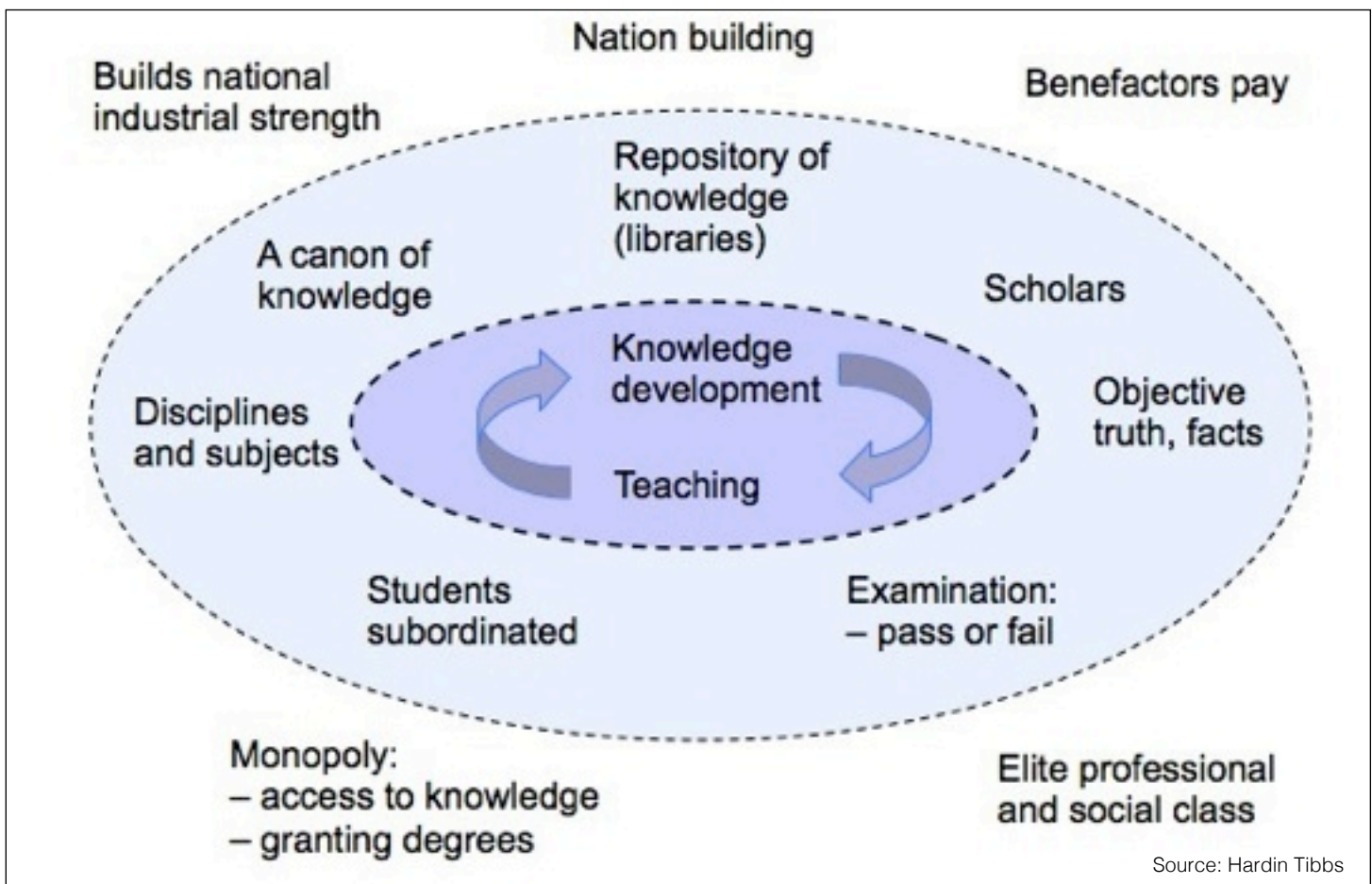
In the late 1990s, while I was living in Australia, I led a research project for a leading university on "the future of post-

compulsory education," which suggested that we are now at the start of another comparable phase shift.

This shift is from what might be called the industrial-era university to a new model of learning. Although the research is now more than a decade old, the outlines of the phase shift remain the same, and for this reason I thought it would be worth briefly sharing the work here.

The roots of the phase shift lie in the sources of change in the strategic environment for education (global and local). While a number of these factors are explored at length elsewhere in this special edition, it is nonetheless worth summarizing them here.

Figure 1: A shift from the industrial-era university with its origins in the 19th century...



Source: Hardin Tibbs

Digital technologies have created an information-saturated environment in which the individual's effort to create personal meaning has rising importance

- **Globalisation**

- cheap travel & instant transfer of information/communications
- transnational commerce
- student diversity

- **Economics**

- massification of education in OECD
- rising funding costs to government

- **Technology**

- internet, online instruction, e-commerce
- cost and complexity of science

- **The 'nature of knowledge'**

- changing from dualist objectivism to participatory worldviews

The industrial-era

university was based on a model that had knowledge development and teaching at its core, and that enjoyed a monopoly on access to knowledge and awarding of qualifications. The social

framework was hierarchical, with students subordinate to teachers.

The monopoly on knowledge relied to a great extent on the physical ownership of university libraries, and the authority of academia rested in part on an assumption of the objectivity and absolute character of knowledge, and its slow rate of change. (Figure 1, above.)

Social, economic, scientific and technological change in the 20th century

has resulted in a new post-industrial cultural context. Networked computers and digital communications have helped create an information-saturated environment in which universities no longer have a monopoly on access to knowledge and are losing their monopoly on granting qualifications. Knowledge itself is rapidly changing (for example in biological sciences), and is now understood as being to some degree relative, dependent on perspectives and

Figure 2: ...to an emerging learning model for the university, shaped by rapid change and digital technology.

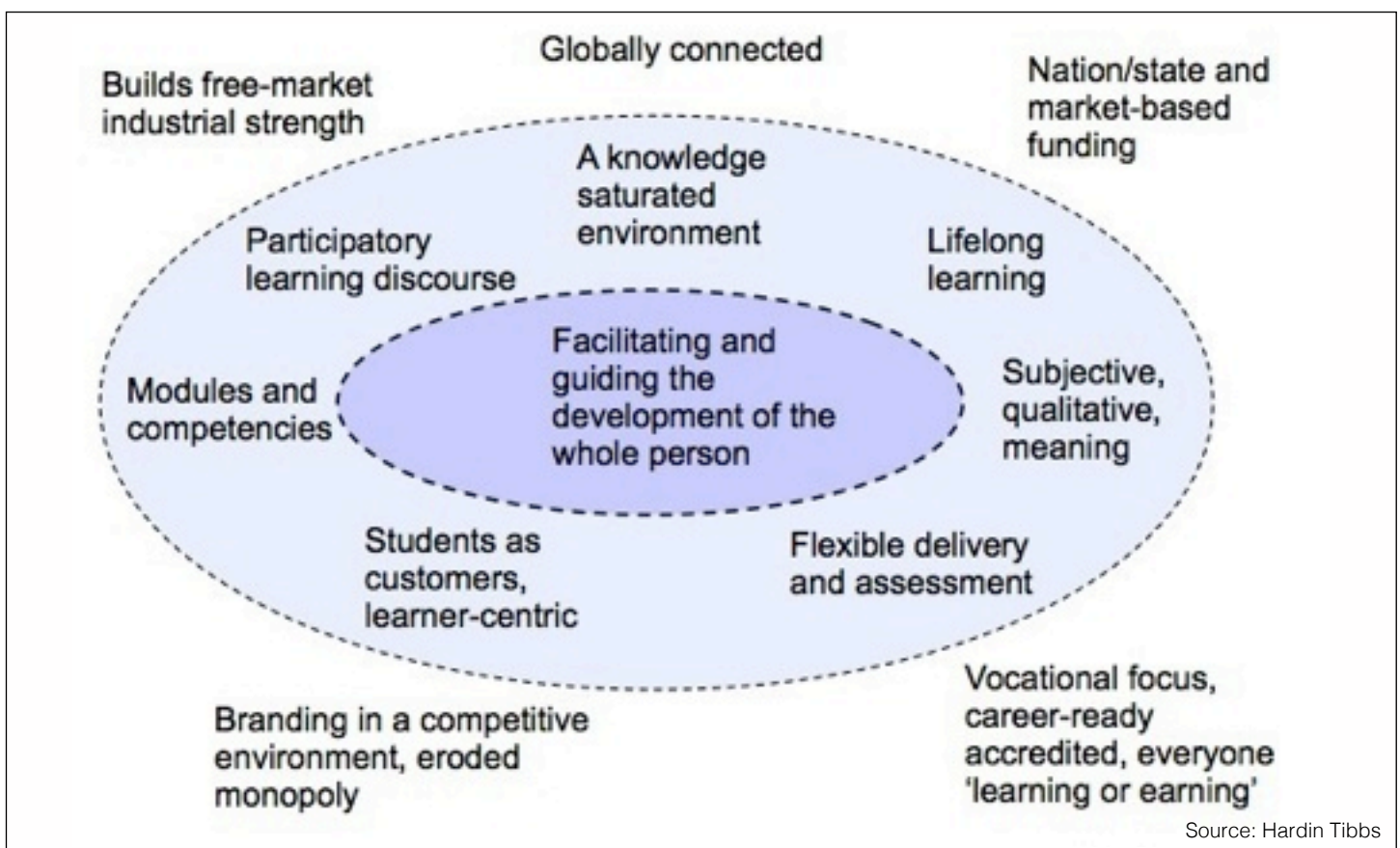
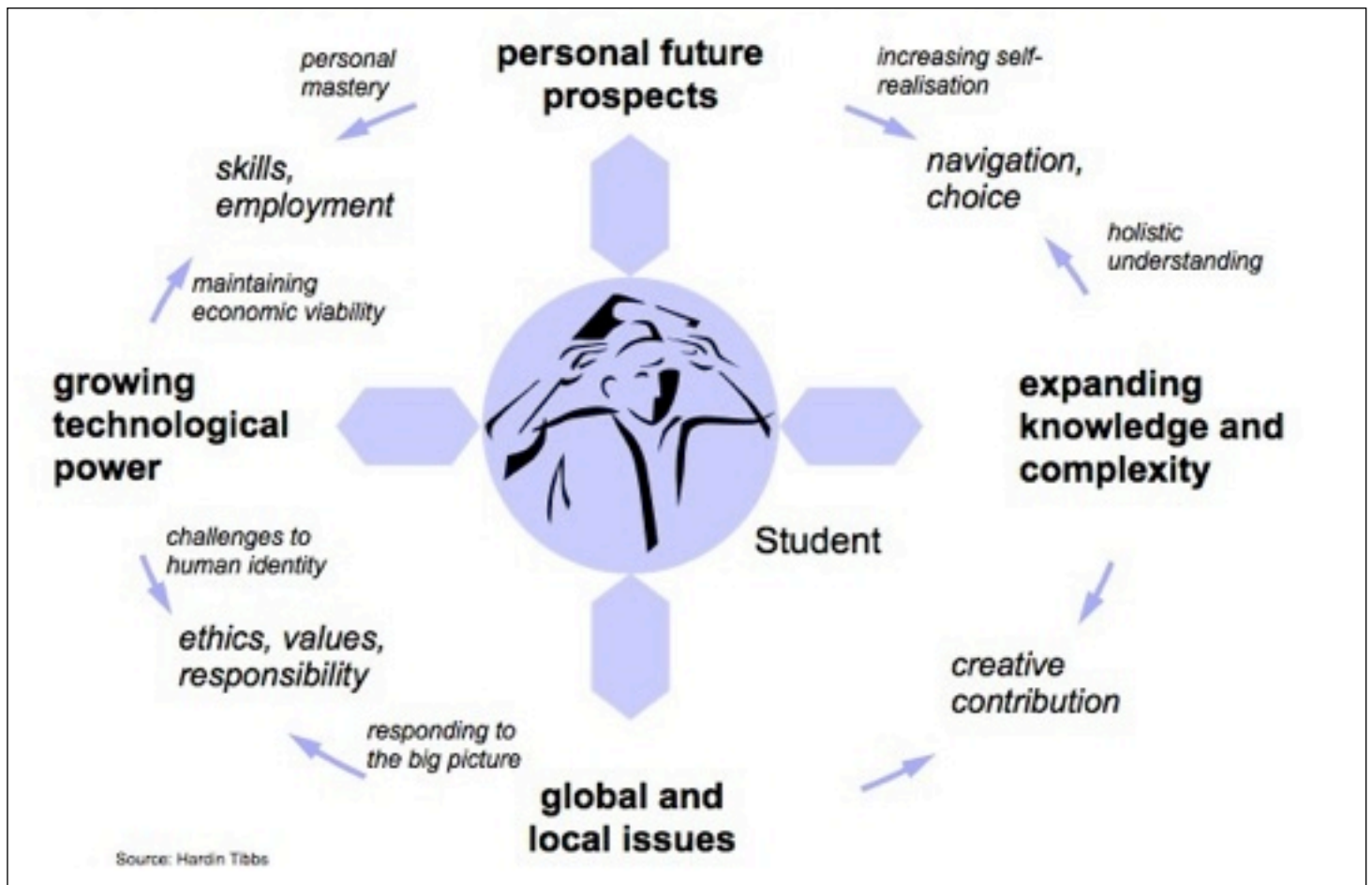


Figure 3: How students hope education will help them navigate an increasingly complex and rapidly changing world.



by the involvement of the knower, so that the individual's effort to create personal meaning has rising importance, both for themselves and for society.

