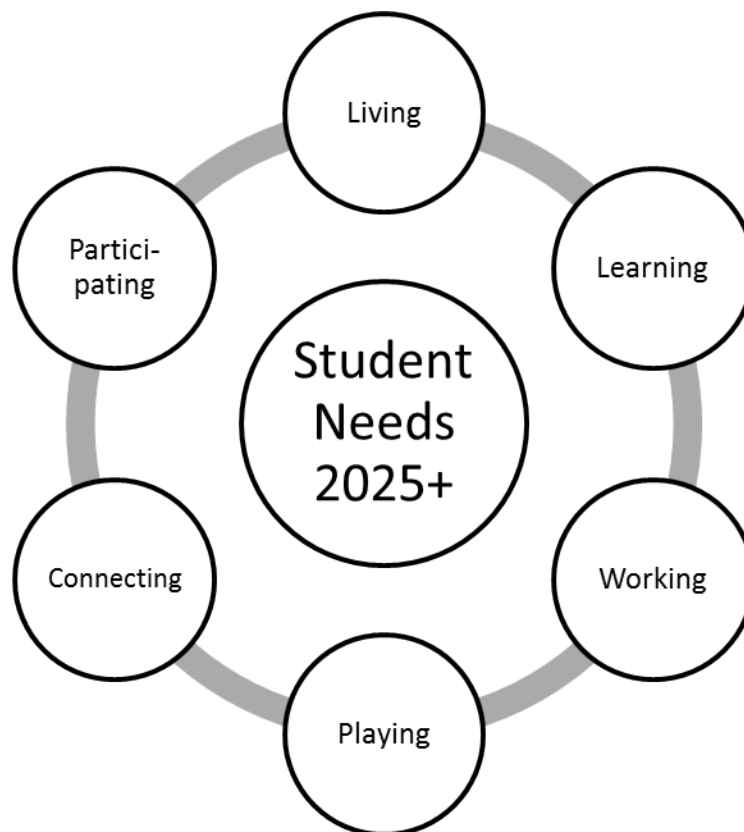


***The Future of Student Needs: 2025 and Beyond***  
***DRAFT***



**The University of Houston Foresight Program**

**On behalf of  
Lumina Foundation**

**June 2014**

## Student Needs 2025+

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## Executive Summary

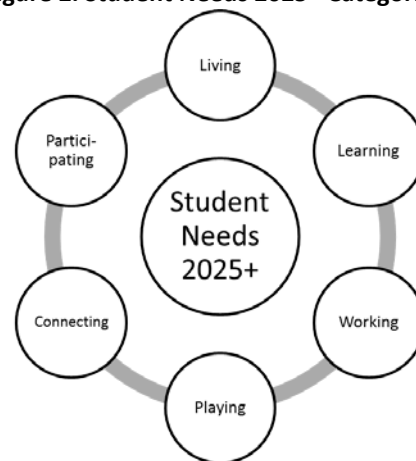
With the support of Lumina Foundation, the Students Needs 2025+ research team from the University of Houston Foresight Program looked for ways to add something new to the discussion about the future of higher education. It found three openings or opportunities to inject some new thinking, with the goal of catalyzing innovative responses to emerging student needs.

- First, much of the writing about the future of higher education assumes continuity in the future – what we call the “baseline future” in which present trends continue and perhaps accelerate, but by 2025 the higher education system is intact. A smaller body of literature assumes the opposite, a transformational future in which the current system is re-made based largely on developments coming from the outside. We explored how the continuity of the baseline future could be disrupted. Even then, we found that we did not have to create a radically transformed future in order to identify a provocative set of student needs. In other words, even a fairly continuous evolution of student life in the future will create a set of student needs that is likely to create significant challenges for established institutions.
- Second, much of the literature about the future of higher education takes the viewpoint of the institution rather than the student. Therefore, we chose to explore the future from the student point-of-view.
- Third, even those works that do consider students only consider them in school, not in the context of their overall life. Therefore, our view of the future goes beyond higher education and looks at student life as a whole rather than just their life in school.

Using the Houston Foresight Program’s “Framework Foresight” approach, the first step was to define the “domain,” the aspects of student life to be explored, in order to look for emerging student needs of the future. Student life was therefore sorted into six categories:

- **Living** focuses on changes in student consumption patterns, health, and housing, and investigates key changes in their routine of daily life, such as how they might be spending their time differently in the future.
- **Learning** focuses on how students might learn, whether within an institutional setting or not, and investigates major changes in how they are acquiring the information and skills they need to get along in life.
- **Working** focuses on the future job market and needs relating to work beyond just having a job, and investigates key changes in how work is done.
- **Playing** focuses on changes in student approaches to leisure, recreation, and having fun and

Figure 2. Student Needs 2025+ Categories



investigates how playing in general is changing.

- **Connecting** focuses on changes in how students connect with one another, their friends, family, and colleagues -- both real and virtual -- in the physical and online space, and investigates the changing means by which they do so.
- **Participating** focuses on how students might participate differently in civic life and investigates what it means to be a citizen in the future and how people interact with government and non-government groups.

### **The four student types**

The students themselves are organized into four types. The inspiration for the student types emerged from work related to a Lumina “Students Rising” scenario workshop held in November 2011. The personas exist today and are anticipated to remain a relevant and useful framework out to 2025. The implications of the forecasts – i.e., the identification of emerging student needs – will use the four types as an organizing framework. Each type is illustrated by a representative persona in the text.

- *Traditional.* Those who go straight to college after graduating high school or soon thereafter.
- *First generation.* They are the first within their family to attend college.
- *Adult.* Older than traditional and first generation students, they often need to attend school part-time to balance work, family, and education.
- *Independent.* They come to learning from divergent paths, often accumulating bits and pieces of credits and work experiences from different places.

### **The STEEP context**

A common context for the year 2025 was crafted using the popular futurist STEEP framework of social, technological, economic, environmental, and political trends. Rather than have the six domain teams each report on the STEEP trends, the key ones were pulled out and gathered together to provide readers a common context within which to situate the forecasts.

### **Current assessments & scanning**

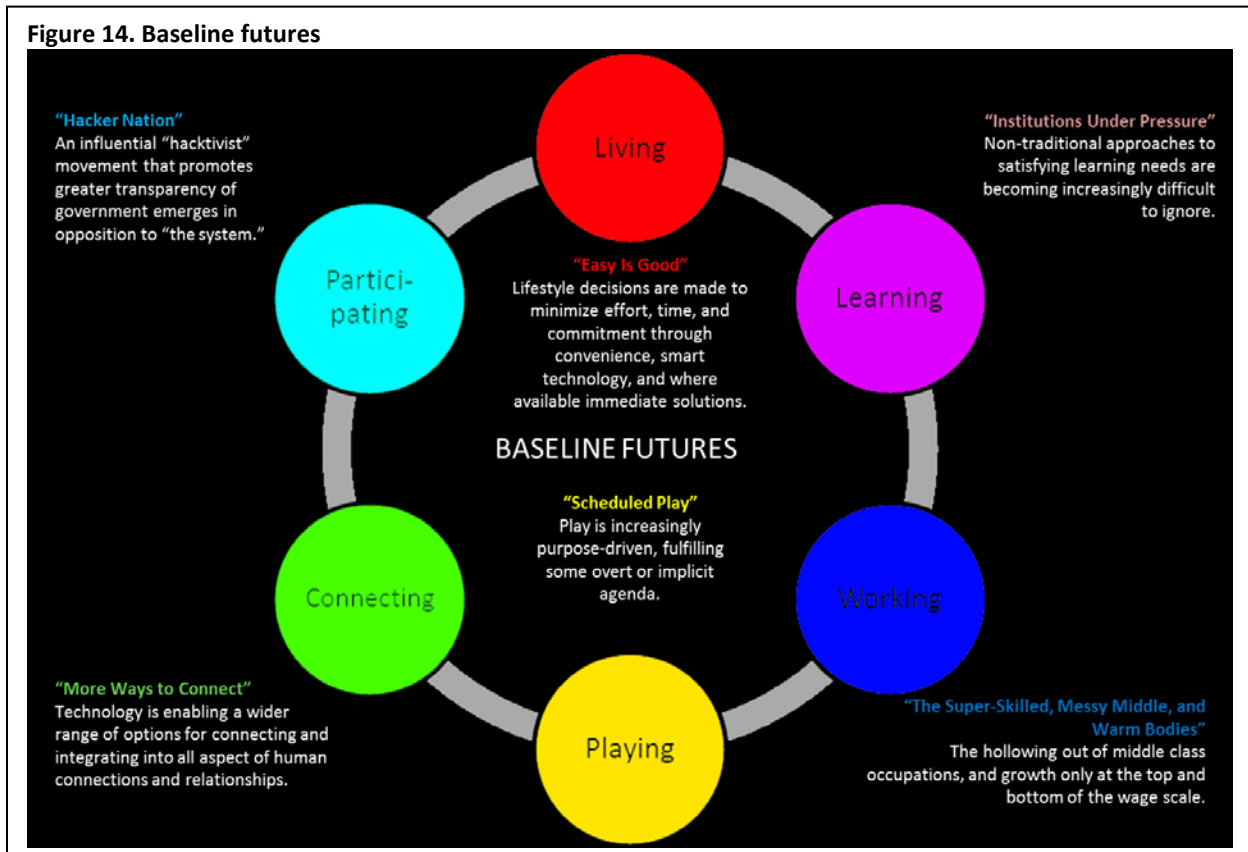
The Framework Foresight process begins by framing the domain with a current assessment. We produced a current assessment for each of the six domains, consisting of a domain description followed by a summary of its current conditions. The domain description is in three parts: first, the domain is briefly summarized in a paragraph or two; second, a visual domain map highlights the key categories guiding the team’s research; and third, key stakeholders are identified. Once the domain is described, the important current conditions, that is, the essential need-to-know information about the domain in the present, are identified. The idea is to ground the domain in the present before forecasting its future.

Scanning identifies what might change in the domains in the future. Individual scanning hits are collected in a web-based bookmarking site that Lumina will be able to access.

The current assessments and scanning provide the foundation for the baseline and alternative futures.

### The baseline futures

The baseline future grounds the exploration of future possibilities and outcomes by identifying what the future would look like if present trends continue, major plans are fulfilled, and there are no major surprises.



The alternative future forecasts explore what might happen if – or one might say when – the baseline breaks down and is disrupted.

**Figure 23. Alternative futures**

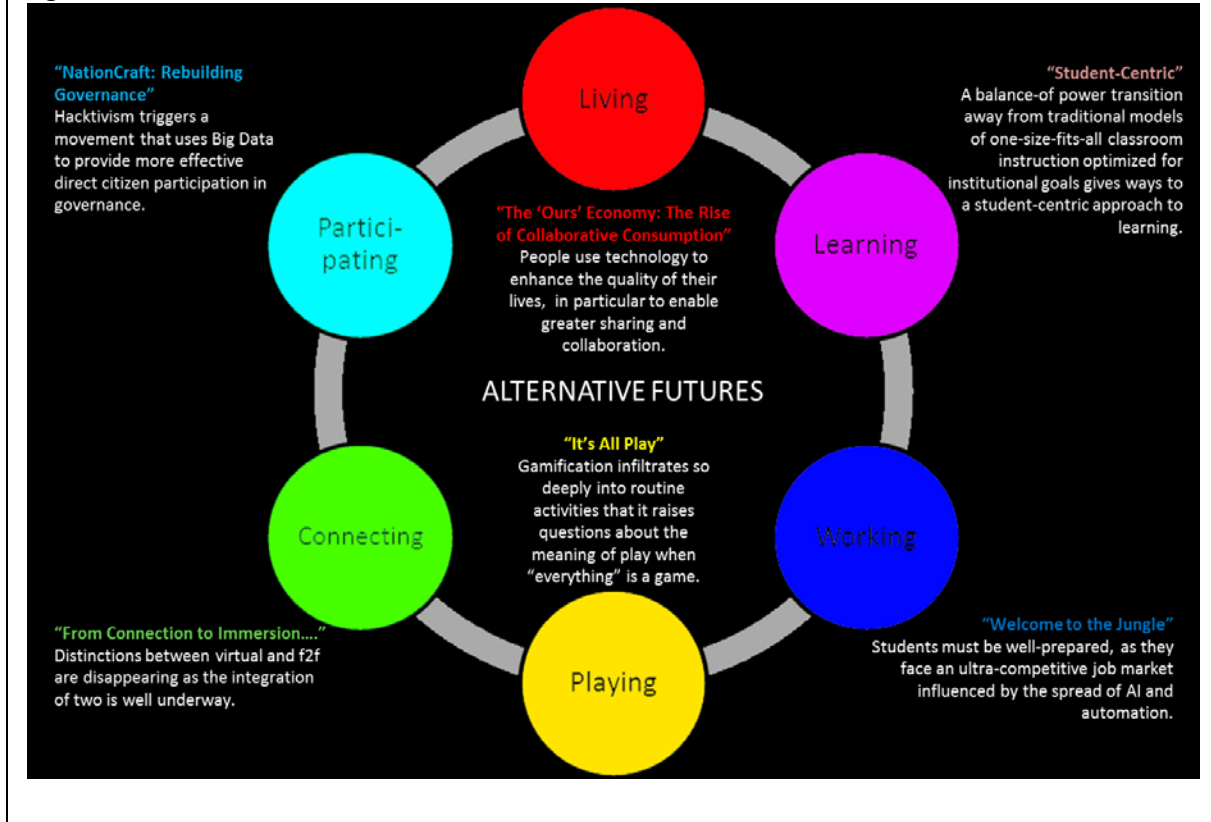


Table 4 lists the baselines and alternative futures for each domain, and highlights the “accelerators” or triggers for each. The baseline extrapolates present trends into the future, and the accelerators suggest how the baselines could be disrupted and shift towards the alternative futures.

Table 4. From baselines to alternatives				
Baseline Title	Abstract	Accelerators	Alternative Title	Abstract
<b>Living:</b> Easy Is Good	Lifestyle decisions are made to minimize effort, time, and commitment through convenience, smart technology, and immediate solutions where available.	A) Student debt bubble pops; universal health care stalls; double-dip recession hits B) Big Data, AI, analytics, sensors, wearables, etc. C) Peer-to-peer collaboration	<b>Living:</b> The “Ours” Economy: The Rise of Collaborative Consumption	People use technology to enhance the quality of their lives, in particular to enable greater sharing and collaboration, such as forming communities to address their needs, sharing living spaces, finding group investment opportunities, and sharing consumer products.
<b>Learning:</b> Institutions under	Non-traditional approaches to satisfying learning	A) Edtech bubble pops and, along with recession, decreases enrollment in	<b>Learning:</b> Student- Centric	A balance-of power transition away from traditional models of

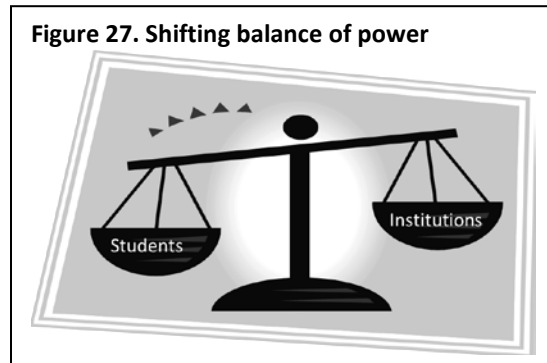


Pressure	needs are becoming increasingly difficult to ignore.	higher education B) New private sector players make inroads, such as by meeting support-type needs. C) Social networks spread “success stories;” institutions respond		one-size-fits-all classroom instruction optimized for institutional goals gives way to a student-centric approach to learning.
<b>Working:</b> The Super-Skilled, Messy Middle, and Warm Bodies	The hollowing out of middle class occupations, and growth only at the top and bottom of the wage scale.	A) “Slow” pace of automation masks the transformational nature of emerging tech-based changes B) Automation and pervasive artificial intelligence make deep inroads into the economy	<b>Working:</b> Welcome to the Jungle	Students must be well-prepared, as they face an ultra-competitive job market influenced by the spread of AI and automation.
<b>Playing:</b> Scheduled Play	Play is increasingly purpose-driven, fulfilling some overt or implicit agenda.	A) “Psychological” barriers to gaming production are reduced by hacker culture B) Physical barriers are reduced by “democratizing” tools such as visualization, simulations, 3D printing, AR and VR C) Gaming spreads beyond play to work, education, etc.	<b>Playing:</b> It’s All Play	Gamification infiltrates so deeply into routine activities that it raises questions about the meaning of play when “everything” is a game.
<b>Connecting:</b> More Ways to Connect:	Technology is enabling a wider range of options for connecting and integrating into all aspects of human connections and relationships.	A) Progress in connecting technologies continues B) Virtual relationships pass the social tests of being “good for relationships” C) Transparency proves stronger than privacy D) Technologies for connecting are ubiquitous and “melded” into the background	<b>Connecting:</b> From Connection to Immersion	Distinctions between virtual and f2f are disappearing as the integration of two is well underway.
<b>Participating</b> Hacker Nation	An influential “hacktivist” movement that promotes greater transparency of government emerges in opposition to “the system.”	A) More data and tools for “hacking” it become available B) “Constructive” hackers outflank the “destructive” C) Governments stop fighting and embrace the “constructive” to become more transparent and open	<b>Participating:</b> “NationCraft: Rebuilding Governance”	Hacktivism triggers a movement that uses Big Data to provide more effective direct citizen participation in governance.

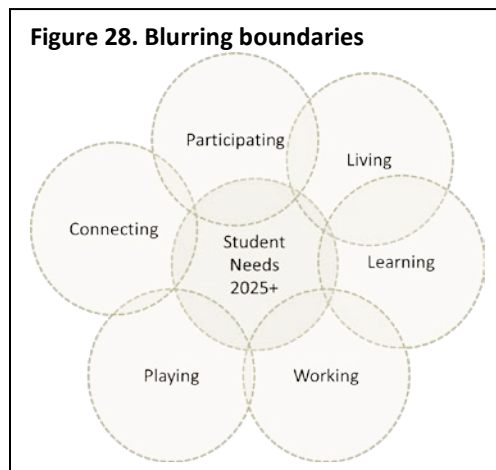
**Key themes**

After the six alternative futures were crafted, they were analyzed for cross-cutting themes and patterns. Four themes were identified:

1. A shift in balance of power from institutions toward students. The balance of power shifting toward students means they will increasingly be dictating what needs to be “produced” rather than the institutions doing so.

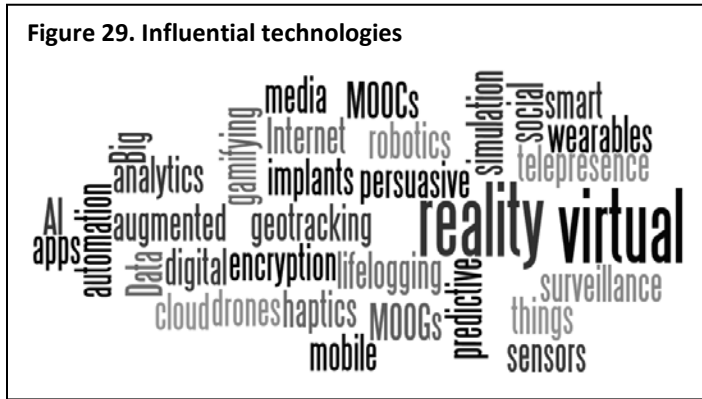


2. A “blurring” between the six domains that makes them difficult to distinguish and thus difficult to address in isolation.



3. An emergence of IT/AI technologies that are both part of the “problem” – that is they drive change – and the “solution” – that is they offer great potential for addressing student needs. The growing capabilities of a vast array of information and communication technologies are the single biggest driver of change across the six domains. Put simply, in looking at how student life is changing, there is no bigger driver than the growing influence of information technologies.

Figure 29. Influential technologies



4. A set of “social” or non-technological issues must be “dealt with” for the alternatives to occur as described. The teams questioned their assumptions and looked for ways that the growing influence of information technology might not happen, and found little to stop it beyond economic collapse. There are social issues, such as personal security in cyberspace or the security of the Internet itself related to technologies that could slow progress, but they are not likely to stop it.

### The emerging needs

We generated more than 300 needs using three different approaches that then went through several rounds of combining, modifying and clustering. We separated out historical and current needs and focused on the future, in order to arrive at this final set of nine emerging needs:

1. *Re-skilling*: students need to know what skills they will need and how to master them
2. *Mentoring*: students need personalized guidance on what to do next and on other life lessons
3. *Continuous and real-time feedback*: students need to know how they are doing so they can continuously improve in order to “keep up” and move forward
4. *Frameworks (for navigating new uncertainties)*: students need to know what to do in various situations, particularly novel ones
5. *Credentials*: students need to document knowledge, skills and experiences acquired
6. *Experiences*: students need contact with people and the world that teach by doing
7. *Personalized instruction*: students need the means to acquire relevant knowledge and skills customized to their individual style
8. *Spaces, tools, and templates*: students need physical and virtual supportive environments and tools for pursuing and acquiring knowledge and skills
9. *Differentiation*: students need to find and communicate their personal value proposition that distinguishes “who they are.”

Table 5 identifies some exemplary services offerings for meeting the emerging student needs as well as issues.

<b>Table 5: Needs, services, and issues</b>		
<b>Emerging need</b>	<b>Example “service”</b>	<b>Issues</b>
<u>Re-skilling</u> : students need to know what skills they will need and how to master them	Competency models Learning outcomes Projections	Is there foresight available to project future skills dependable enough?
<u>Mentoring</u> : students need personalized guidance on what to do next and on other life lessons	Mentors or life coaches AI personal assistants	Are there enough mentors to go around?
<u>Continuous and real-time feedback</u> : students need to know how they are doing so they can continuously improve in order to “keep up” and move forward	Personal, e.g., real-time “grading”; AI/big data quantification devices	How real-time does it need to be? Is there a point of too much feedback?
<u>Frameworks (for navigating new uncertainties)</u> : students need to know what to do in various situations, particularly novel ones	Schemas, codes, rules, roadmaps	If institutions provide these, will anyone believe or use them?
<u>Credentials</u> : students need to document knowledge, skills and experiences acquired	Diplomas, certificates, badges	Whose credentials have credibility?
<u>Experiences</u> : students need contact with people and the world that teach by doing	Internships, travel, experiments	How does this tie to improving student life? Do they get credentials for this?
<u>Personalized instruction</u> : students need the means to acquire relevant knowledge and skills customized to their individual style	Learning needs assessments; personal or AI tutors	Is this approach affordable? How do group approaches fit?
<u>Spaces, tools, and templates</u> : Students need physical and virtual supportive environments and tools for pursuing and acquiring knowledge and skills	Tech hub; Second life for learning; degree plans	How to provide appropriate “generic” support to “customized” learners?
<u>Differentiation</u> : Students need to find and communicate their personal value proposition that distinguishes “who they are.”	Personal brand	Is there too much competitive pressure? Will this cause too much specialization?