Learners are now

customers who engage in a participatory learning dialogue in which they not only consume but produce knowledge, learning is lifelong, and everyone is either "learning or earning."

These new principles are being advocated by educational innovators such as Stephen Heppell and point to the emergence of a new model, outlined in Figure 2, on the previous page.

The core of the new learning model is learner-centric rather than teacher-centric, with a focus on providing resources for facilitating and guiding the development of the whole person (see Figure 3, above). The teacher

increasingly becomes a "guide on the side" rather than being the "sage on the stage."

As it happens, this new learner-centric emphasis fits well with the educational potential now offered by the internet. The conceptual design of online learning offerings should therefore aim to reflect, embody and enable these new organising principles, and avoid trying to replicate the industrial-era university. ◀

Hardin Tibbs is an independent futurist and consultant with over 20 years' experience of future-oriented strategic thinking. His company, FutureLens, is based in Cambridge, England.

Further Reading

John Henry Newman, *The Idea of a University*, 1858.

Ivan Illich, *Deschooling Society*, 1971.

Duke Maskell and Ian Robinson, *The New Idea of a University*, 2002.

Jennifer Washburn, *University Inc.: The Corporate Corruption of Higher Education*, 2006.

Clayton Christensen et al, *Disrupting Class: How Disruptive Innovation Will Change the Way the World Learns*, 2008.

The Khan Academy: www.khanacademy.org/about

A New Science of Qualities': a talk with Brian Goodwin. *The Edge*, 1997.

Overhauling higher education

by Sara Robinson

Americans share a broad understanding that their educational system is due for a major overhaul. The visions of what a new system should do, and what it needs to accomplish for both the student and for our civilization, are a subject of increasing debate. And the debate reveals at least one clear point of consensus: the old industrial-era model that's been in place for the past 150 years is no longer delivering the goods.

Here are some of the forces of change that are re-shaping higher education in this century. Looking at them laid out in one place, it's hard to escape the conclusion that higher education is in the grip of a realignment that's undermining the model that's served us so well for many centuries.

Erosion of the

meritocracy. In his book, *The Twilight of the Elites*, Chris Hayes documented how our old ideal of an equal-access meritocracy is failing in America; and also how our university-educated elites are in turn failing America. He argued that meritocracy is failing in part because it's increasingly harder for people from the lower classes to get to college. A two-tier public education system, exploding tuition, an SAT testing regime that's being gamed by the rich (who can afford tutors), the atrophy of our public universities, and the threat of overwhelming student debt are increasingly making college what it was a century ago: a luxury only for the wealthy.

The result of this, he argued, is that our national leadership is drawn from an

increasingly narrow band of elites; and these elites lack the perspective to lead the country well. As a result, the American public is losing faith in a great many credentialed professions, and the institutions they represent.

Objectivity under attack.

As documented by Allan Brandt in *The Cigarette Century* and Naomi Oreskes and Erik Conway in *Merchants of Doubt*, there's been a 60-year campaign by major corporations to systematically undermine Americans' faith in science. Started by PR firms seeking to cultivate public doubt about the tobacco-cancer link, this campaign has now moved on to undermine our collective understanding of evolution and climate change as well.

On a wider level, this campaign is actively encouraging the mass of Americans to reject science entirely, and discount anything they're told by scientists. Americans who have been through university-level general science courses (even 100- and 200- level courses) are far more likely to understand and accept important concepts like evolution and climate change. In contrast, this study shows that US high school graduates are to a large degree scientifically illiterate.

Similar revisionist efforts are afoot in the teaching of American history and economics. In particular, political conservatives are endowing university chairs in an effort to perpetuate discredited ideologically-driven theories that are at odds with the factual basis of both disciplines.

Science for sale. Over time, university-based scientific research is funded less by government and more by corporations—which are then able to dictate what will be researched, by whom, and in what way. In this way, corporations are exerting more control over what gets funded and published within the academy, crowding out pure research.

There's also abundant evidence that fundors favor researchers who are willing to skew results toward a preferred conclusion; and that funded research tends to yield results that tend to reflect the best interests of the funders. Funders—both private and governmental—are also more aggressively attempting to interfere with the peer review function of scholarly journals.

All of this limits and compromises the scientific discussion, which in turn significantly affects the quality of the research that gets done. It also plays into the hands of those who are seeking to undermine public faith in science. As a long-term, deep trend, allowing university research to be co-opted by moneyed interests represents a serious political and cultural challenge to the perceived legitimacy of the academy in its current form.

Cost/benefit of a university education. Over the past year, state and national politicians have proposed gathering “return-on-investment” (ROI) information on degree programs, so that students and lenders can have good consumer information about which degrees will yield the highest income return after graduation. Some national

politicians have suggested that federally-insured student loans should be preferentially granted to “high-ROI” degree programs.

While these initiatives are presented as pro-consumer efforts to help families spend their education dollars more wisely, there’s a darker side that should also be part of these discussions: Policies like this also hasten the evolution of the university into a glorified trade school. As a result, as a society, America will have far fewer linguists, musicians, Sinologists and Arabists, anthropologists, poets, and so on. These professions may not pay well, but the arts and humanities are the heart and soul of all great civilizations—and no civilization has abandoned the teaching of them and survived for long.

The shrinking middle

class. Unfortunately, the above cost/benefit calculation is being made in almost every middle-class household left in America. Given the high cost of college and the prospect of a lifetime of student debt, parents and students are re-thinking the value of university education altogether. Many of our top high school graduates are cobbling together the education they need from other, cheaper sources. They’re opting to learn more lucrative hands-on trades, informally apprenticing to experts in fields they’re interested in, or relying on online courses and shorter certification classes. This situation is loudly demanding that universities argue more strenuously for the value that they bring to society, and work harder to justify the cost of their offerings. Their survival depends on how much real lifetime value Americans believe that education will have.

The changing purpose of education. At the root of this conversation is a pervasive tension—do we value private goods that benefit only ourselves, or do we also believe in the larger common good? As long as a university education is seen as a private good (with benefits that redound only to the student), universities will be forced to justify themselves in terms of their economic value alone.

The answers to this question are shifting. We are at the nadir of a 40-year cycle in which the rights of individuals have been given primacy over those of community, which is why market values are being imposed on every institution, including universities. And the pendulum will likely continue to swing as the (very collectivist) Millennial generation ascends to cultural dominance over the next decade. Universities should position themselves to capitalize on the Millennials’ instinct for the common good, and revive the idea that there are some things that have essential cultural value apart from market values.

Here comes everybody. At the same time Americans’ faith in the university-educated meritocracy is declining, the internet has fueled a resurgence of a longstanding cultural belief that everybody is entitled to an opinion, regardless of their familiarity with the topic. (In fact, this is one of the core levers used by the anti-science campaign: the idea that real Americans shouldn’t listen to experts—like scientists—but rather work out the answers to important questions for themselves.) Again, this serves to erode the status of experts—like professors and researchers—and with it, ultimately, the general willingness of our society to support them.

Learning and the gift economy. Stewart Brand once famously said that information wants to be free—which means that anybody who’s in the business of brokering information is facing the possibility of having to survive in a gift economy at some point in the future. Our landscape is already littered with the corpses of businesses that have succumbed, from newspapers to travel agents. And universities will not be immune from this trend. As the number of venues through which people can acquire needed knowledge and credentials increases—and the price of acquiring those things decreases—the level of cultural support for vast university campuses and expensive faculties (and the willingness to pay ever-spiraling tuition costs) will decline.

The emergence of the relationship economy. The cutting-edge businesses of the 21st century are calculating success not on the basis of number of sales, but rather the number of customers with whom they cultivate long-term relationships. In this model, customer service is the number one product; all else is subordinate to making and keeping strong, lifelong bonds with your customer base.

Universities are already very experienced at building intense loyalty among their stakeholders. But it may be time to bring the lifelong nature of the student-U relationship even more front and center—start it earlier, support it more strongly later, and loosen the ways in which people can affiliate so that many more people will feel invested and involved. Certain exclusivist academic traditions, like selective admissions and grading, may have to be reconsidered and re-imagined in order to do this at a large enough scale.

The next generation of students will be more willing to ask tough existential questions and to think deeply to find the answers

Changes due to the

internet. Super-professors. MOOCs. The lack of social interaction among and with distance students. The high online dropout rates. Those concerned about our changing universities are already well aware of the challenges posed by the internet.

To these concerns, I offer two thoughts. The first is that online teaching is a pedagogy unto itself. It can be execrable, or excellent, depending almost entirely on the design of the online platform and the skill of the professor who uses it. There's a real and valuable skill set here, and mastering it matters—a lot.

The second is that this problem may have a strong generational component. Boomer and X-er faculty and administrators may well be seeing a problem that the Millennials—as the first digital natives—won't recognize. They grew up forming close relationships online, and doing the bulk of their learning from YouTube and Google and all the rest of it. When they start teaching, they'll probably have a very clear grasp of how to form compelling learning communities—a grasp that eludes those of us who didn't grow up with smartphones in hand.

The Maker movement. As noted above, middle-class Millennials and their parents are increasingly skeptical of the value of a university degree. At the same time, Millennials see the acquisition of hands-on making and manufacturing skills as intensely desirable. Not only does having a trade liberate them personally from depending on an economic order

they see as unstable, and workplaces that don't share their interests or values. In their view, it's far better to be an employed gardener or shoemaker—either solo, or as part of a growing worker-owned business—than an unemployed lawyer.

Universities may find it in their interest to welcome this trend. This generation is already expecting more hands-on learning and more experiential techniques that get them out into the field. Courses that encourage students to team up on projects where they achieve real things together, in real time, can go a long way toward replicating the communities of learning that so many fear are about to be lost.

Look who's coming next.

Finally, looking to the 2018-2020 time frame, there will be a changing of the guard, as the last Millennials give way to the leading edge of the Homeland generation—the kids who cannot remember the world pre-9/11.

This generation will be very similar in style to the Silent Generation that came of age during WWII. They will be just about as cooperative and communitarian as the Millennials; but they're also going to be more interested in the deeper meanings of things, and capable of enormous nuance, compassion, and complexity. Gradually, between 2020 and 2030, universities are going to find themselves dealing with students who are more willing to ask deep, hard existential questions, and who are also more willing to read and think deeply to find the answers. It's going to be a refreshing change—and one that university planners need to bear in mind as they think about their campuses decade from now. ◀

Sara Robinson, MS, APF, is a consulting futurist specializing in social change. [A longer version of this article first appeared in two parts at futurist.com.](#) It is re-published here with our thanks to [futurist.com](#).

Re-shaping the university

by Bryan Alexander

This is a challenging and exciting time to work in the education futures space. American schools are under enormous pressures: political, economic, cultural. At the same time digital technologies present a variety of options to educators, from creative opportunity to replacement.

In order to start thinking through this topic I have assembled a series of trend lines. These are drawn from a monthly report I publish, along with continuous social media feedback and environmental scanning. They are divided into macro categories of education's environment, followed by the intersection of education with technology. There is also a final category which ties together many of these trend lines, concerning the possibility of peak education or a higher education bubble.

I. The education environment

Demographics play a major role in campus planning, as the decline of the American population aged 1-18 drives K-12 [primary and secondary] and higher education to compete more fiercely for a dwindling market. University and college recruiters

American institutions continue to build branch campuses in other nations, and a growing proportion have socio-political contexts different from those of the liberal Western world.

In addition to the demographic problem of a shrinking pool of *available* students, the *actual* number of enrolled students has

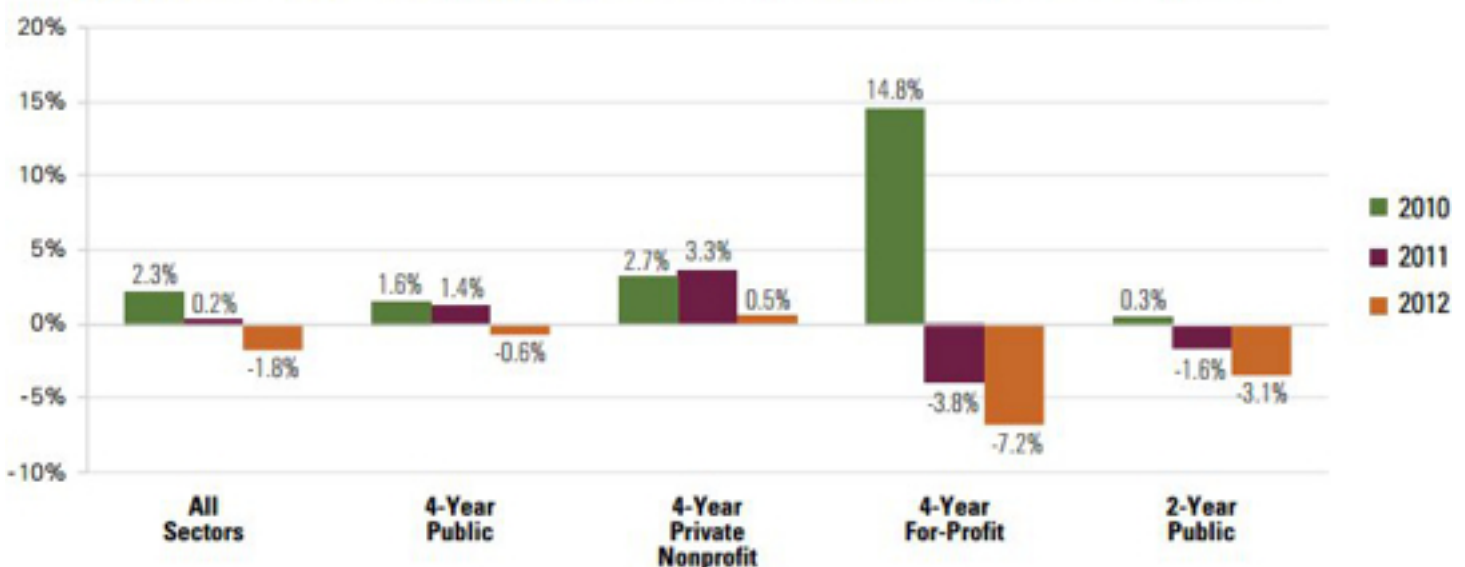
The majority of college and university instruction is now done by part-time faculty lacking the institutional support and benefits of tenure-track colleagues

have greatly expanded their efforts in unconventional geographical areas, including the American southwest and east Asia.

At the same time many countries are engaged in reforming and developing their higher education sectors, while sending large numbers of students abroad.

declined overall across the past three years. Various reasons have been put forth for this decline: the ongoing economic malaise, shock at student debt, a crisis of faith in educational outcomes. It is unclear if this represents a temporary drop or an indicator of a long-term plateau, or even decline.

Figure 1: Percent Change from Previous Fall, Enrollment by Sector (Table IV, Degree-Granting Institutions)



Part of the education reform movement concerns new forms of assessment and certification. The badges movement continues to grow, and more campuses have created structures for registering lifelong learning achievements. No major alternatives to overall degree certification have emerged so far.

Meanwhile the composition of the American professoriate has changed. The majority of college and university instruction is now done by adjuncts, part-time faculty lacking the institutional support and benefits of their tenure-track colleagues. Education reform has now connected with this aspect of education, as labor organization is now occurring in several urban areas, and seems likely to

continue in 2014, given adjuncts' status and media stories of abuse.

One aspect of education remains immune to the reforming spirit. Despite moral scandals and the financial stresses to higher education, institutions remain committed to supporting student athletics programs.

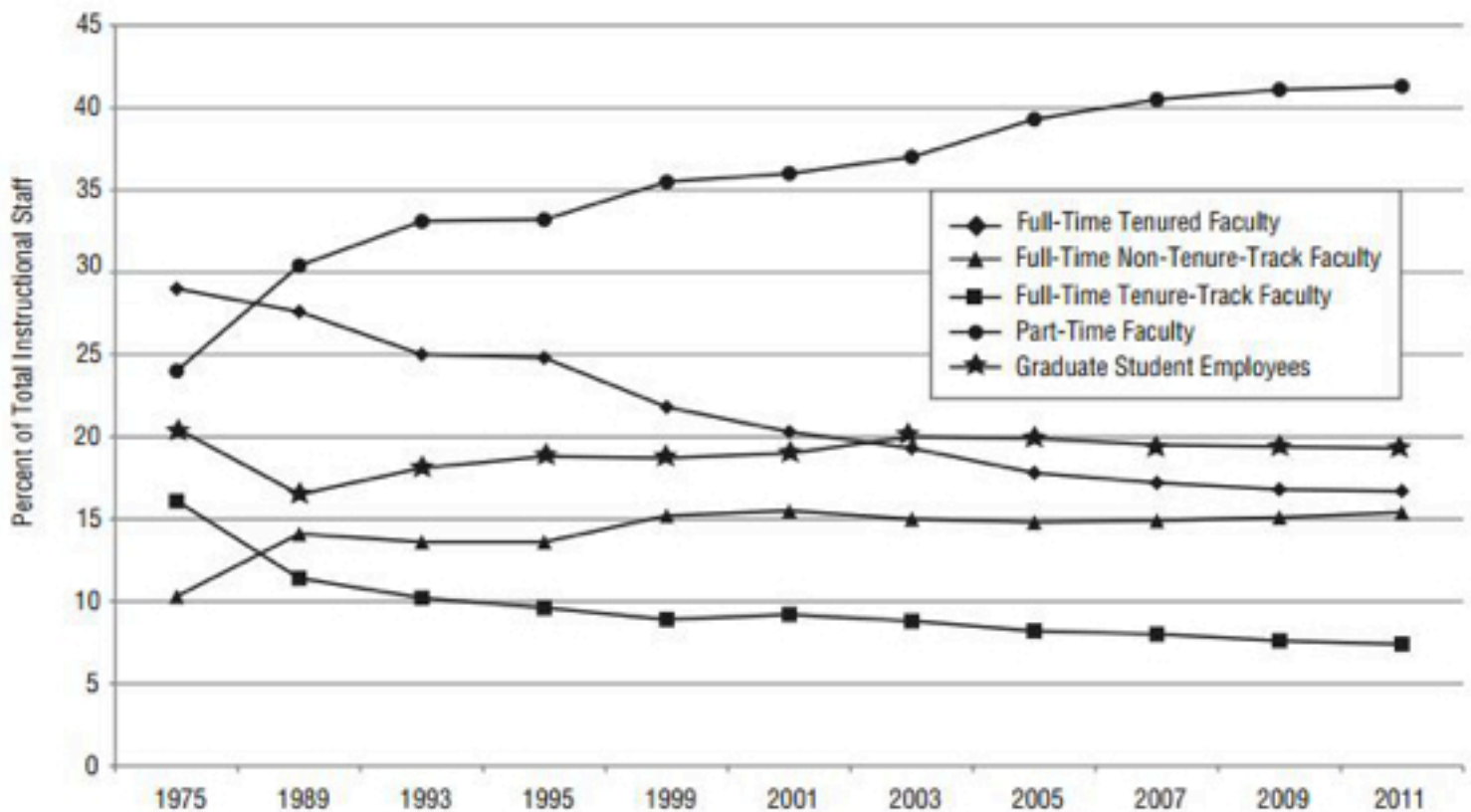
Intriguingly, there are no signs of intergenerational tension in this stressful situation, although, for example, older faculty tend to enjoy a greater proportion of tenured jobs as compared the generally adjunctified juniors. Teens and 20-somethings are unhappy about debt and employment, but have yet to express this in 1960s-style generational critique.

2. Education and technology

Online learning is the most visible category within the broader field of technology's impact on education. Within that category, MOOCs continue to dominate news and discussions. The number of MOOCs grows, as more campuses (both from the United States and elsewhere) partnered with MOOC providers to offer courses.

It is unclear to what extent Udacity's noteworthy pivot away from higher education will inspire a broader MOOC turn. It is also unclear if universities (and employers) will start accepting MOOC completion evidence for credit; they have not done so so far.

Trends in Instructional Staff Employment Status, 1975–2011
All Institutions, National Totals



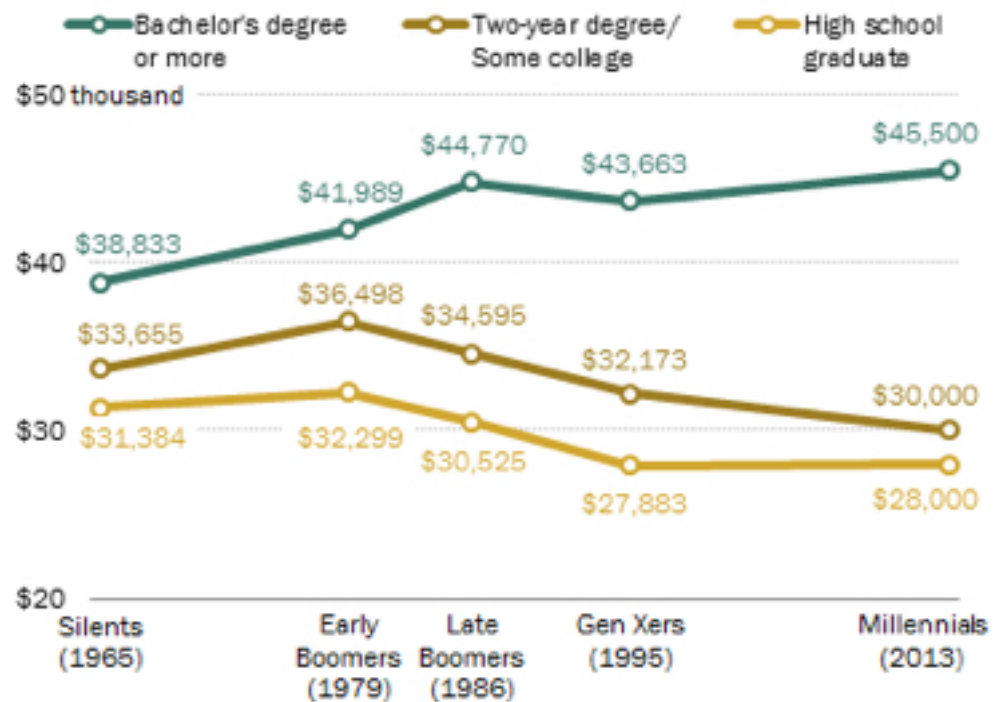
Notes: Figures for 2011 are estimated. Figures from 2005 have been corrected from those published in 2012. Figures are for degree-granting institutions only, but the precise category of institutions included has changed over time. Graduate student employee figure for 1975 is from 1976. Percentages may not add to 100 due to rounding.

Source: US Department of Education, IPEDS Fall Staff Survey.

American higher education has reached a decisive moment. We have seen 'peak higher education' as America supported its maximum student population.

Rising Earnings Disparity Between Young Adults with And Without a College Degree

Median annual earnings among full-time workers ages 25 to 32, in 2012 dollars



Notes: Median annual earnings are based on earnings and work status during the calendar year prior to interview and limited to 25- to 32-year-olds who worked full time during the previous calendar year and reported positive earnings. "Full time" refers to those who usually worked at least 35 hours a week last year.