## Uses of this report

Four potential uses of the report are suggested in the introduction:

1. Input to the next strategic plan: the emerging student needs suggest issues that could be candidates to consider for Lumina’s next strategic plan.
2. Input into ideation sessions for innovation: The emerging student needs and the supporting material provide abundant raw material to stimulate ideation sessions for innovation (and strategy as well).
3. Design principles for a new higher education ecosystem: The emerging student needs could be used as a set of “customer requirements” as a basis for future planning relating to higher education.
4. Stimulate or build a movement around emerging student needs based on the research and continuing it into the future that would advocate for a greater student voice in higher education.

## Chapter 1. Introduction

Lumina Foundation has set up an Innovation Advisory Council as part of its efforts to achieve Goal 2025. Council Chair Juan Suarez asked the Houston Foresight program how it might help with the innovation efforts. In thinking this through, an initial observation was that much has been written about the future of higher education. [See Appendix A1] Rather than add to the clutter, we looked for a way to add something new to the discussion. In looking over the literature, we saw three openings that might provide an opportunity to inject some new thinking and that might in turn catalyze innovation in higher ed.

- First, much of the writing about the future of higher education assumes continuity in the future – what we call the “baseline future” in which present trends continue and perhaps accelerate, but by 2025 the higher education system is intact. A smaller body of literature assumes the opposite, a transformational future in which the current system is re-made based largely on developments coming from the outside. We explored how the continuity of the baseline future could be disrupted. Even then, we found that we did not have to create a radically transformed future in order to identify a provocative set of student needs. In other words, even a fairly continuous evolution of student life in the future will create a set of student needs that is likely to create significant challenges for established institutions.
- Second, much of the literature about the future of higher education takes the viewpoint of the institution rather than the student. Therefore, we chose to explore the future from the student point-of-view.
- Third, even those works that do consider students only consider them in school, not in the context of their overall life. Therefore, our view of the future goes beyond higher education and looks at student life as a whole rather than just their life in school.

We thus saw an opportunity to first and foremost look at the future of higher education from the vantage point of the students and what they will need in 2025 and beyond. Second, instead of an either-or forecast, we start with a baseline future and explore what might trigger an alternative future. This approach blends elements of continuity, challenge, and transformation, which we believe relieves policy-makers and innovators from having to choose one or the other. It is a blended future – from the perspectives of the students and their needs.

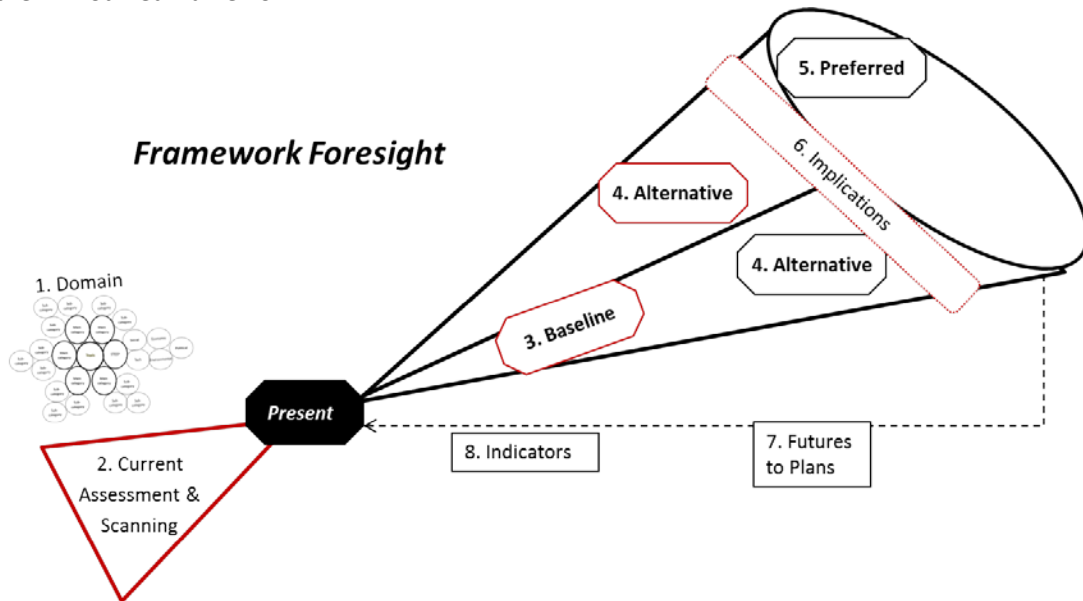
Our goal is not to provide another list of “what needs to be done to fix higher education.” Rather we seek to provide a different lens from which to think about the future by taking the student perspective. We believe that this fresh lens will provide Lumina’s staff with a different jumping-off point from which to consider innovative approaches.

### The approach

The University of Houston Graduate Program in Foresight is the world’s longest-running graduate program specializing in the field. We train student in the concepts, theories, and frameworks for understanding the future, approaches and methods for mapping out the future,

and ultimately for influencing the future. We have developed a core approach called Framework Foresight<sup>1</sup> for forecasting the future of any domain. For this study, we modified the core approach to emphasize the aspects that we felt would maximize our contribution to Lumina’s innovation efforts. As Figure 1 shows, the steps highlighted in red are the focus in this study. Our goal was to paint a picture of how student needs might change out to the year 2025. In some cases, we stretch beyond 2025 to give a sense of needs that might not be front-and-center in 2025, but would be looming around the corner.

Figure 1. Modified framework



The first step is to frame the domain, or topic. We chose the title “Student Needs 2025.....and Beyond” to capture our focus on the student. The “and beyond” allowed us to stretch our timeframe to include needs beyond 2025 that might provide opportunities for innovation by thinking about them before they fully emerged. The geographic scope was the US, but we allowed the inclusion of relevant examples wherever they occurred globally. We maintained an insistent focus from the start that we were not focusing on the needs of the institution – again, we felt numerous other studies had covered that perspective.

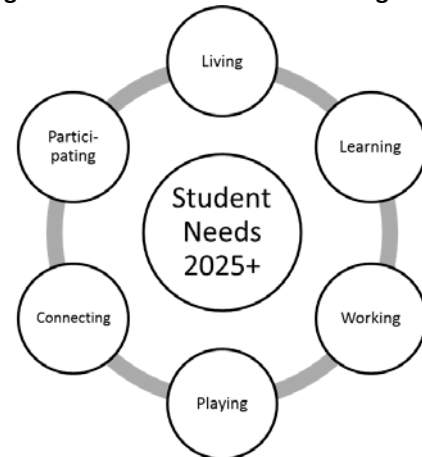
The Framework Foresight process suggests creating a visual domain map of the key categories to be explored in order to properly map the domain. This presented a tricky problem in how to conceive of student needs in the future – an admittedly huge domain! After several iterations, we settled on a schematic that broke student needs into six categories, shown in Figure 2.

The six categories:

- **Living** focuses on changes in student consumption patterns, health, and housing, and investigates key changes in their routine of daily life, such as how they might be spending their time differently in the future.

- **Learning** focuses on how students might learn, whether within an institutional setting or not, and investigates major changes in how they are acquiring the information and skills they need to get along in life.
- **Working** focuses on the future job market and needs relating to work beyond just having a job, and investigates key changes in how work is done.
- **Playing** focuses on changes in student approaches to leisure, recreation, and having fun and investigates how playing in general is changing.
- **Connecting** focuses on changes in how students connect with one another, their friends, family, and colleagues -- both real and virtual -- in the physical and online space, and investigates the changing means by which they do so.
- **Participating** focuses on how students might participate differently in civic life and investigates what it means to be a citizen in the future and how people interact with government and non-government groups.

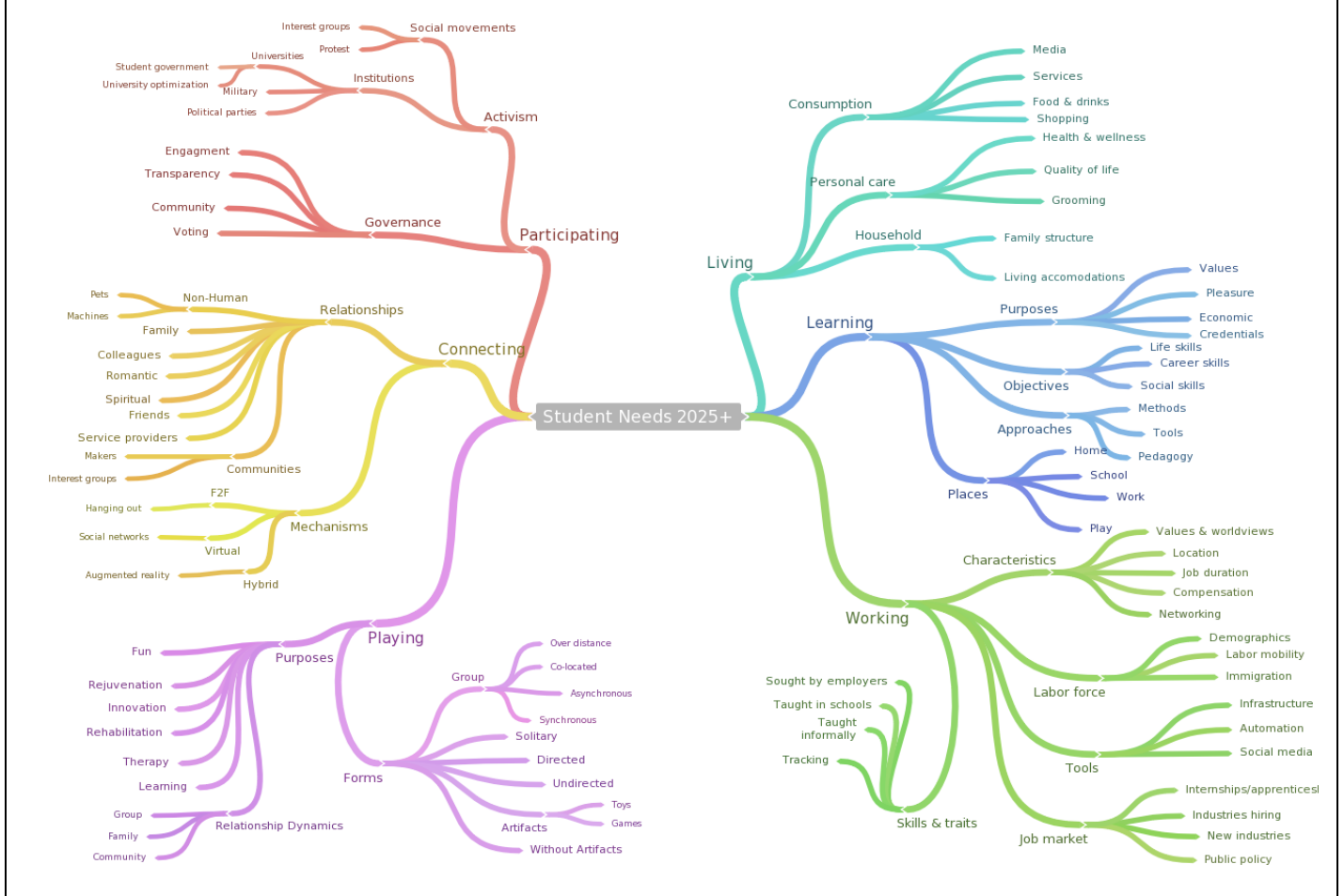
Figure 2. Student Needs 2025+ categories



We then assigned teams of three to be responsible for investigating each of the six domains. A program alumnus headed each team, supported by two students.

The domain mapping process is an iterative one in which teams proposed how they would scope out their domain. Then the full team reviewed the initial proposal and made comments and suggestions. After a few rounds, the teams were ready to research and scan in their domains. The maps were tweaked as the research revealed either new categories to be added or initial ones to be dropped. The overall map of the six domains proved useful in making sure that categories were adequately covered, as well as avoiding duplication. A bit of horse trading ensued as teams negotiated who covered which categories. The master domain map shown in Figure 3 was crafted on “Coggle” < <http://tinyurl.com/jwg9aws> > which provided an online home for all team members to see and edit.