Source: Pew Research Center tabulations of the 2013, 1995, 1986, 1979 and 1965 March Current Population Survey (CPS) Integrated Public Use Micro Samples

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In other trends:

- Blended learning is on the rise, as some campuses emphasize this combination of face-to-face with online learning as a strategic response to the challenge of distance learning.
- The open education movement persists, and seems to grow, at least in terms of the amount of open content. The number of open access journals has increased.
- Students, staff, and faculty use social media for a variety of purposes. Media stories of social media controversy surface regularly, usually when a poster's expression collides with institutional leaders' desires. Overall, social media has matured into a major communications channel for education.
- The Maker movement is achieving some presence on campuses, most notably in the form of Maker spaces.

- The digital humanities movement thrives, producing research, content, and scholarship, without much controversy or drama.
- Faculty members have taken to resisting their institutions' use of technology either as individuals or through departments and larger bodies, usually focused on the perceived threat of some form of distance learning to the academic enterprise and the professoriate. Humanities departments are strongly represented in this tendency.

- The number of business start-ups emerging from academia or aimed at serving educational needs grew steadily, while concerns about the impact of business funding on higher education rose.
- Faculty, staff, and students increasingly spend time with mobile devices. This has taken numerous scholastic forms. Campus IT departments have been developing new support strategies.
- 3D printing pilots are appearing on campuses, hosted by individual academic departments and libraries.

One phrase to conjure with: 3D printing across the curriculum.

- Colleges and universities have not been immune to the world's digital security challenges, as malign actors impinge on campus infrastructure and occasional data errors elicit media attention.
- Digital video (production and especially consumption) and videoconferencing seem to be on the rise.
- The many potential uses of gaming and gamification for learning are apparent, but appearing in small numbers so far.
- Big data and data analytics holds much promise for education, but implementations are in very early stages so far.
- Learning management systems persist, with a slight tendency towards the more social-media-oriented style exhibited by Instructure's Canvas.
- A number of institutions took drastic steps to stave off financial crisis, including merging with other campuses, closing academic programs, and laying off faculty.
- The number of students taking classes went down across many sectors (see above).
- Some graduate programs are suffering badly, most notably law schools, who saw declining revenues, applicants, graduates, and jobs.

3. The higher education bubble

This topic wraps together a variety of trends, and posits that American higher education has reached a decisive moment. Colleges and universities may have experienced a bubble akin to the recent real estate one, and are experiencing its first stage of deflation. I have an alternative interpretation, that we have witnessed 'peak' higher education as America supported its maximum student population. Peak or bubble, these trends underpin it:

- College and university tuition fees (published, not net) continue to rise, received strongly negative reactions from students and families.
- The total amount of student debt rose throughout 2013, inspiring widespread anxiety.

Americans think college is too expensive and fewer of us enroll, but the benefits remain and no alternatives have seriously challenged higher education

- Political pressures on higher education remain strong. Some of this occurs in partisan terms, as Republicans extended their criticism of public K-12 to all of higher education. Otherwise Democrats join in, from a presidential charge to build a new institutional assessment system to high-profile governors and mayors calling for reducing higher education fees.

At the same time several powerful trends counter the preceding:

- The boost to lifetime earnings associated with attaining an undergraduate degree, a/k/a "the college premium", remains in evidence, despite anxieties about rising tuition and student debt.
- College and university endowments grew in 2013.

In other words, Americans think college is too expensive and fewer of us enroll, but the benefits remain and no alternatives have seriously challenged higher education. ◀

Bryan Alexander is a futurist working in the area of education and technology. He blogs at bryanalexander.org, and publishes a free monthly newsletter, Future Trends in Technology and Education.

Badges? We don't need no LinkedIn badges

by David Birch

The son of a Texan friend of mine decided earlier this year not to go to college, as someone like him would surely have done a few years ago. Instead he dropped out of high school and went off to interview potential employers in San Francisco. A talented programmer, he accepted one of a number of job offers, turning down Google in the process, and is already hard at work.

To me this means that he has, in essence, made the calculation that the use of social networks will replace the “badges” that my generation valued to determine reputation. Having spurned Eric Schmidt’s [advice from SXSW](#) that everyone should go to college, he has begun to stockpile the social capital that will power the post-industrial revolution. He has opted for the social network over the fraternity as the basis for future advancement, and I hardly think he will be the last to do so.

He is bypassing the “hack” of using badges as a substitute for more valuable and accurate information that used to be too expensive to gather. A college degree is a hack? Yes. At an “[Unconference](#)” my colleagues and I hosted in Palo Alto last year, [Sam Lessin](#), the Head of the Identity Product Group at Facebook, talked about the way in which human societies evolved *trust networks* to increase efficiency by connecting with more trading partners and by capturing more information about those partners over time.

Money became a key element of these trust networks because it was cheaper to trust the money than the credit of a

counterparty beyond your clan, village, or tribe. In time, the networks grew, and it became cheaper to trust other intermediaries too, rather than gather and collect and store the information about the trading partners.

Sam introduced me to a useful way of thinking about these intermediaries, what he called social “hacks.” Shortcuts. Workarounds. Approximations. These

As social capital (the result of the computations across the social graph) becomes accessible and useable, the hacks will fade. A college degree will be *worth* less than it is now. Using hacks instead of real data is just not good enough in a connected world. Google was famous for its rigorous hiring criteria, but when its analysts looked at “tens of thousands” of interview reports and attempted to

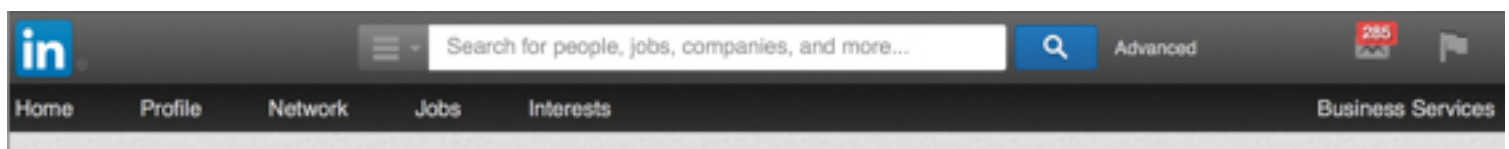
Social “hacks” are shortcuts and approximations, things like badges, diplomas, dress codes and credit ratings. But we will no longer be needing them.

hacks are things like badges, diplomas, dress codes, and, as it happens, credit ratings. However, because of what he called the “superpower” all of us have now gained – the ability to instantly communicate with anyone else on Earth – we will no longer be needing those hacks.

This way of looking at the existing business models around identity (that is, as being hacks in response to incomplete authentication, attributes and reputation data) provides a good way of understanding the logic of what my acquaintance’s son has done.

[correlate them with employee performance](#), they found “zero” relationship. The company’s infamous interview brainteasers turned out not to predict anything.

Even more interesting: Nor did school grade and test scores. As job performance data racks up, the proportion of Google employees with college degrees has decreased over time. It’s a development that Rory Sutherland, the Vice Chairman of Ogilvy & Mather UK echoed when he [recently wrote](#) that he



was unable to find any evidence that “recruits with first-class degrees turn into better employees than those with thirds (if anything the correlation operates in reverse).”

You can see exactly where this headed if you think about the way that we already use LinkedIn, Twitter and Quora. In the old world, I would use the social hack of finding out which university your degree came from as a sort of proxy for things I wanted to know about you if I was recruiting.

But I no longer need to do that because from the social graph I can find out if you are smart, a hard worker, a team player, an expert on the endochronic properties of

From the social graph I can find out if you are smart, a hard worker, or a subject expert. So there's less premium for learning at a prestigious university.



Checking badges.

Image credit: [Girl Guides of Canada](#), under licence CC BY 2.0

resublimated thiotimoline or whatever. So there's less premium for your learning, say, biochemistry at Harvard rather than Swindon Polytechnic: as long as you know the biochemistry, my hiring decision will be tied to your social graph, not the hack of institutional badges.

It is happening now

because the powerful combination of the mobile phone, the social graph, and new authentication technologies is reducing the cost of using social capital effectively at a transaction level. Hacks such as high-school diplomas and glossy CVs are being replaced by social capital because the social graph is a more efficient form of the kind of memory we need to make transactions work.

Personally, I still think there is something to Eric Schmidt's advice. I didn't go to college only to learn about physics, but to be socialized. I found out about politics and arguing, about learning and art, about curiosity and community. What I suspect, therefore, is that the college degree is not about to disappear but about to transform. Maybe two years rather than three or four will be sufficient for a great many people across a great many disciplines. I'll still want a doctor who went to medical school, but perhaps I'll want a programmer from the school of LinkedIn. Most of the working world will fall somewhere in between. ◀

David Birch is a founding Director and Global Ambassador at [Consult Hyperion](#), a consultancy that specialises in secure electronic transactions. This column was first published on the [HBR Blog Network](#), and is republished here with their permission and our thanks.

Student Needs 2025+

by Katie King

Cultivate personal brands.

Ask questions that artificial intelligence can understand. Hack your way into effective activism.

In the year 2025, students will need to be skillful in these areas, according to an assembly of researchers in the University of Houston Foresight program who, on behalf of the Lumina Foundation, are working to answer a simple question:

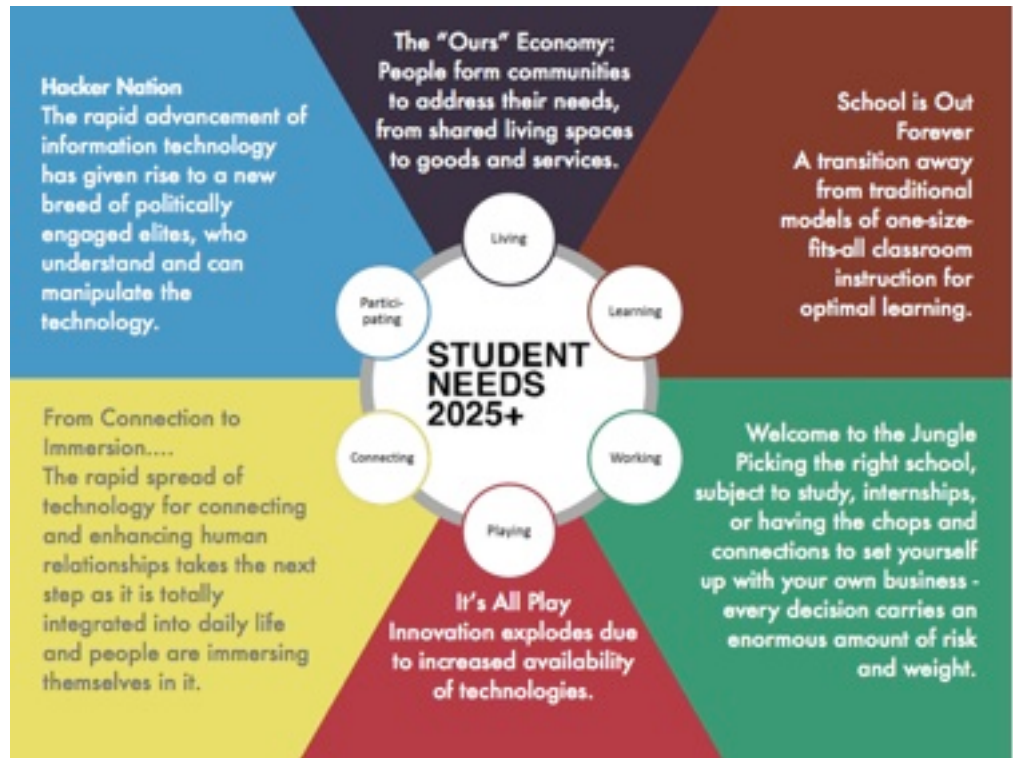
Could changes in student needs alter what higher education will provide by 2025 and beyond?

Student Needs 2025+ is a six-month project in which 20 University of Houston faculty, alumni, and students, are using Houston's Framework Foresight process to produce forecasts of future student needs and identify implications and issues for higher education. The teams are exploring how students will be living, learning, working, playing, connecting, and participating in the future.

Andy Hines, coordinator of the Masters in Foresight program and project lead, says most studies about the future of higher education have a limited focus just on learning. He believes that looking at all aspects of student life and using the team's expertise in foresight and futures tools will uncover connections and trends that higher education doesn't normally see.

"We know that Lumina has a handle on the future of higher education, especially from the point of view of the institutions," he says. "But what about the students and their needs? Could they be much different a dozen years from now? That's the question we're exploring, and, unlike most

A. Hines & P. Bishop, "Framework foresight: Exploring futures the Houston way," *Futures*, Volume 51, July 2013, Pages 31-49.



The six domains of Student Needs 2025+. Source:Houston Foresight

studies looking at higher education, we're 100% focused on the student rather than the institution."

Lumina is a leading higher education foundation with a goal of raising higher educational attainment levels from 40% today to 60% in 2025. The rationale for the Houston Foresight commission: "Strategic foresight is what leaders should spend most of their time doing," according to Kiko Suarez, the foundation's Vice President of Communications and Innovation.

"Lumina is determined to help the United States reach Goal 2025, and firmly believes in providing thought leadership in the field of post-secondary education attainment through strategic foresight."

The research teams recently presented at the Foresight program's Spring Gathering, and shared preliminary findings to about 30 alumni and students.

After seeing the findings,

Hines was struck by how lines between the six categories will blur in the future.

"Play is a recurring theme in all six domains. It's changing from a stand-alone, structured activity to being a part of everything."

Another recurring theme is technology: "Technology is moving from an accessory to an essential component of the fabric of student life," he says. "It will be so integrated that students will have a hard time imagining life without it."

Scan hits, analysis, and interviews with the researchers can be found on the [Houston Foresight blog](#), Twitter feed (@houstonfutures), and at #studentneeds2025. ◀

Katie Bishop is a student on the Houston Foresight program.

Time and the university

by Andrew Curry

One of the things I have learnt from my time as a futurist is that the past matters as much as the future. Paul Saffo (2007) popularised this with his injunction that you should look "twice as far back as you look forwards," although in my experience this is not nearly far enough.

Indeed, in some projects I have found that you have to go deep into the history of the institution or sector to make sense of it. For example, on a project about the future of water management, we found ourselves wading into the history of the 19th century municipalities and their attempts to provide clean piped water and sewage systems. More recently, in a workshop with Britain's leading open access university, we similarly went back into the history of opening up education, initially to Britain's 1870 Education Act, and then further, to the printing press and the spread of cheap books.

It is enticing to look at the recent history of the higher education sector, and examine the squeeze it faces, particularly in the richer countries of the North (and certainly in the Anglo-Saxon world), caught between the ICT transformations of the latest technology wave on the one hand and 30 years of aggressive public sector marketisation on the other, and conclude that nothing will ever be the same again.

But it is also worth at least a moment's pause. As Hardin Tibbs observes elsewhere in this collection, the European idea of the "university" is a 900-year old institution. In the UK, it goes back 800 years, as it does in France; in the US, Harvard predates the Republic by more than a century, Yale by 75 years. Even the modern stripling, the German-invented "industrial university", is 200 years old. It is at least possible that despite the current pressures they will, as institutions, find ways to reshape themselves in less predictable ways that have closer connections to their deep history.

One way into this discussion is through the work of David Watson. In his recent book *The Question of Conscience* (2014), he suggests that there are five discourses about the university that have appeared since the early universities were founded, and that these now co-exist. He usefully summarised these in a list in the book (his bullet points and capitalisation):

- **“The Question of Conscience (especially through religious foundations)**
- **The Question of Character (as formed through ‘liberal’ higher education)**
- **The Questions of Calling, Competence and Craft (in the**

zones of professional and vocational higher education)

- **The Question of Citizenship (as in respective obligations to civil society, the state and global obligations)**
- **The Question of Capability (the role of higher education in inculcating life-skills, including employability).”**

Of course, the present

picture is not attractive. The education sector, in any country, is shaped in the short-to-medium term by local (meaning national) social, economic, and political trends. In England*, where the numbers attending university have increased over a generation from around 10% of the eligible population to more than 40%, the means of trying to finance and manage this increase have involved turning autonomous public institutions, that could be influenced through public policy, into *faux*-market institutions that adopt the forms of the commercial sector even while the “market” they are supplying is completely shaped by the government.

* *The higher education systems of Scotland, Wales and Northern Ireland are run separately from that of England.*

The current English higher education policy has been shaped by just one model of the university—a model that elevates the idea of capability and employability.

It is, however, clear that the policy has been framed by a single model of the university, of capability and employability. Actually, it is worse than this: it has been framed by a model of the university imagined as a part of a market in education in which good educational outcomes are driven by consumers (students) exercising choice. This was, in effect, the result of the Browne Report, named for its chair, the former chief executive of BP. He was commissioned by the last Labour Government and reported to the current Conservative-Liberal coalition, who implemented his recommendations without putting them out to consultation.

Andrew McGettigan (2014) has summarised the effects concisely: “Readers will be most familiar with the creation of a new market in undergraduate recruitment through the large-scale cuts to direct grant funding, increases in fees and the relaxation of caps on recruitment at individual universities. As David Willetts, Minister for Universities and Science, told a fringe event at the most recent Conservative party conference: unleashing the forces of consumerism is the single best means of improving the quality of undergraduate provision.”

Fees have been ratcheted up to £9,000 a year, from the fees of £3,000 a year introduced a decade ago, while a graduate tax model was discounted precisely because the loans system was thought to turn students into consumers. Public

funding has largely been removed from teaching. Already there are signs that students from poorer families are deciding to stay away from university, despite rhetoric in the Browne Report about “increasing social mobility.” The evident flaws in the model have been deconstructed forensically by Howard Hotson (2011). Perversely, the concessions made to low-earning graduates as the political price of pushing through the latest hike in fees could have destroyed the financial calculations made at the time: it may have better to leave the fees as they were.

The institutions seem to have heard the discourse about the market more quickly than the students. Vice-Chancellors award themselves lavish salaries, regardless of the performance of their institutions (“a new breed of academic fat cats”, said Guardian journalist Aditya Chakraborty); they have outsourced services even though it is more expensive than not doing so; and they have clamped down on dissent, sometimes colluding with police. The University of London, in particular, seems to have taken on the persona of a 19th century mill owner. It has closed its student union, while, as one writer noted at the end of last year, “protesting on campus has been effectively banned by the university since the summer,” and done its utmost to face down strikes over pay and conditions by its lowest paid service staff.

This model of a university is thin stuff, of course, a narrow interpretation of just one of David Watson’s dimensions. It seems unlikely to be a long-term resolution of the funding shortages of the 1980s and ‘90s that created the current crisis. And as Howard Hotson has argued, it is also a model that carries within it the seeds of its own crisis. If you leave the fees the universities charge uncapped (as Browne proposed), you uncork a spiral of elitism that has increasingly poor public outcomes.

If you cap them, and thereby acknowledge that higher education is also a matter of public policy, the contradictions between the public interest and the simulacrum of the market quickly unravel. Indeed, all around the edges of the Browne Report, such contradictions appear. For example, as Stefan Collini (2011) notes, it proposes central funding “for ‘strategically important and vulnerable’ subjects that ‘require support to avoid undesirable reductions in the scale of provision’.”

David Watson argues elsewhere in his book that “the history of higher education is essentially geological. Strata are laid down at different times, in differing ways, and for different purposes, but once there are irremovable. ... ‘Pipes’ connect some locations directly with earlier layers.”

This seems, then, to be a question about time. So let’s map the university back onto another theory of layered time, of Stewart Brand’s pace layers (1999). The six layers



Gargoyles at Magdalen College, Oxford. Images by Chris Creagh, via Wikimedia Commons.

move at different speeds, as in the image to the right, from the fastest at the top to the the slowest at the bottom. Not much to see at the top layer (fashion & media), which is too fast-moving to be useful, and not much either at the bottom (nature), which is too slow. But the middle four layers—commerce, infrastructure, governance and culture—are richer territory. Commerce seems to move, at least by my interpretation, in 30-year cycles, while infrastructure renews every 60 to 70. Governance is slower, perhaps running on 200-year timescales (think of the idea of the “seventh generation”), while culture runs slower, at 500 years, perhaps a thousand. “The fast layers innovate, the slow layers stabilise”, says Brand. “The whole combines learning with continuity.”

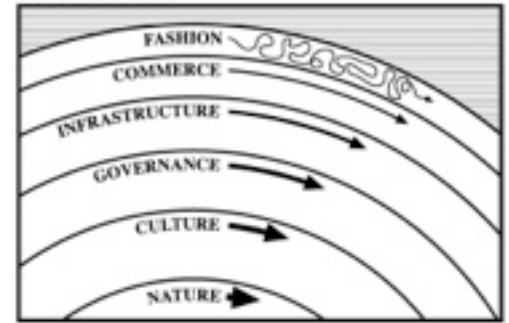
As it happens, Brand argues more or less in passing that, “Education is intellectual infrastructure; so is science. Very high yield, but delayed payback.” This might be a reasonable account of the

As we adjust to a world of limits, universities will be required to address different questions

“industrial university” model of the 19th century, created to develop and manage the new infrastructures of the industrial revolutions. But when you look at it through David Watson’s five lenses, it seems quite a narrow view, as is seen in the Table below.

My suggestion, then, is that the whole current discourse around the future of the university has been squeezed onto two of the relevant pace layers, Commerce and Infrastructure, and the others have simply been removed from the debate.

But when you go back to the wider economic and social context, it is clear that capitalism, and the traditional business behaviours that have driven it for the past 150 years or more, are running out of space. The 20st century market that Britain’s universities are urged to model themselves on has become saturated and outdated. As Nancy Fraser (2014) has observed recently, it is reaching three different sorts of limits: limits of nature (resources), limits of social reproduction (family, learning, and so on), and limits of law and polity (the maintenance and management of the institutional frameworks that make markets possible). These limits mean that services that used to come free are either running out or have to be paid for. To find new ways of managing these limits we need new forms of knowledge that can underpin disruptive social innovation, just at the point where we are, at least in the UK, constructing models of the university that are rewarded for replicating, even reifying, the *status quo*.



The six pace layers. Image from Brand, *The Clock of the Long Now*.

Of course, new forms of business management are emerging that acknowledge these limits. It seems likely that over the next 15-20 years these new organisational forms will be one of the legacies of the 2007 financial crisis, just as new forms of economic management emerged from the Crash of 1929. And so it also seems at least possible that our universities will be required to address different questions, in different ways, than those to which they have been asked to respond in the past two decades.

There’s little space here to speculate on what form these institutions will take. But in an age when global multinationals are experimenting with mindfulness as a way to get the most from their staff, it doesn’t seem so foolish to suggest that issues of conscience and character might start to reappear in the public discourse about the university. Or, when there is discussion in the commercial world, for example by Tom LaForge at Coca-Cola, of brands becoming “the expression of desired society”, that notions about citizenship are likely to be close behind.

Timeframe	Pace layer (Brand)	Question (Watson)
30 years	Commerce	Capability
60 years	Infrastructure	Calling/ competence
200 years	Governance	Citizenship, Character
500 years	Culture	Conscience

“The university is a social technology for manufacturing knowledge as a public good.” (Steve Fuller)

For his part, Watson concludes that “higher education’s purposes come together in terms of self-creation and the authentic life, the habit of thinking deeply, and the capacity to connect with others empathetically.” These are all deep values which also have strong contemporary resonance. They are more likely to help than hinder the transition to a “post sustainable” world.

So as we consider the future of the university, transfixed by the salvos of gloom exploding all around, we should also consider that institutions with several hundred years of history, deep resources of knowledge and social capital, substantial financial flows, and that are embedded in

their geographical communities, could manage to find a way to adjust and survive.

My own best guess is that we’ll see a form of adaptation in which these older values of conscience, character, and citizenship, sitting deeper in the university strata, respond to the newest infrastructure platform of digital technologies. And further: that given that these older values are essentially social and inter-personal, that this adaption will not necessarily drive the academy to the individualistic and fragmented models implied by the combination of the MOOC and the market. ◀

Liverpool University students protest against fee increases and education cuts, 2010. Image by [The Spyglass](#), via Flickr. Some rights reserved: CC BY-NC 2.0



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Where will we learn?

by Cindy Frewen

In a recent workshop on university campuses 2025, participants envisioned environments that encourage experimentation, are flexible, creative, and collaborative, and blend virtual and real world experiences. They referenced “e-harmony learning”, a “hall of contemplation”, “in the wild”, hands-on learning as well as brain-based in segregated campuses, and just-in-time adaptations.