**Figure 3. Student Needs 2025+ domain map**



Armed with their domain maps, the teams set out to do their current assessment, which includes research and scanning. Research is distinguished in our process as getting up to speed as to what’s happening in each of the six domains. Scanning is the search for signals of change within the domain, which provide the raw material upon which to build the forecasts in the next step.

The current assessment is a grounding or level-set activity that ensures that the teams are aware of the current situation.

### Uses of this report

There are several ways that this report could be used.

1. Input to the next strategic plan



The emerging student needs suggest issues that could be candidates to consider for Lumina's next strategic plan. The timing as "emerging" is indeed targeted to fit with the next plan, whose timeframe is likely to extend to 2025, coinciding perfectly with the needs and suggested here.

The report also provides a rich source of inputs to the next plan, with the key future themes and emerging needs, based on the current assessments, the baseline and alternative futures, and the library of scanning hits.

## 2. Input into ideation sessions for innovation

The emerging student needs and the supporting material provide abundant raw material to stimulate ideation sessions for innovation (and strategy as well). Indeed, the next step in the Framework Foresight process, if it were to continue, would be to use the student needs and supporting material to identify either strategic issues or innovation opportunities.

Innovation sessions could be framed around a particular challenge, e.g., "What are some ways in which we might stimulate innovation to improve the completion rates of 1<sup>st</sup> generation students." The framing could also be much broader to range across the full body of material, e.g., "How might we direct our grant funding toward new or promising need areas?"

A workshop design and templates can be provided for this use if desired.

## 3. Design principles for a new higher education ecosystem

The student needs could be used as a set of "customer requirements" as a basis for future planning relating to higher education. With input from Lumina and after further refinement, they could be framed as a set of design principles. They could be used as criteria upon which to evaluate grant proposals, i.e., to what extent does a proposal address the design principles? More broadly, they could be promoted within higher education as principles informing future development in general.

## 4. Stimulate or build a movement around emerging student needs based on the research and continuing it into the future

This report could provide a foundation upon which to stimulate or build a larger movement championing greater attention to student needs. The forecasts and supporting research suggest that a more student-centric future is on the way, and that the implications will be quite significant.

Along these lines, Lumina hosted a “Students Rising” scenario workshop in 2011 that suggested the need for a platform to host a student movement that would advocate for a greater student voice in higher education. Lumina, in conjunction with the Houston Foresight Program or other desired partner, could stimulate this movement through activities such as:

- Host a virtual home for a Students Rising/Student Needs platform that would promote the research into student needs, provide a focal point for social media, host virtual discussions and communities -- basically, promote all things relating to emerging student needs.
- An ongoing social media campaign promoting awareness of student needs and highlighting examples of where it is taking place – or not taking place. This could be enhanced by producing short YouTube-friendly videos that depict the student personas and how they fare in the various futures.
- Sponsor annual “deep dive” explorations on specific domains related to student-needs, focusing one of the nine emerging needs at a time or issues relating to the needs, such as an exploration of specific job types or titles likely to rise or fall in the future.
- Host an annual “live” conference that brings students and other stakeholders to explore a particular issue or issues which could be supplemented by webinars in between.

## Chapter 2. The 2025 Context

This report explores six inter-related aspects of student life. This chapter describes the common context underlying the six domains. It begins with framework of four student types that are described and “brought to life” with representative personas. The chapter then goes on to cover the common context using the popular futurist STEEP framework of social, technological, economic, environmental, and political trends.

Students are organized into four different types. The inspiration for the student types emerged from work related to a Lumina “Students Rising” scenario workshop held in November 2011. The personas exist today and are anticipated to remain a relevant and useful framework out to 2025. The implications of the forecasts – i.e., the identification of emerging student needs – will use the four types as an organizing framework.

Each type is briefly characterized and is then brought to life by an illustrative persona. Personas are representative characters that fit a profile of someone fitting the type. They are illustrated via their social media pages, with a profile pic, name, age, gender, location, groups they belong to, and their introductory page in which they tell the world about themselves. It should be kept in mind that these personas are generalizations of a large and diverse group. They are useful to the extent that they help create an image or mental model of what the types might look like, thus helping to make the abstract a bit more concrete.

### Student types

*Traditional.* This segment captures those who go straight to college after graduating high school or soon thereafter. In 2014, they are in their late teens to early twenties and were born in the mid- to late-1990s. Their percentage of the student population is shrinking.

Figure 4. What is a student?

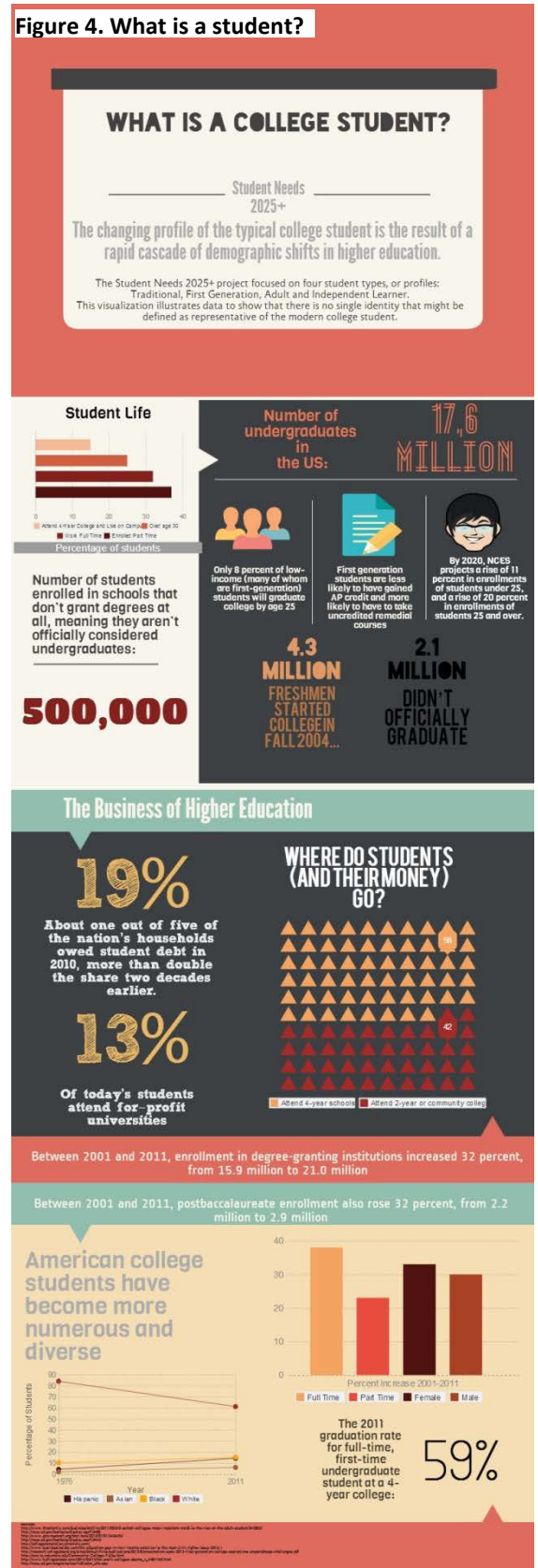
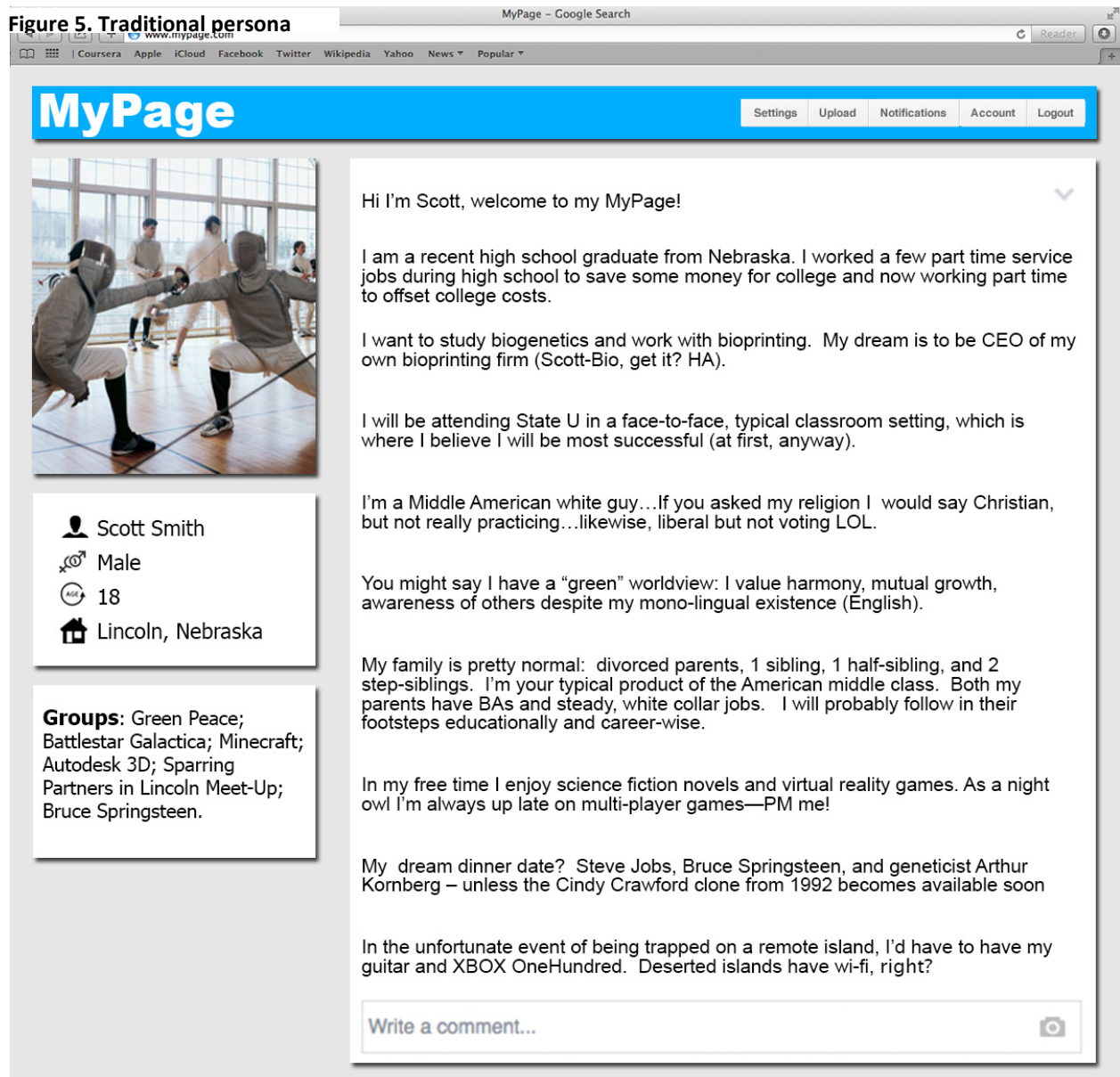


Figure 5. Traditional persona



*First generation.* They are the first within their family to attend college. They are more likely to live at home or off-campus, to face serious financial hurdles, and to come from working class families from various cultural and ethnic backgrounds. They often start at a community college, attend college part-time, delay entering college after high-school graduation, or work full-time while they are enrolled. These students are often treated the same as traditional students are, but they have different needs and motivations. For instance, they tend to be much more pragmatic about the translation of education into jobs and income. They are more concerned with affordability since they typically want or need payback sooner. Accompanying these needs, however, is a lack of knowledge of and support within higher education. They have a need for “wrap-around” services that go beyond “just school.”