A survey of 250 college students by my co-presenter David Broz, of Gensler, found that students prefer individual learning and face-to-face experiences over distance learning. “Students know the power of a campus in a digital world and are looking for spaces that are memorable despite the fact that they are part of more on-line communities than face-to-face networks.”

In contrast to the focus on real versus virtual environments, Eleanor Roosevelt said eighty years ago that students should also spend time in nature. She believed education was intended to create good citizens. Schools imbue “a desire to learn and teach them how to use their minds.” Leadership and character-building were as crucial as language and math skills.

Similarly, Stanford 2025 found students seek a mission, not just a job. It seems after seventy years of herding students between huge lecture halls, the individual and purpose-driven education may re-emerge. The urgencies of Silicon Valley and Wall Street careers may be balanced with contemplative mindfulness and well-being.

Incubator U. Image: Columbia University Medical Center, Diller Scofidio + Renfro and Gensler www.m.gensler.com/projects

The differences to campus design would be profound. The university may move from the current interest in MOOCs and mobility to a collaborative model to studios.

Three university campuses of the future may emerge in response to these new demands.

- **Incubator University:** Aligned with corporate interests, environmental problems are solved through technology. The university creates students who are competitive, creative, critical thinkers ready to work or founding start-ups. Students network to produce collaborative products and experiences. Campuses may reflect corporate brands.



The 'Stanford 2025' project found that students seek a mission, not a job



Maker U: MIT Media Lab, via flickr cc
www.flickr.com/photos/vairoj



Atelier U: Networked Ecologies
competition entry by Studio One for
eVolo "Transiting Cities", www.evolo.us.

community live and learn in a
university "spa."

- **Maker University:** With scarce resources, local networks dominate and people need hands-on skills. The university's mission is "better together." Students aim to be self-reliant doers learning DIY skills with new technologies. The campus becomes the laboratory, constantly being rebuilt and shared for full functionality. The "maker" future is lived, with roaming student tribes honing skills in the harshest environments, from disaster events to space stations.
- **Atelier University:** In a sustainable, post-consumer society, the art of living and mindfulness reshape the university into a studio-like environment. Harmonious living balances mind, body, and spiritual needs into an integrated learning experience. The co-creative university values integrated, experiential, human-centered design. The built and natural environment converge, where students, faculty and

These three models retain campuses, but many universities are shrinking, even failing. Those located in growth regions or with desirable qualities may be repurposed as corporate headquarters, research centers, and retreats. Future college campuses will adapt to new uses, benefit from endowments, or be abandoned.

To sustain meaning and usefulness in the next century, university life must be reimagined, and the campus with it. ◀

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Future college campuses will adapt to new uses, benefit from endowments, or be abandoned

Tick TOCS Tick TOCS

Channeling change through theory into scenarios

by Wendy Schultz and Richard Lum

Many different methods exist for building scenarios. Bishop, Hines, and Collins cite almost two dozen scenario building approaches¹. Methods vary across a process landscape that includes contrasting uncertainties; mapping permutations and combinations of outcomes from key variables; and dynamic forecasting models. Good futures work includes clearly identifying the theories of change underlying scenarios: what drives the changes that create alternative futures? how do impacts collide and connect in the patterns they do? Yet researchers rarely acknowledge the specific theory(ies) of change that contribute to their scenario

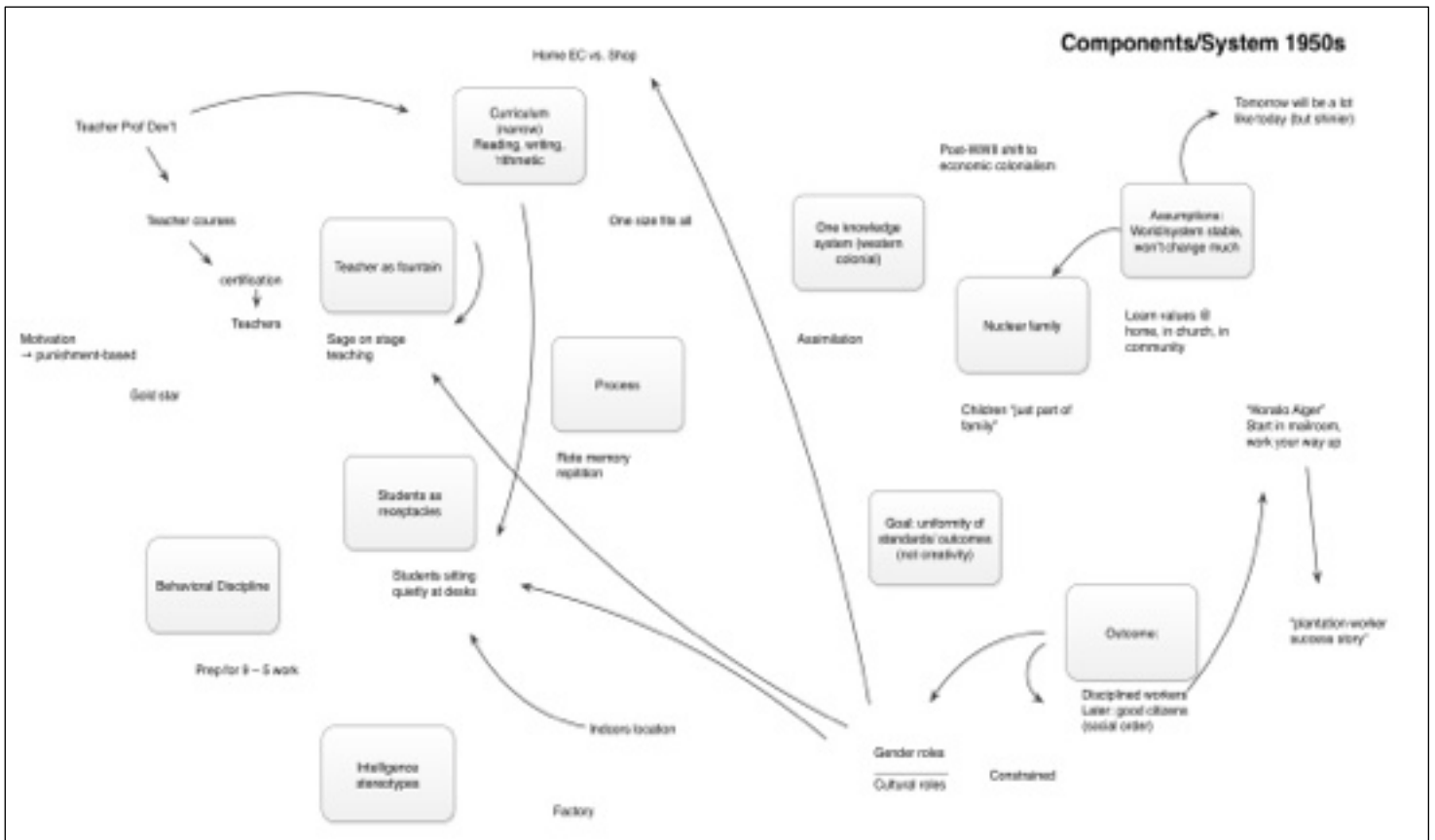
outcomes, and none that we know of use alternative theories of change and stability (TOCS) as the actual conduits and differentiators of change.

In a recent futures project with Kamehameha Schools of Hawai'i, (Hawaii's largest private school), we helped educational administrators and planners explore the future of education

We used different theories of social change to create distinct scenarios for learning

and learning. This exploration supported Kamehameha School's ongoing drive to develop public and private partnerships to support high quality education for Native Hawaiian children and their families. The intent was strategic – to windtunnel the school's proposed planning goals for the next twenty years against a set of scenarios depicting possible outcomes for US educational and learning systems. The process chosen was specifically systemic and theory driven. Richard Lum developed this approach for his work at Vision Foresight Strategy, and has used it most recently for the UK's National Ecosystem Assessment²; in exploring political transformations in The

Figure 1: The education system and components in the 1950s



Third Era³ (presented at the APF Gathering 2012 in Oxford); and as part of VFS training modules. The steps of the process, in brief, are:

- Create a shared timeline of transformations in the US educational system over the past 100 years (based on both participant contributions in a workshop as well as desk research);
- Create a soft systems ‘map of the territory’ depicting the state of education and learning in the 1950s (see Figure 1 above);
- Create a contrasting map depicting the current state of education and learning (Figure 2);
- Engage in environmental scanning to identify trends and emerging issues (TEIs) of change that might affect either the nodes or interconnections of the current system as participants had

mapped it (see the yellow notes in the system map below as the participants’ first brainstorm of TEIs directly affecting system components);

- Sort the TEIs into clusters using a TOCS as a ‘seed crystal’ / attractor, and as a design focus (see below);
- Write the scenarios depicting how the TEIs in concert with a specific TOCS created a narrative arc of change over time.
- Enliven and personalise the scenarios with character quotes.

We chose four specific theories of social change, and created four distinct scenarios for education and learning as a result.

The social change theories chosen included P.R. Sarkar’s social cycle theory depicting displacement of successive leader worldviews (worker,

warrior, intellectual, capitalist); William F. Ogburn’s theory of culture lag; Clayton Christensen’s theory of the disruptive impacts of innovations; and Strauss and Howe’s age-cohort theory of generational worldview cycles.

To give you a sense of the scenarios that resulted, highlights of the unique features of each scenario in comparison to the others are presented in a summary table below (Figure 4). Short summaries of the four scenarios are:

I. Go Local Voc Ed is framed by the social cycle theory of P. R. Sarkar. This scenario traces the evolution of learning as society undergoes a broad social transformation driven by increasing economic volatility and destabilization. Society moves from a period of unquestioned capitalism and the

Figure 2: The education system and components in the 2010s

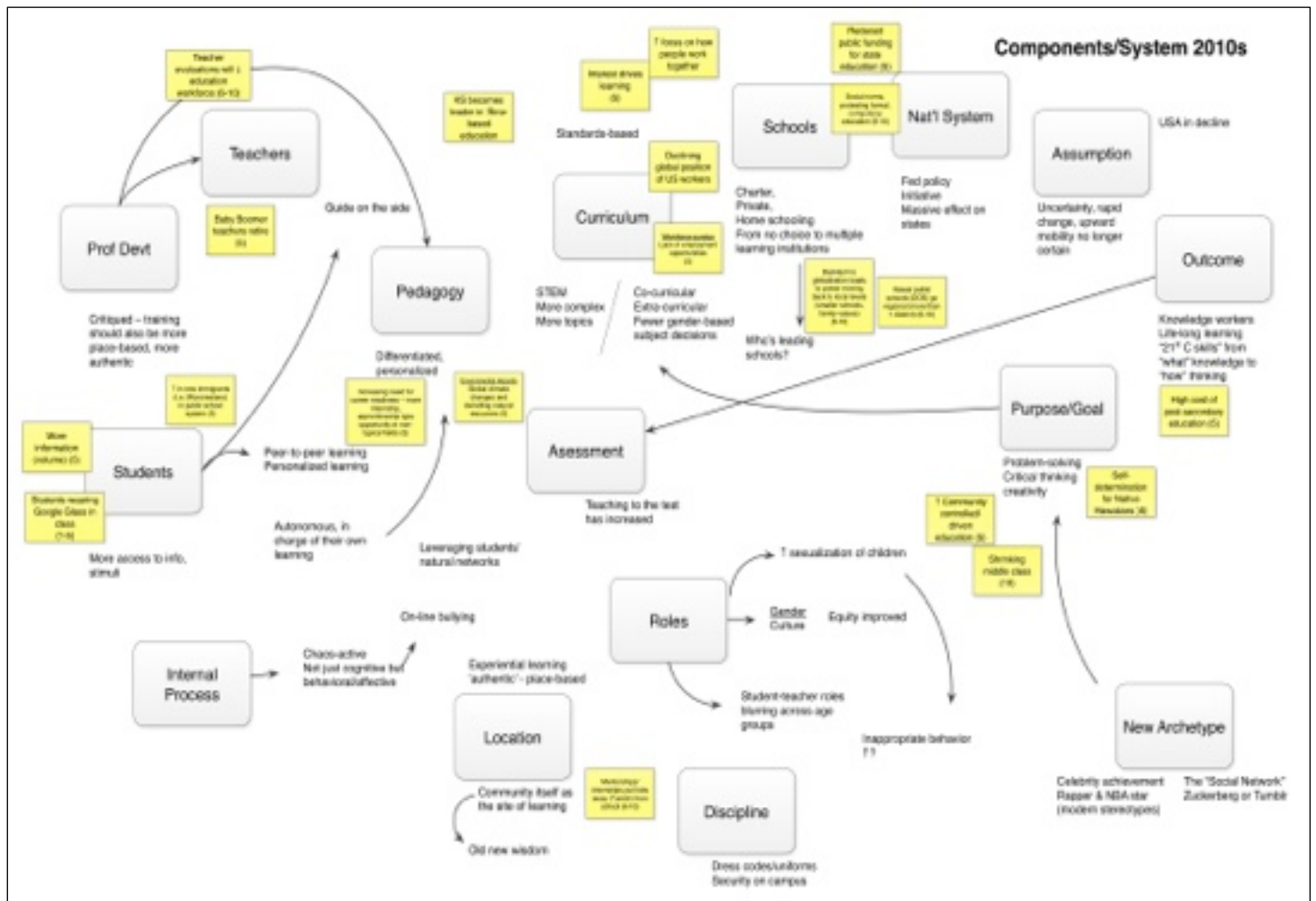
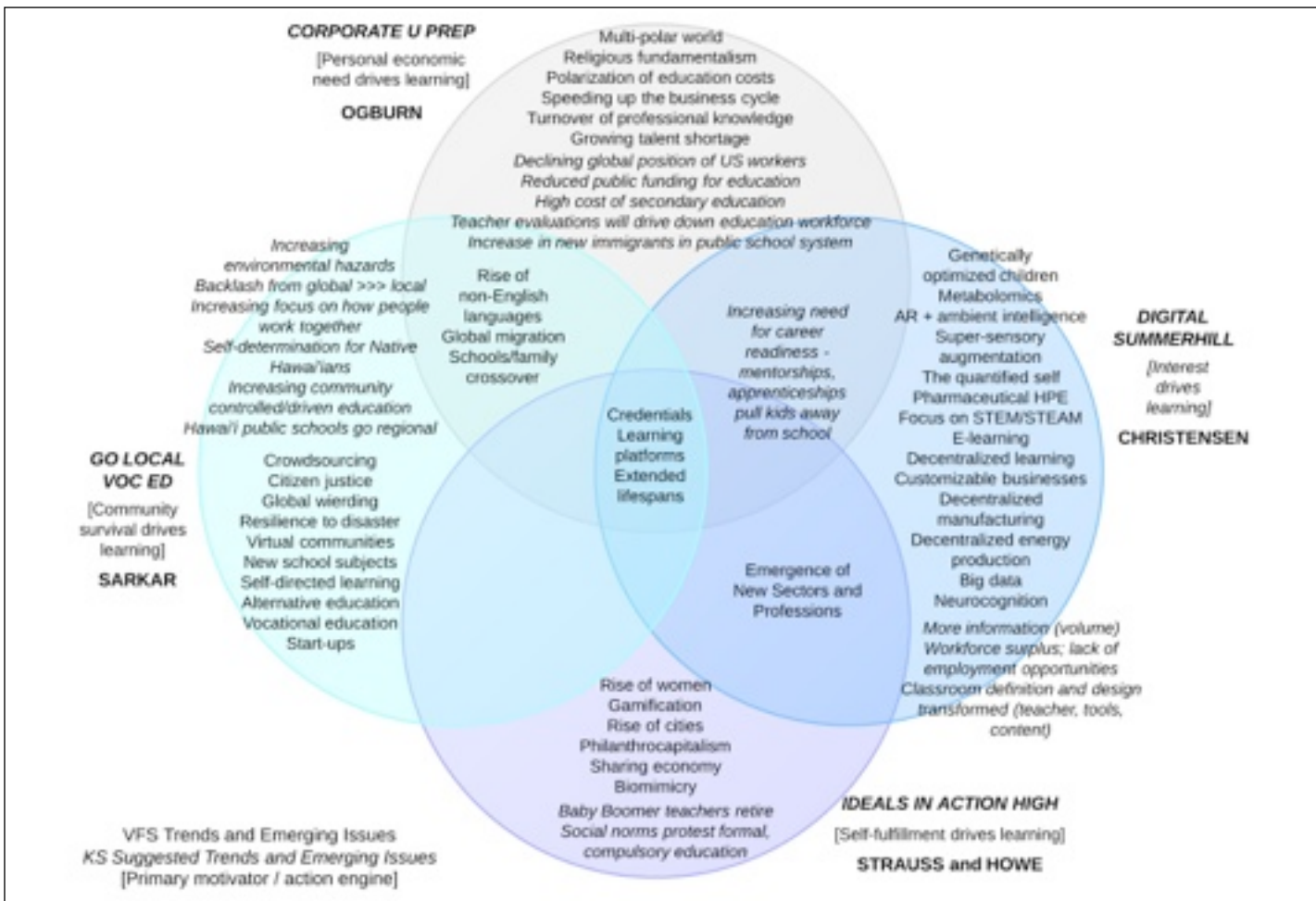


Figure 3: The scenarios and their roots in theories of change



pursuit of profit to a period of “democratization,” grass roots values, and environmental sustainability and justice. As control of education shifts to public communities, the purposes and methods of learning likewise shift to reflect newly dominant priorities and concerns for the future. Schools refocus on a localised education, oriented towards practice but not vocational in the traditional sense. Content connects deeply to cultural tradition, specifically its insights regarding Hawaii’s unique biosphere – but as a stepping stone to Bio Age innovations and global comparative advantage.

2. Corporate U Prep, a scenario framed and driven by the theory of culture lag as articulated by William F. Ogburn, describes a future of significant dislocation to mainstream education. A broad and

rapidly evolving “skills” ecosystem emerges, built by private industry and to which individual learners subscribe. Key components of this scenario include public schools offering business certificate/career programs but focusing mostly on socialization, leaving private education as the last bastion of liberal arts.

3. Digital Summerhill, a scenario illustrating the transformative impacts of disruptive technology as described by Clayton Christensen, evolves as the digital age matures. In this future people, infrastructure, and environment are linked in an immersive, adaptive data context that shatters the last vestiges of industrial-age public education and creates what to many resembles individual educational decentralization and freedom bordering on anarchy. Children can and do teach themselves

via technology at any time and in all places, assisted by learning avatars and digital coaches. Schools essentially disappear as physical institutions.

4. Ideals in Action High is driven forward by sweeping generational changes as described in age-cohort analysis. This is a future in which the millennial generation reshapes the institution of education, erasing the already-fading lines of the old system and redefining the role of schools and youth in daily community life. Learning becomes more individual, community-relevant, and project-based as millennials transform education to solve society’s problems.

Each of these rewrites the assumptions of traditional primary and secondary education and learning, but in distinctly different ways.

Figure 4: The four scenarios unpacked

Characteristic	GLOCAL VOCATIONAL EDUCATION (Sarkar Social Cycle)	CORPORATE U PREP (Ogburn Culture Lag)	DIGITAL SUMMERHILL (Christensen Disruptive Innovation)	IDEALS IN ACTION HIGH (Strauss + Howe Age-Cohort Analysis)
What catalyzes change?	Global–local tensions; from valuing profit to valuing nature	Economy / jobs / talent shortage	Disruptive technology; connected mind-body-tech-ecosystem	Crisis amplifies generational gap in perspective re: education and learning
What drives learning?	Community survival	Economic need	Personal interest	Civic needs
What are the roots of this scenario’s learning styles?	Experiential learning; discovery learning	Mastery learning	Multiple intelligences; Kolb’s learning styles model; connectivism	Constructivism; communities of practice; new roles, new rules in classroom—blend and flip
What’s the focus of learning in this scenario?	Equal and just development based on unique local environment	Skills acquisition	Personal optimization	Action to improve local community
Who designs curriculum and how?	Local expertise amplified with global / tech resources	Negotiated evolution between traditional education and new biz education providers	Design anarchy, splintering old institutions, programs—more like ed app market/ecology	Pro-consumers; collaborative creation—learners, teachers blur in successful systems
Physical plant	Scattered workspaces throughout the community near often-used local learning contexts (coastal and mountain classrooms, urban / professional center classrooms, etc)	Downsizing public school plants, outsourcing to commercial spaces (e.g., unused storefront, city center, and mall spaces near private partners)	Unnecessary: education / learning communities find their own gathering spaces via adaptive, flashmob-like process	“Hive Hub” for community projects—much more community use of schools as well; become lively centers of local activity
Public schools	Backlash—DOE tries to maintain uniform curriculum nationally Mass shift to vocational schools	In HS students half in traditional classes; half enrolled in certificate classes on-line outside of school; socialization is the main value add.	Some schools try to adapt by adopting tech—costs too high; others go retro, stress basics. Truant officers overloaded as students simply stop attending.	Public education focusses on learning/problem- solving for civic action, creating new collaborative learning environments in the process
Charter schools	Evolving community-controlled education; taking the lead in the new ‘local context’ education. More important; proliferate	Solve funding problem by partnering with corporations—new public-private educational/vocational/ research mix; successful ones evolve to align with business	Successful transitions: uploading themselves to system, continuing as virtual learning communities	Diminish in importance as public schools transform; become historical artifact
Private schools	This shift challenges college prep focus; marginalized dinosaurs	Last bastion of liberal arts—philosopher-kings in prep	Go hybrid, focus on elite socialization, and state-of-the-art enhancements.	Solving global problems with their global reach—training philanthro-capitalists
Home/student independent schooling	Some link into ‘new local ed’ experiments, others stick to ‘old traditional ed’ in backlash	All certificate classes all the time—or traditional ed backlash	Educational change emerges with students themselves	Decline—so anti-social and Gen X!—former home schoolers flock to Hubs
Interaction with Common Core / New Common Core	Ecosystem Services, Biomimicry, Genetic Engineering, Cultural Studies	Mindfulness, Empathy, Cultural Identity, Civic Virtues	No “common” core	Design Thinking, Facilitation, Mediation, Fundraising
Interaction with NCLB / New NCLB	One Biolab Per Child	One Yoga Mat Per Child	One Learning Butler Per Child	Six Thinking Hats Per Child

A connected campus in a connected world.

Image: Kamehameha Schools photo by Michael Young.



Using a TOCS as a backbone for the emergent future meant the narrative dynamic and story arc (the ‘future history’) were built in from the start. Each social change theory also attracted specific categories of emerging issues. Sarkar highlights worldviews shifting as ruling elites and leaders shift; Ogburn prioritizes cultural lag in the face of change; Christensen focusses on disruptive innovations and technology; and Strauss and Howe on demographic, value, and cultural changes across generations.

Kamehameha Schools’ staff found the process very useful: both exploring the evolution of four different futures for education and learning, and using the resulting scenarios for wind-tunneling. The level of distinguishing detail that emerged across the four scenarios confirmed how effectively different theories of social change can generate and differentiate a set of futures. Most importantly, the emphasis on social change embedded an emphasis on values, culture, and worldviews, both within communities and across generations. ◀

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Using a theory of social change as a backbone for the emergent future meant the narrative dynamic was built in from the start

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The first parenting book for futurists

by Anne Boysen

If you are raising children

in the second machine age, you might consider clearing some space in your bookshelf between Kurzweil and Spock (the doctor, not the pointy ear guy!).

I first learned about *The Curiosity Cycle* reading an interview with Dr. Jonathan Mugan on the *Singularity Hub* blog a few years ago. So when he invited me to do a book review recently, I was flattered. Mugan has the unique combination of academic degrees in both developmental psychology and computer science, which puts him in a distinctive position to delineate machine learning from how human children learn.

The book is divided into three parts. The first explains how children learn and suggests everyday activities to stimulate curiosity and deep learning experiences. In the second part we learn about psychological and metacognitive aspects of human learning and thriving, and what makes us uniquely human. Mugan provides ample amounts of advice on how children can develop self-efficacy and strategies to understand or overcome biases in our thinking. The third part is about how computers think, how children can recognize the algorithmic ways computers process information, and what we can do to help children master and use technology to their advantage.