Figure 6. 1<sup>st</sup> Gen persona

**MyPage** Settings Upload Notifications Account Logout

Lein (Lee-in)  
Female  
22  
Houston, Texas

I'm a semi-urban cowgirl from little Vietnam in Houston, where I work at my parents' Pho restaurant

**Groups:** Farm2TableFoods; Houston Food Trucks; 8th Wonder Brewery; H-Town Chow Down; Houston Free Press Summer Festival

I was raised Buddhist, and love and honor the culture I was raised in, but my parents married young in Vietnam and immigrated here before I was born. My mom had four more kids after me and let's just say that is NOT the path I see for myself. I grew up in a very different reality from Mom and Dad, who had a dream: the American dream. I, on the other hand, have a practical vision of success.

I've always helped mom and dad in the business, ever since I was a kid. They both speak perfect English now, but I'm still their go-to person to approve the new menus or deal with letters from city offices. I still remember being eight years old and facing off with a food inspector over the live frogs in our kitchen.

We have a very lively foodie scene in Houston but they want me to go for a medical degree. I'm less than convinced. My languages (Vietnamese/English) put me at an advantage in Houston's growing international business community. What puts me at a disadvantage compared to some of my peers is my age—my time working in the family business has slowed my education down so another several years of med school does not sound appealing right now...

Anyway, I don't care for memorizing facts in books, which is part of the reason I selected the less-traditional school I'm in now, a culinary program focused on raising animals for food. We learn all kinds of interesting things, like what to do when they have babies and how to slaughter the animals.

I'm on to a few career options that fit with my background in the restaurant business ). For example, I'd like to build my own brand of local, healthfully and ethically raised livestock. Better to build on what I know —food—than spend my 30's drowning in anatomy books

Write a comment...

*Adult.* They are older than the first two types. They often need to attend school part-time to balance work, family, and education. In recent years, the percentage increase in students age 25 and over has been larger than for younger students, and this pattern is expected to continue. Between 2000 and 2010, the enrollment of students under age 25 increased by 34% while 25-and-over rose 42%. From 2010 to 2020, NCES projects an 11% increase for those under 25, and a 20% increase for those for those age 25-and-over.<sup>2</sup> An issue with this group is that they do not get as much attention from the higher education system as the more visible traditional students. They take fewer courses and are overlooked in student support services, yet they are approaching 50% of the student population. Their numbers and unique needs will change institutions and instructional delivery. They are still not getting the proper emphasis.




Figure 7. Adult persona

The screenshot shows a web browser window with the address bar displaying 'www.mypage.com'. The browser's address bar also shows 'MyPage - Google Search'. The browser's address bar also shows 'Reader'. The browser's address bar also shows 'Coursea Apple iCloud Facebook Twitter Wikipedia Yahoo News Popular'. The browser's address bar also shows 'Settings Upload Notifications Account Logout'. The browser's address bar also shows 'MyPage'. The browser's address bar also shows 'Hi to all the young people I haven't scared off MyPage yet! If you accept my friend request I promise not to be a creepy old dude... Really, I'm a pretty cool person despite my age.' The browser's address bar also shows 'I live in a small desert community around Tucson, AZ where I volunteer at the local church sometimes, but am mostly a stay-at-home husband. I want to get certified in sustainable farming to make a little money while I commune with nature. I'm studying for my certificate while working part time as a freelance Portuguese/English interpreter. I'm also a writer that sometimes gets paid for writing. Luckily my partner supports me, emotionally and financially.' The browser's address bar also shows 'My Brazilian accent makes me seem much more exotic than I actually am. It makes me stand out in my community college classes. But I'm a basic suburban sunbelt middle-aged guy committed to daily yoga practice, biking, tennis and partner of 10 years. Hate to be a stereotype, but we are also trying to adopt.' The browser's address bar also shows 'As an only child, I grew up very close to my parents, who see my life as a case study in social mobility. My father was an entrepreneur and my mother stayed home, so I guess I grew up with a mix of traditional and risk-taking examples. I'm sort of a weird mix of both.' The browser's address bar also shows 'I really never tire of taking classes. For me, adding to the knowledge and degrees I already have is fine, but even more of a plus to learn a new skill that allows me to try different work or volunteer roles. But I do avoid online classes. I just can't enjoy school without the peer socialization.' The browser's address bar also shows 'As a lifelong learner, my dream dinner party guests would have to be truly inspirational and visionary, like Gandhi, and Jung. Of course, I could chat with just about anyone over the right meal...'. The browser's address bar also shows 'Write a comment...'. The browser's address bar also shows 'Saul Male 43 Tucson, AZ'. The browser's address bar also shows 'Groups: YogaGlo; Deepak Chopra; LGBTQ OutReach; Tucson Writers Guild; Freedom Fellowship: a non-denominational church.'

MyPage

Settings Upload Notifications Account Logout



Saul  
Male  
43  
Tucson, AZ

**Groups:** YogaGlo; Deepak Chopra; LGBTQ OutReach; Tucson Writers Guild; Freedom Fellowship: a non-denominational church.

Hi to all the young people I haven't scared off MyPage yet! If you accept my friend request I promise not to be a creepy old dude... Really, I'm a pretty cool person despite my age.

I live in a small desert community around Tucson, AZ where I volunteer at the local church sometimes, but am mostly a stay-at-home husband. I want to get certified in sustainable farming to make a little money while I commune with nature. I'm studying for my certificate while working part time as a freelance Portuguese/English interpreter. I'm also a writer that sometimes gets paid for writing. Luckily my partner supports me, emotionally and financially.

My Brazilian accent makes me seem much more exotic than I actually am. It makes me stand out in my community college classes. But I'm a basic suburban sunbelt middle-aged guy committed to daily yoga practice, biking, tennis and partner of 10 years. Hate to be a stereotype, but we are also trying to adopt.

As an only child, I grew up very close to my parents, who see my life as a case study in social mobility. My father was an entrepreneur and my mother stayed home, so I guess I grew up with a mix of traditional and risk-taking examples. I'm sort of a weird mix of both.

I really never tire of taking classes. For me, adding to the knowledge and degrees I already have is fine, but even more of a plus to learn a new skill that allows me to try different work or volunteer roles. But I do avoid online classes. I just can't enjoy school without the peer socialization.

As a lifelong learner, my dream dinner party guests would have to be truly inspirational and visionary, like Gandhi, and Jung. Of course, I could chat with just about anyone over the right meal...

Write a comment...

*Independent.* They come to learning from divergent paths. This group may include the very young (example: a 12-year-old attending a college course online or on campus), or the very old (example: a 100-year-old graduating with her Bachelor's degree). The independent learner is the least defined of the segments. There is a sense that they are a growing group. A term that resonated well with us was that these learners are “nomadic.” They often accumulate bits and pieces of credits and work experiences from different places. There is currently not a good mechanism for integrating their learning and enabling them to build on what they have done. They are typically forced to start over, and this often leads them to drop out of the system or not even entering it at all.

Figure 8. Independent persona



Table 1 provides a comparison of the four types to provide a better feel for the types of likes, dislikes and preferences one might see with them.

	Traditional	1 <sup>st</sup> Generation	Adult	Independent
<b>Name</b>	Scott	Lien (Lee-in)	Saul	Hakima
<b>Sex</b>	Male	Female	Male	Female
<b>Age</b>	18	22	43	15
<b>Sexual orientation</b>	Straight	Straight	Gay	Straight
<b>Location</b>	middle America suburbs-Nebraska	semi-urban, little Vietnam in Houston	lives in desert community around	family originally from Kabul;

			Tucson, AZ	currently in Cambridge, MA
<b>Employment</b>	a few part time service jobs during high school to save for college; now working part time	at her family's restaurant	volunteers at local church but mostly stays at home	works "under the table" tutoring family and friends' children
<b>Studying/learning pursuits; job/career prospects</b>	biogenetics; wants to work with bioprinting	her parents want her to obtain a PhD in something medical; she's not sure what she wants	wants to get certificate in sustainable farming	interested in studying information technology
<b>Aspirations/dreams</b>	CEO of his own bioprinting firm	maybe a biologist or veterinarian; likes working with animals	work part time as college professor or maybe writing	bring online learning opportunities to more women globally
<b>Learning style</b>	face to face, typical classroom setting	hands on learning	face to face	learning style is self-education; sought ways to go beyond the classroom
<b>Ethnicity/languages spoken</b>	white & English	Vietnamese/English and Vietnamese	Brazilian/Portuguese with moderate English	can speak and read her native languages Dari and Pashto; primarily reads and speaks English
<b>Religion/beliefs</b>	would say Christian, but not really practicing	brought up Buddhist but doesn't adhere like parents do	no religious preference	her and her family are Sunni Muslims
<b>Political affiliation</b>	liberal but not voting	moderate liberal	conservative emphasizing individual liberty	Independent
<b>Worldviews, beliefs, values</b>	green "postmodern" worldview; harmony, mutual growth, awareness of others	orange "modern" worldview; competition, autonomy, success-driven	turquoise "planetary" worldview; consciousness, global community, sustainability	having seen the how violence and war are affecting her family and family friends in her family's home country, she seeks peace
<b>Lifestyle</b>	night owl	exercises	yoga enthusiast, biking, tennis	book worm
<b>Family status and type</b>	solid middle class, divorced parents, 1 sibling, 1 half-sibling, and 2 step-siblings	parents married young in Vietnam and immigrated before she was born; oldest of 5 siblings	married to partner for 10 years, trying to adopt; only child, very close to parents	large and wealthy family; father granted US work visa
<b>Hobbies and leisure activities</b>	science fiction reading; virtual reality gaming	reading, painting	sports with partner; being in nature	tutoring, reading, learning languages, solving puzzles



<b>Personal/ household economic status; socioeconomic status</b>	from middle class family	family works hard at their Pho restaurant; their frugality allows them advantages	partner runs consultancy so is comfortable middle-class; grew up poor	large and wealthy family; strong work ethic; family is very important
<b>Parents' educational obtainment/status</b>	both parents have BAs and steady, white collar jobs	Father completed some high school in Vietnam; mother was a credentialed manicurist before the restaurant	father was entrepreneur and mother stayed at home	father's college degree earned in England; mother has some college
<b>If this person could have dinner with any three people, living or dead....</b>	Steve Jobs, Bruce Springsteen, and geneticist Arthur Kornberg	Steve Irwin (she thinks he was funny and liked old reruns of his shows)	Gandhi, Lionel Messi (favorite footballer of all time), Carl Jung	Susan B. Anthony, Benazir Bhutto, and Audrey Hepburn
<b>What would this person bring if they were trapped on a desert island?</b>	his guitar and XBOX One	her favorite book, a favorite stuffed animal that reminds her of family home	partner, who is love of his life	dictionary and set of encyclopedias

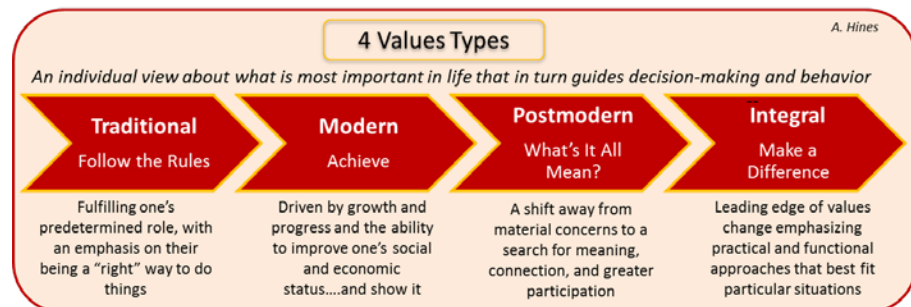
## STEEP Context

The common context for these students is now highlighted using the STEEP framework of social, technological, economic, environmental, and political categories. Within these categories, key trends, models or frameworks are used to highlight the important and probable developments out to the year 2025.

## Social

A framework for guiding thinking relating to social change is the New Dimensions Values Inventory based on data from the World Values Survey and Spiral Dynamics.<sup>3</sup>

**Figure 9. Four values types**



The data suggests people, including students, cluster into these four types.

- **Traditional (25-35%)** Focused on following the rules and fulfilling one's predetermined role, with priorities such as respect for authority, religious faith, national pride, obedience, work ethic, large families with strong family ties, and strict definition of good and evil

- *Modern* (30-40%) Focused on achievement, growth and progress, with priorities such as high trust in science and technology (as the engines of progress), faith in the state (bureaucratization), rejection of out-groups, an appreciation of hard work and money, and determination to improve one’s social and economic status.
- *Postmodern* (25-30%) Focused on the search for meaning in one’s life, with priorities such as self-expression, including an emphasis on individual responsibility as well as choice, imagination, tolerance, life balance and satisfaction, environmentalism, wellness, and leisure.
- *Integral* (2-5%) Emerging as the leading edge of values change, with a more practical and functional approach to employing values that best fit the particular situation, enabling one to pursue personal growth with an understanding and sensitivity to larger systemic considerations.

A key implication is the research showing a long-term shift from traditional to modern to postmodern to integral. In the US, traditional values are declining, modern values are peaking, and postmodern and integral are both growing. The data also shows that the newer types (postmodern and integral) are younger, suggesting those students are more likely to be at the forefront of changing values and lifestyles. The research identified five key themes of change resulting from the shift toward postmodern and integral values:<sup>4</sup>

- *Authenticity*. People are tired of being managed and manipulated and hunger for the straight story, warts and all.
- *Connection*. The desire to get reconnected with what is really important in life.
- *Anti-consumerism*. A sense that the consumption relationship needs to be reoriented such that consumption is not the end goal, but a means to various ends.
- *Self-expression*. Sharing one’s search for deeper meaning and purpose.
- *Enoughness*. Voluntary simplicity driven by sense of one “having enough” or being fed up, embracing a need for limits and getting back in control of one’s life.

## Generations

Another common lens or framework through which to view social change is via the generations concept popularized by Strauss & Howe.<sup>5</sup> It suggests generational cohorts share common characteristics that can provide insight into future behavior patterns.

<b>Table 2. Generations</b>		
<b>Generation</b>	<b>Age in 2013</b>	<b>Age in 2025</b>
<i>Matures</i> —Born between 1925 and 1945	68–88	80-100
<i>Boomers</i> —Born between 1946 and 1964	49–67	61–79
<i>Generation X</i> —Born between 1965 and 1978	35–48	47–60
<i>Millennials</i> —Born between 1979 and 1998	15–34	27–46
<i>Generation Z</i> – Born between 1999 and 2009	3-14	15-26

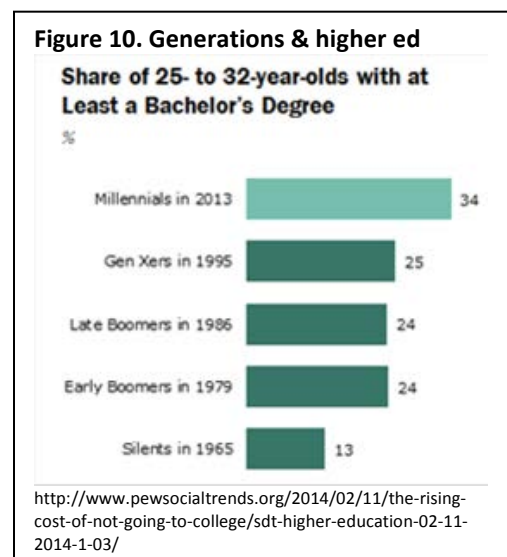
*Matures.* With just under 38 million members, Matures are America’s smallest generation. They range in age from 64 to over 100 in 2009. In 2025, the youngest Matures will be 80,<sup>6</sup> so they will not be a significant source of students.

*Boomers.* America’s Boomers have lived through a great deal of change in their lives—from the political upheaval of the 1960s to the dawning of the era of human genetics. Boomers themselves drove many of the changes in lifestyles that are now taken for granted, and they are expected to keep innovating as they enter their third age — a time that will likely include an eclectic mix of work, leisure, education, and semi-retirement. Today there are approximately 77 million US Boomers. Among the living generations, they are outnumbered only by the Millennials (84 million).<sup>7</sup> They were the generation that most benefited from increased access to higher education and show a strong predisposition to lifelong learning.

*Gen X.* The term Gen X conjures many images -- -- author Douglas Coupland, the “slacker” lifestyle, grunge, and the Seattle music scene. But today those iconic images do little to describe Gen X. America’s “slackers” have grown up and have moved beyond their early stereotypes. Instead, today’s Xers have chosen a middle road that lets them hang onto elements of their youth but still pursue elements of adulthood, such as family formation and rising responsibility at work. Today, there are approximately 57 million Gen Xers in the US, some 20 million fewer than there are Boomers.<sup>8</sup>

*Millennials.* American Millennials have grown up in a remarkably different world than those of previous generations. For most Millennials the Cold War is purely a figment of history, while the Internet and helicopter parents are normal aspects of everyday life. As the largest living generation, the Millennials will have a significant impact on US society and work culture. Their new approaches to everything from work to politics are already creating large ripple effects throughout US consumer lifestyles. Today there are approximately 84 million Millennials—about 7 million more than the boomer generation.<sup>9</sup> They appear to be participating in higher education at a higher rate than Xer and Boomer predecessors.

*Gen Z.* America’s youngest generation, much has been made over their tech-dominated environment — labels have ranged from “Google Generation” to the “iGeneration,” reflecting just how much their elders expect technology to shape members of Gen Z. They have been called the ultimate multi-taskers, a generation unaware of a world before user-generated content, whose members may be learning to type even as they are learning to walk. According to US census data, there were around 41 million members of Generation Z in 2008 — with as many as 3 million more born in 2009, bringing the total for Gen Z to around 44 million to 45 million. This generation is comparatively smaller than some of its predecessors: there are approximately 84 million



Millennials, 57 million Gen Xers, and 77 million Boomers, but they span only 10 years (1999-2009) compared to Boomers spanning 18 years (1946-1964).<sup>10</sup>

Looking across the generations in higher education, Figure 10 shows that there was a big jump in completion of Bachelor's degrees from Matures to Boomers and Xers and now another jump with the Millennials, almost tripling over the last 50 years.

### Family types

A third lens through which to view social change is by family type, produced by the Culture of American Families Project.<sup>11</sup>

*The Faithful* (20% of families) are the most conservative and traditional of the four types. They are the most likely to attend religious services (4 out of 5 do so regularly) and have larger families (25% have four or more children). As their name conveys, they believe that right and wrong is dictated by God, and the role of the family is to share religious teachings with their children. They are notably less tolerant of alternative lifestyles and suspicious of public schools.

*Engaged Progressives* (21%) are the opposite of the Faithful, in terms of ethics, since they embrace a more subjective moral stance that focuses on doing what is right for the situation, and making choices that are affirming to the individual's values. However, they are similar to The Faithful in that they tend to be married at about the same, relatively high, rate, and live in nuclear family households. They are among the most highly educated of the four parenting types.

*The Detached* (19%) are probably the least cohesive of all four. The parents believe growing up is a child's journey, so they tend to have a less opinionated view of the major parenting issues. They also tend to be less enthusiastic about being parents and their current marriage, at least compared to the other family groups. Demographically Caucasian, they are suspicious of ethnic diversity. They spend (empirically) less time with their kids, as their name suggests.

*American Dreamers* (27%) are the largest of all four cohorts. The group also stands out because it's the only "majority minority" family culture, mostly composed of Hispanic and African American families. They have the least education, and more than half of them live below the median income. The research uncovered several interesting facts about the American Dreamers, including their strong hope that their children will grow up with "loving" qualities above other personality traits. They perceive great dangers in society (predators, drugs), though they avoid calling themselves religious and are the least likely to be married. They view the parental role as one of providing moral guidance. At the same time, they are the most likely to want to be BFFs (Best Friends Forever) with their grown children.

### Demographics

A few basic statistics on US households. The average number of persons per household from

2008-2012 was 2.61, which breaks down as follows: <sup>12</sup>

- Total households 112 million
  - Family households - 80 million
    - 59 million married-couple households
    - 15 million female householders (no spouse present)
    - 6 million male householders (no spouse present)<sup>13</sup>
  - Nonfamily households - 42 million
    - Twelve million non- family households were maintained by individuals 65 years and older.<sup>14</sup>
  - 32 million households consisted of one person living alone.<sup>15</sup>

### Lifestyle trends

Finally, eight lifestyles trends are selected for their relevance to students and their emerging needs.

- *Co-creation*. Businesses are increasingly giving their customers the opportunity to participate in the design and final specs of the products they buy.
- *Crowdsourcing*. Innovative firms are exploring ways to extend relationships beyond co-creation — and in some cases are entering what look more like partnerships with their consumers than simple producer-consumer relationships
- *Digital tribes*. The online aspects of our personal identity are increasingly becoming “real,” with technology enabling the formation of new forms of online and virtual social ties.<sup>16</sup>
- *Empowered consumers*. A much more savvy, information-hungry, and knowledgeable class of consumers, such as those who carry smartphones, use comparison apps, and check prices in store aisles are often looked at as a threat by companies, but this need not be the case.<sup>17</sup>
- *Enoughness*. Some consumers are deciding that they’ve “had enough,” and are accepting the need for limits and opting out of consumerism. They are willingly downsizing their lifestyles in pursuit of greater simplicity, more free time, and in some case more spiritually grounded lifestyles.<sup>18</sup>
- *Personalization*. Consumers will increasingly look for products and services that align with their individual needs and preferences, whether this means the look and feel of a car’s instrumentation or personalized foods based on one’s genetic profile.<sup>19</sup>
- *Pop-up experiences*. Growing popularity of “pop-up” experiences (e.g. food trucks, pop-up restaurants, flash mobs).<sup>20</sup>
- *Social currency*. As social networking and social media continue to ascend in importance, shared content, tweets, and “likes” are seen as having real-world value and increasingly function as a form of social currency.<sup>21</sup>

## Technological

The big story for student life and needs will clearly be the growing influence of ICT (information and communications technology), but it is not the only story. This section provides a brief overview of key enabling technologies, that is, core technologies that will be leveraged by other technologies.