Humans learn through concept individuation, model building and model testing.

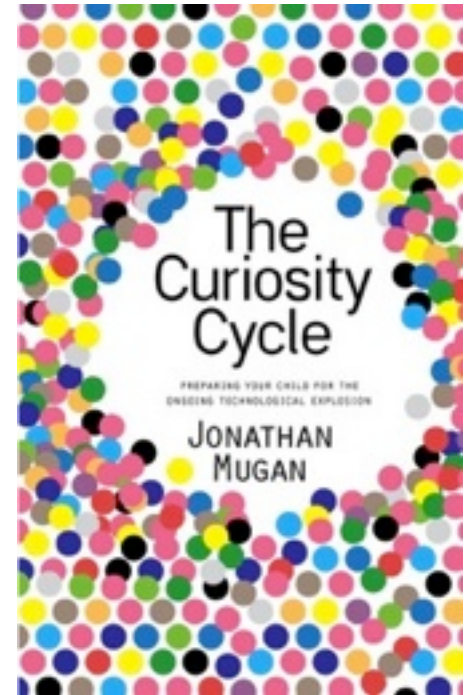
Curiosity drives the iterations of this learning cycle and by encouraging children's curiosity we can help them build supple and adaptive knowledge. What is that metal spout with two knobs on top of the sink? Why does water come out when

you turn the knob? And why do my parents get so mad when I try to see what happens when water runs over the edge? As busy and absent-minded parents we often forget how essential the incessant "whys" and experimentation are in these heuristic processes when children learn.

Problem articulation is another entry point through which to access children's curiosity. Children learn new concepts and put their mental models to the test by solving problems. Problem solving skills develop when we help them learn by exploration, and we can help them by viewing dilemmas through the lens of time. When we tell children stories about how people overcame daily problems in the past we help them understand that the world is malleable and subject to change.

A hot gender topic these days is whether girls should be discouraged from toys that allegedly promote princess obsessions. Mugan skips elegantly over this thorny debate, and suggests instead that princesses and their castles may open their iron gates to discussions about political systems like monarchy and arranged marriages. Seeing how problems have been solved differently in other times should strike a chord in futurist parents, since by giving children a sense of historical change, we may nurture an appreciation for the idea that the future may also look radically different.

Mugan suggests we solicit deep, unanswered questions like extraterrestrial life, future space colonization or the nature of consciousness. Even absurd topics will have an appeal, since children are more explorative than adults and think that more things are possible.



The Curiosity Cycle

by Jonathan Mugan

Anne Boysen is a professional futurist and consultant specializing in changes that affect and are affected by our youngest generation, the post-millennials. She writes at afterthemillennials.com.

From my own experience, this is why doing scenario exercises with children is so rewarding!

Embodiment (humans) and architecture (computers) have bearings on how we learn and what we are good at. Our mental, physiological and social embodiment provides the structure comprising our learning experiences.

Because our brains make frequent shortcuts, we are prone to biases and flawed thinking. Memory is another area of human mediocrity, but it is the way humans organize memory that gives us a leg up compared to computers. Humans are also (still) superior to computers when it comes to pattern recognition and learning and creating by association. Parents and teachers should help children

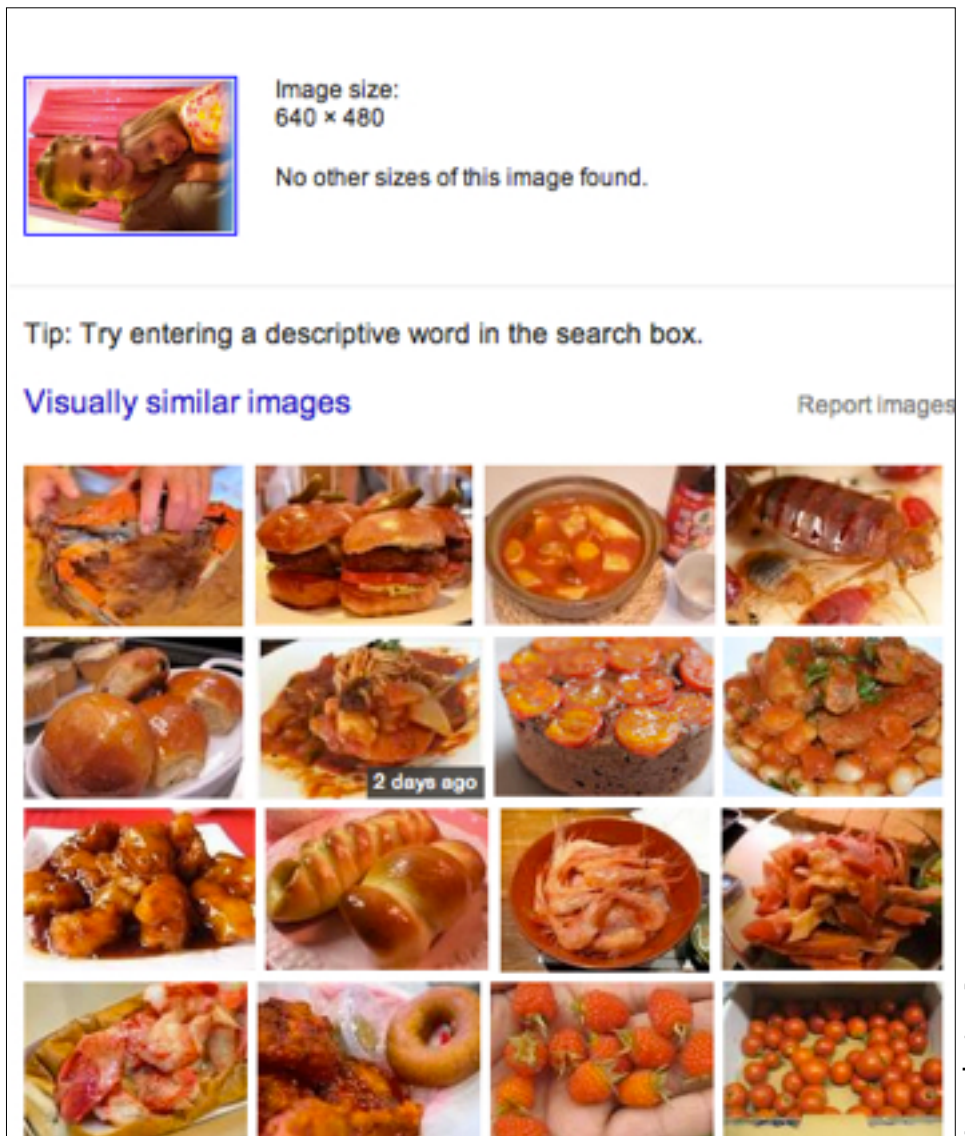
learn when their mental biases lead them awry. Children are encouraged to discover patterns in their surroundings, but also to identify “superstitious patterns,” i.e. where our biases mislead us to mistake randomness for patterns. By helping children develop better mastery of their own thought processes they will also become aware of the motivations of others and learn empathy as well as the persuasiveness of advertisers and fraudsters.

Children have a theory of mind from around age four, and Muga believes that introducing game theory, effective argument and logical reasoning techniques is not premature at an early age. The exercises concluding this part of the book revolve around teaching children

their societal embodiment and the boundaries of our human mind.

Despite the many suggestions on how to facilitate structured learning experiences for our children, there is a refreshing perspective on unstructured play. Children learn through their physical embodiment, and the best way is to let them experiment outdoors. Here is where the author could easily have taken us into a discussion on whether our security-obsessed society is eliminating opportunities for these experiences to a point where physiologically driven learning suffers. Muga doesn't go there, but he unambiguously point out that digitally gamified substitutes cannot replace real-world experiences.

When I upload a tilted photo of my daughter and myself to Google's Image search, its algorithms suggest we look visually similar to various food items.



The screenshot shows a Google Image search interface. At the top left, there is a small thumbnail of a tilted photo showing a woman and a child. To its right, the text reads "Image size: 640 x 480" and "No other sizes of this image found." Below this, a tip says "Tip: Try entering a descriptive word in the search box." Underneath, the heading "Visually similar images" is displayed in blue, with a "Report images" link on the right. The main content is a grid of 16 small images, all of which are various food items, including burgers, pizzas, and other dishes, illustrating the search algorithm's suggestion.

Image by Anne Boysen

I don't think it is too

hubristic to assume that the readers of this article will mostly be drawn to the book's third part. Part III, on 'Your Child's Future,' is where the rubber meets the road—or where human intelligence meets AI. But it is also in this part we understand why the two previous parts about human cognition are so important. Dr. Mugan, who is well immersed in various aspects of machine learning, has an optimistic outlook on human intelligence:

"One way to gain deep appreciation for human intelligence is to try to build artificial intelligence embodied in computer architecture".

Having just finished *The Second Machine Age*, I recall a quote from Steven Pinker where he says:

"The biggest lesson after thirty-five years of artificial intelligence research is that hard problems are easy and easy problems are hard."

But this Moravec's paradox is also a source of humor. When I upload a tilted photo of my daughter and myself to Google's Image search, Google's algorithms suggest we look visually similar to various food items. Even a famished two year old would not make such a ridiculous association, which suggests that even toddlers still outperform computers in certain situations.

Another example of computer quirkiness became apparent when I listened to sections of Mugan's book using iPhone's text-to-speech function on my Kindle app. Besides the hilarity of listening to Siri discussing the limitations of computers, it also turns out that she doesn't know the phonetic sounds of the word "taco" so she pronounces it like "tæco". As a person for whom English is a second language, I have made embarrassing mistakes trying to pronounce words I know only from text.

Technology can help children become active producers or passive consumers, and it is parenting that makes the difference.

But as a mother of three native English speakers I cannot remember my children ever mispronouncing the syllables, intonations or vowel sounds that make the melodic structure of a word. I could easily imagine my children saying "paco" or "baco", but never "tæco" or "tacó".

Computers systemize information incomparably faster than humans, but they do not have the advantage of *limited* information and cannot rely on common sense. Unlike humans, computers don't understand new situations by drawing analogies with old situations and they cannot narrow down their searches efficiently. Computers' thinking is brittle and reduced to Boolean or binary logic while humans can apply higher-level meta-structures that adapt their thinking to each unique situation.

But computers are adapting fast and they are coming for our jobs. Of course, digitization of the work process poses other challenges than merely substituting human labor. It also connects our intelligences together into a global mind and removes geographical obstacles to competition *between* humans. Technology amplifies the availability of humanly derived information, but poses also danger to the human nodes in these

networks by eradicating privacy and by removing previous barriers to competition.

As Brynjolfsson and McAfee reiterate in the *Second Machine Age*, digital goods enjoy enormous economies of scale, creating a global "winner takes it all society" far beyond the manufacturing sector. Mugan draws similar conclusions in his book: that even if in the past technological development created more jobs than it removed, this time we're dealing with an entirely new animal. Both books exemplify this point with the Mechanical Turk, the computer-organized "job recruiter" that pays humans a pittance to do things computers still cannot do.

We can help protect our children from these dystopian prospects by guiding them in ways that put them in control of technology and develop uniquely human skills, such as creativity. Technology helps children become either active producers or passive consumers in the new economy, and it is how we approach this as parents that will make the difference. We can let them play games where the game structure is created for them, or we can teach them basic coding skills and introduce them to games where they control more of the creative process.

We can let them mindlessly consume cable sitcoms or we can limit their screen time to educational experiences. We can continue to feed children shallow knowledge through rote memorization or we can teach them critical thinking and curiosity-driven learning. And finally, as parents or educators we can continue to drill and test children in areas where computers are inevitably better, or we can help them build comparative advantages that complement rather than compete with the smart machines. ◀

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“I cut the stone for this building ... I was damn proud of my work. And the buildings went up. When they were finished the damnedest thing happened. It was like the buildings were too good for us. Nobody told us that. It just felt uncomfortable, that’s all.”

(Raymond Stoller in the film *Breaking Away*, on building the town’s university.)

If you have a contribution to Compass—words or pictures, feature, review, news, opinion piece, photo or cartoon—for the October issue, please send it to andrew.nextwave@eclipso.eu by 15th September 2014.

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