### Key enablers

#### ICT

- *Virtual-real blending.* The boundaries between the real and the virtual are becoming more porous, in areas from economics and consumer goods to media. For example, companies have embraced virtual worlds as places where they can design and test products before launching them in the real world. For example, Starwood Hotels designed a virtual hotel that mirrored a real hotel it was constructing, with a goal of studying online users' behavior in the virtual hotel and then using that information to better configure the actual building.<sup>22</sup>
- *AI gets real.* AI and expert systems are growing more capable and will increasingly be integrated into commercial and consumer-facing applications.<sup>23</sup>
- *Big data, big opportunities.* Big data is poised to become increasingly important to businesses, governments, and consumers. The volume of data is increasing exponentially around the world, with Facebook alone generating 30 billion pieces of new content per month. Only a handful of organizations currently understand and exploit the full potential of their data assets.<sup>24</sup>
- *Persuasive technologies.* Persuasive technologies are interactive technologies designed specifically to influence the behavior and beliefs of users. They can monitor consumer behaviors and provide real-time feedback and incentives to influence consumers.<sup>25</sup> Examples of persuasive technology include Amazon's system for recommending books to users, in-auto displays that indicate economical and environmentally friendly driving behavior, and exergames such as the Wii Fit that encourage physical activity.<sup>26</sup>
- *Augmented reality.* Augmented reality (AR) systems supplement a user's real world with digitally created visual and aural information including text, graphics, 3-D animation, and sounds. In doing so, AR technologies produce information streams that lie somewhere between reality and virtual reality.<sup>27</sup>
- *Internet of things.* Advancing network and sensing technology, backed up by ever smarter software, is enabling intelligent networks of "things", making their operations, status, and even surrounding environmental conditions increasingly transparent.<sup>28</sup>
- *Cloud computing.* The move to cloud computing — data storage, applications, platforms, computing power, and managed services being delivered over the Internet rather than hosted on personal computers — is underway. Consumers are quickly becoming more comfortable with cloud computing as they use popular cloud-based services such as Gmail and Google Docs, social sites like Twitter and Facebook, and photo- and video-sharing sites like Flickr and YouTube.<sup>29</sup>

- *Smart buildings.* Smart homes and buildings are emerging, with the ability to monitor and control energy consumption and internal systems. Future development of this technology may provide an infrastructure for in-home medical monitoring.<sup>30</sup> Not only are buildings getting smart, but cars are as well, and people spend most of their lives in buildings, and the second most in cars.

### Bio

The global biotech industry revenue were \$262bn (2013) with annual growth of 11% between 2008 and 2013.<sup>31</sup> Biotech is typically divided into three sectors:

- *Industrial:* use of genetically engineered microorganisms to do work, such as industrial production, e.g., enzymes for fermentation, waste cleanup, etc.
- *Food & agriculture:* modify gene to breed in resistance to pests, or herbicide-resistant crops, e.g., roundup-ready seeds
- *Health:* modifying genes to combat inherited diseases or conditions, e.g., biologics, pharmaceuticals and stem cells

Examples of interesting developments include:

- *GMO foods increasing.* Advances in genetics are enabling greater precision in everything from breeding of varieties to the creation of genuinely new foods. It could be an also be avenue to healthier foods, e.g., breeding in vitamins and minerals. An increasing proportion of the global food supply has been genetically modified.<sup>32</sup>
- *GMO concerns.* While to date there is no clear evidence about health risks from GMO foods, some experts, and citizens, remain concerned about the long-term health effects of GMO food consumption.<sup>33</sup>
- *Industrial biotech* will provide biodegradable polymers, biofuels, and green chemical products to meet the dual challenge of reducing fossil-fuel use and environmental impacts.<sup>34</sup>
- A few forecasts made several years ago on health biotech from physicist/futurist Michio Kaku that appear to be on track:<sup>35</sup>
  - In the next ten years, stem cell research may result in the ability to grow human organs and tissues such as the heart, stomach, or muscles, increasing the supply and availability of transplant organs. Beyond twenty years, it will become possible to grow any human organ in the lab.
  - In the next ten years gene therapy will start to become a key weapon in the war against disease. Some 50 to 100 diseases will be curable through gene therapy. Beyond 20 years, several hundred of the 5,000 known human genetic diseases will be curable by gene therapy.

### Energy

- *Peak oil.* The idea of peak oil -- the hypothesis that a peak in oil production is approaching, after which global supplies will gradually decline -- has moved from an inside-the-industry idea to a mainstream issue that more Americans are aware of.<sup>36</sup> It may be however, that the fracking boom, noted in the next bullet, will postpone its arrival.



- *Shale boom.* New discoveries and fracking technology to access shale gas are increasing the natural gas supply, suggesting perhaps another generation or two of relatively affordable energy.<sup>37</sup>
- *Alternative energy.* Renewable energy sources include hydropower, wood biomass (used to generate heat and electricity), alternative biomass fuels (such as ethanol and biodiesel), waste, geothermal, wind, and solar. About 9% of all energy consumed in the United States in 2012 was from renewable sources, and they account for about 11% of the nation's total electricity production.<sup>38</sup>
- *Wireless electricity.* Wireless electricity transmission is poised for commercialization and for integration into a wide variety of products over the next decade. Wireless recharging stations that utilize direct-contact induction have been developed for personal electronic devices, and are poised for greater integration into homes, cars, and commercial environments, e.g., the Powermat.<sup>39</sup> While not as revolutionary as some other technologies, it will help facilitate the ubiquity of smart devices into daily life.
- *Energy efficiency.* US total energy consumption per unit of GDP (primary energy intensity), decreased 1.8% per year between 1990 and 2011.<sup>40</sup>

### *Materials*

- *3D Printing:* 3D printing is transitioning from a prototyping tool to a manufacturing tool. It has the potential to profoundly alter the manufacturing landscape by allowing individuals and small businesses to create custom products on demand. 3D printers sell for about \$1,000 and service providers are popping up. For example, Shapeways, a provider of on-demand 3D printing, lets users upload their own digital designs to the Shapeways site, or choose and modify a digital design already available online, and it then prints the one-of-a-kind physical object and delivers it to the user.<sup>41</sup>
- *Smart materials.* Materials engineers are creating advanced materials that are: (1) smart, e.g., able to respond to environmental conditions and changes; (2) multifunctional, e.g., aircraft skins that can both absorb radar and change their shape depending on airflow; and (3) adjustable to the environments in which they will be used, e.g., structural materials that strengthen during service, perhaps in response to temperature changes.<sup>42</sup>

### *Nano*

- *Nanotech products:* Products with nanotech elements are beginning to hit the market. While much of the promise of nanotechnology remains in the lab or in the pages of industry vision documents, some early examples of nano-enabled products are beginning to hit the market.<sup>43</sup>
- *Nano-enhanced materials.* The development of nanomaterials -- including nanoparticles, nanotubes, coatings, and three-dimensional nanostructures -- is improving the quality and durability of traditional materials.<sup>44</sup>



## Economic

It is important to ground the forecasts economically. For the project, the scenario archetype approach is used. The basic idea is that in looking over several decades of scenarios and foresight work, four common patterns of change in systems emerge have consistently emerged. Thus one way to do scenarios is start from the present, apply the archetypal pattern, and describe the future that emerges, in this case starting from the current economic system. The archetypes are:

- *Continuation*. The system moves forward along its current trajectory. It is “present trends continued;” usually considered most likely to happen.
- *Collapse*. The system falls apart under the weight of “negative” driving forces.
- *New equilibrium*. The system reaches a balance among competing forces that is significantly different from the current balance.
- *Transformation*. The system is discarded in favor of a new one with a new set of rules.

### Archetypes

#### *Long Boom (continuation).*

The most familiar possibility shows the recession as a painful bump in the road, and soon domestic and international economies will pick up roughly where they left off. Steady long-term growth is the continuing norm; society and business look a lot like they have for the past 20 years.

*Stagnation (collapse).* The most dire scenario treats the Great Recession as a prelude to further recession and long-term stagnation. It is not an apocalypse, but it’s a world

in which the economy and society do not respond to government intervention, and consumers and society slow down. Security becomes paramount.

*Our Turn (new equilibrium).* This exercise imagines a world in which the recession continues to be severe and is conquered only as emerging markets take the reins of the global economy, displacing the governments and consumers of the developed world.



*Soft Path (transformation).* Here environmental and social sustainability move from “nice to have” to “need to have” values as worldwide consumers fundamentally reassess priorities. Local products and services flourish in an environment that defines success and progress in sustainable terms.

For this project, the baseline forecasts in Chapter 4 are based on “continuation,” that is, present trends continuing uninterrupted. The alternatives in Chapter 5 assume a “disruption” to the baseline, either in the form of a new equilibrium change, in which the system is challenged and responds to “save itself” or the beginning of transformation in which a new economic system begins to emerge (see in particular the “Living” alternative: The ‘Ours Economy’). Possibilities for “collapse” are noted, but not highlighted, since a collapse future would like mean a return to previous approaches rather than a shift to novel ones.

## Sectors

The current GDP in America is around \$16 trillion.<sup>45</sup> The Bureau of Labor Statistics (BLS) table below shows the distribution and projected growth of major industry sectors. It is noteworthy that services are continuing to grow and are projected to hit 80% of workers by 2012, while goods-producing declines to 12% (including manufacturing at 7%) and agriculture at 1%.

Industry Sector	Thousands of Jobs			Change		Percent Distribution			Compound Annual Rate of Change	
	2002	2012	2022	2002 -12	2012— 22	2002	2012	2022	2002— 12	2012— 22
<b>Total<sup>1</sup></b>	142,294	145,355	160,983.	3,060	15,627	100	100	100.	0.2	1.0
<b>Non-ag wage and salary<sup>2</sup></b>	131,028	134,427	149,751	3,399	15,323	92.1	92.5	93.0	0.3	1.1
<b>Goods-producing, excluding ag</b>	22,486	18,360	19,554	4,126	1,193	15.8	12.6	12.1	-2.0	0.6
<b>Mining</b>	512	800	921	288	121	0.4	0.6	0.6	4.6	1.4
<b>Construction</b>	6,715	5,640	7,263	1,074	1,622	4.7	3.9	4.5	-1.7	2.6
<b>Manufact'g</b>	15,258	11,918	11,369	3,339	-549	10.7	8.2	7.1	-2.4	-0.5
<b>Services</b>	108,541	116,067	130,197	7,525	14,129	76.3	79.9	80.9	0.7	1.2
<b>Utilities</b>	596	554	497	-42.1	-56.4	0.4	0.4	0.3	-0.7	-1.1
<b>Wholesale trade</b>	5,652	5,672	6,143	20.4	470	4.0	3.9	3.8	0.0	0.8
<b>Retail trade</b>	15,025	14,875	15,966	-149	1,090	10.6	10.2	9.9	-0.1	0.7
<b>Transportation &amp; warehousing</b>	4,223	4,414	4,742	190	327	3.0	3.0	2.9	0.4	0.7
<b>Information</b>	3,394	2,677	2,612	-717	-65	2.4	1.8	1.6	-2.3	-0.2
<b>Financial</b>	7,847	7,786	8,537	-60	751	5.5	5.4	5.3	-0.1	0.9

<b>Professional &amp; biz services</b>	15,976	17,930	21,413	1,954	3,482	11.2	12.3	13.3	1.2	1.8
<b>Educational services</b>	2,642	3,346	4,022	704	675	1.9	2.3	2.5	2.4	1.9
<b>Health care &amp; social assist</b>	13,555	16,971	21,965	3,416	4,994	9.5	11.7	13.6	2.3	2.6
<b>Leisure and hospitality</b>	11,986	13,745	15,035	1,759	1,289	8.4	9.5	9.3	1.4	0.9
<b>Other services</b>	6,129	6,174	6,823	45	648	4.3	4.2	4.2	0.1	1.0
<b>Federal government</b>	2,766	2,814	2,406	48	-407	1.9	1.9	1.5	0.2	-1.6
<b>State and local government</b>	18,746	19,103	20,032	356	929	13.2	13.1	12.4	0.2	0.5
<b>Agriculture, forestry, fishing, and hunting<sup>3</sup></b>										
<b>Agriculture, forestry, fishing, and hunting<sup>3</sup></b>	2,245	2,112	1,889.	132.	-223	1.6	1.5	1.2	-0.6	-1.1
<b>Agriculture wage and salary</b>	1,217	1,306	1,281	89	-25	0.9	0.9	0.8	0.7	-0.2
<b>Ag self-employed &amp; unpaid family</b>	1,028	805	607	222	-198	0.7	0.6	0.4	-2.4	-2.8
<b>Non-ag self-employ and unpaid family</b>										
<b>Non-ag self-employ and unpaid family</b>	9,021	8,815	9,343	205	527	6.3	6.1	5.8	-0.2	0.6
<b>Footnotes:</b>										
<p><sup>1</sup> Employment data for wage and salary workers are from the BLS Current Employment Statistics survey, which counts jobs, whereas self-employed, unpaid family workers, and agriculture, forestry, fishing, and hunting are from the Current Population Survey (household survey), which counts workers.</p> <p><sup>2</sup> Includes wage and salary data from the Current Employment Statistics survey, except private households, which is from the Current Populations Survey. Logging workers are excluded.</p> <p><sup>3</sup> Includes agriculture, forestry, fishing, and hunting data from the Current Population Survey, except logging, which is from Current Employment Statistics survey. Government wage and salary workers are excluded.</p> <p>Source: Employment Projections program, U.S. Department of Labor, U.S. Bureau of Labor Statistics</p>										

## Environmental

Growing attention to environmental issues and concerns is expected to continue.

### Sustainability

- *Sustainability and the Triple Bottom Line:* Sustainability has emerged as a mainstream concept that is the central organizing concept of environmentalism, and has expanded to include social and economic concerns as well.<sup>46</sup>
- *Ethical consumption.* Ethical consumption integrates personal values into purchasing choices, including ethical, religious, political, and other beliefs -- going beyond standard consumer variables such as price, quality, and convenience. Lifestyles of Health and Sustainability (LOHAS) describes an estimated \$290 billion U.S. marketplace for goods

and services focused on health, the environment, social justice, personal development and sustainable living -- approximately 13-19% percent of US adults.<sup>47</sup>

- *Corporate social responsibility.* Companies are generally increasingly joining environmental causes and are incorporating socially responsible practices, such as charitable giving, fair trade. An E&Y survey found 63% of surveyed large companies make public environmental and social goals, and publicly report progress against those goals.<sup>48</sup>

### Key issues

- *Climate change.* Global climate change has emerged as a dominant global environmental issue, but it ranks relatively low among concerns of US citizens. On a list of priorities for the president and Congress in 2014, it ranked second to last among 20 issues tested.<sup>49</sup>
- *“Peak” resources.* The idea that several resources have hit their peak usage and are declining, with “peak oil” gaining the most attention<sup>50</sup> -- along with food and water -- and capturing concerns about humanity’s ecological footprint.<sup>51</sup>

### **Political**

Most of the attention to political matters is covered in the “Participating” domain, but a few cross-cutting trends are worth being called out as important across all six domains.

- *Political transparency.* Citizens have growing demands for accountability on the part of elected officials and public employees.<sup>52</sup>
- *Gross National Happiness.* Governments are considering measures of happiness in addition to or instead of GDP as a success criterion, e.g., the government of Bhutan.<sup>53</sup>
- *US voter participation rates fluctuate, but generally low.* Voter turnout in the US fluctuates, but has never risen to levels of most other well-established democracies. Overall, OECD countries turnout is about 70%, while US is 60% for presidential election years, and about 40% during midterm elections.<sup>54</sup>
- *Polarized views.* A recent Pew Research report found that “Congress reflects an America that has been growing further and further apart ideologically for decades.”<sup>55</sup>

### Regulation

- *Soft paternalism.* There is growing interest in using incentives and disincentives to “nudge” citizens towards better decision-making. One approach, used with pensions, is to dispense with formal enrollment, and instead have enrollment become automatic, with an opt-out option if wanted.<sup>56</sup>
- *Market-based regulations struggling.* The most common example is emissions trading or cap-and-trade approaches for reducing emission by providing economic incentives,<sup>57</sup> but they are struggling to grow.<sup>58</sup>

### Chapter 3. Current Assessments & Scanning

The Framework Foresight process begins by framing the domain with a current assessment. The teams produced a current assessment for each of the six domains: Living, Learning, Working, Playing, Connecting, and Participating. The current assessment consists of a domain description followed by an assessment of the current conditions of the domain.

The domain description described how each domain is defined and bounded. It is in three parts: first, the domain is briefly summarized in a paragraph or two; second, a visual domain map highlights the key domains guiding the team's exploration, and third, key stakeholders are identified in a table.

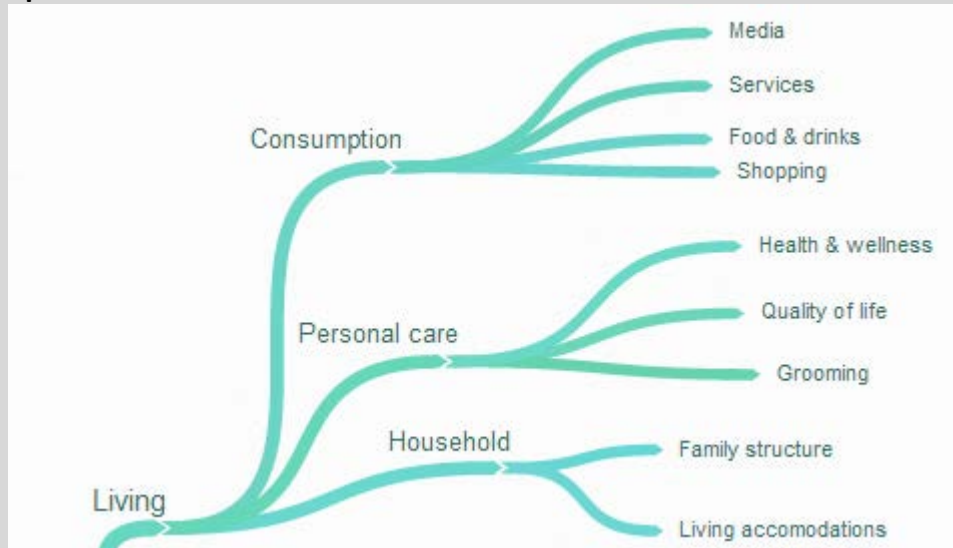
Once the domain is described, the important current conditions – what is the essential need-to-know information about the domain in the present – are identified. The idea is to ground the domain in the present before forecasting its future.

Scanning identifies what might change in the domains in the future. The chapter closes with a description of the process. The individual scanning hits are collected in a web-based bookmarking site that Lumina will be able to access.

## The Living Domain

Living is the basis and foundation for all the other domains. It includes the foundation of the other domains, such as housing, family structure and needs, health and wellness, quality of life, grooming, shopping, services, media, and food and drink.

### Domain map



### Stakeholders

Stakeholder	Description	Interests
Universities	Institutions of higher learning	Producing graduates Doing research Making money
Other education providers (tutors, charter schools, MOOC's, etc.)	Auxiliary educational sources	Aiding students in their studies Providing alternative means for gaining an education Making money
Governments (Federal, State, Local)	Political body that enacts and enforces laws, builds infrastructure, and maintains the well-being of society and its citizens	Keeping the peace Producing well-informed voters Providing opportunities for businesses and individuals to prosper
All of the business that provide living services	Retail, grocery, restaurants, media outlets, physical and mental health providers, personal care products, builders, apartments	Being as free as possible to offer their products and services without interference from government Making money

## **Living Current Conditions**

### **Consumption**

#### Shopping

- Crowdfunding is allowing consumers to influence what products are produced.
- Ongoing focus on green and reusable continues, such as chopsticks that contain seeds that can be planted.
- Consumers want some return on the value that they provide for consumer data.
- More than half (62%) of US consumers with Internet access now shop online at least once a month, and only 1% say they never shop online.<sup>59</sup>
- 90% of customers say buying decisions are influenced by online reviews.<sup>60</sup>

#### Food & drink

- The average household spends about 11% of its income on food, according to *The Atlantic*.<sup>61</sup>
- Americans eat out about 5 times a week.<sup>62</sup>
- A recent Gallup poll reveals that 8 out of 10 Americans eat at fast-food restaurants at least once a month.<sup>63</sup>
- A total of \$4.6 billion was spent on all advertising by fast food restaurants in 2012. McDonald's spent 2.7 times as much to advertise its products as all fruit, vegetable, bottled water, and milk advertisers combined.<sup>64</sup>
- Less than 1% of all fast food kids' meal combinations met recommended nutrition standards.<sup>65</sup>
- Fast food restaurants continue to target black and Hispanic youth, populations at high risk for obesity and related diseases.<sup>66</sup>
- Awareness and discussion around GMO's continues.
- A report analyzing the sales of 15 major food and beverage companies found that sales of better-for-you (BFY) products (defined as no-, low- and reduced-calorie items) drove more than 70% of sales growth from 2007 to 2011.<sup>67</sup>

#### Media

- When compared with various classifications, freshmen students spent more time on social networking and less time on reading than other groups.<sup>68</sup>
- In 2013, college students spend 60% of the day interacting with technology -- 14.4 hours daily.<sup>69</sup>
- Consumers are increasingly looking for apps to solve their needs, with global revenue forecast to rise 62% this year to \$25 billion.<sup>70</sup>

## Personal care

### Health & wellness

- The American College Health Association Spring '12 survey reports that 50% of students get sick at least once a year at school, and 22% report dropping a class, stopping work on a major research project, or earning a lower grade due to illness. According to the CDC, half of the 20 million STD cases diagnosed each year occur in young adults ages 15-24; within the college population, estimates of infection are as high as 25%.<sup>71</sup>
- On average, most college students get 6 to 7 hours of sleep per night, and the college years are notoriously sleep-deprived. Recent research on college students and sleep indicates that insufficient sleep impacts our health, our moods, our GPA and our safety.<sup>72</sup>
- Nearly 70% of Americans are on at least one prescription drug, and more than half take two, Mayo Clinic researchers say. Antibiotics, antidepressants and painkilling opioids are most commonly prescribed. Twenty percent of patients are on five or more prescription medications.<sup>73</sup>
- The adult obesity rate in 2013 of 27.2% is up from 26.2% in 2012, and is on pace to surpass all annual average obesity rates since Gallup-Healthways began tracking in 2008. The one-percentage-point uptick in the obesity rate so far in 2013 is statistically significant and is the largest year-over-year increase since 2009. The percentage of normal weight adults fell to 35.3% from 35.9% in 2012, while the percentage of adults who are overweight declined to 35.5% from 36.1% in 2012. An additional 1.9% of Americans are classified as underweight in 2013 so far.<sup>74</sup>

### Grooming

- Convenience and on-the go products are a growing market, including smaller or unit-dose packs that are simple and effective.
- Personal care products are now sold as a point of experience, and it is even better if they support a social or environmental cause.
- A survey done on cleaning hands after public restroom usage found that one-third of Americans skipped washing.<sup>75</sup>
- Too many Americans lack access to preventive dental care, a new study reports, and large differences exist among racial and ethnic groups.<sup>76</sup>

### Quality of life

- According to the American Census FactFinder, 9.9% of the U.S. population 18 and over is enrolled in college or graduate school, with 43.4% of the U.S. population ages 18 to 24 enrolled in college or graduate school.
- Ninety-five percent of college counseling center directors surveyed said the number of students with significant psychological problems is a growing concern in their center or on campus, according to the latest Association for University and College Counseling Center Directors survey of counseling center directors. Seventy percent of directors believe that the number of students with severe psychological problems on their campus has increased in the past year. The survey also found that:



- Anxiety is the top presenting concern among college students (41.6%), followed by depression (36.4%) and relationship problems (35.8%).
- On average, 24.5% of clients were taking psychotropic medications. However, 19% of directors report the availability of psychiatric services on their campus is inadequate.
- Directors report that 21% of counseling center students present with severe mental health concerns, while another 40% present with mild mental health concerns.
- A new survey shows that more than eight in 10 employed Americans are stressed out by at least one thing about their jobs. Poor pay and increasing workloads were top sources of concern reported by American workers.<sup>77</sup>
- Adolescents' self-rated health and reported mental health declined significantly, especially among those in low-income families, but their physical health and activity limitation did not change.<sup>78</sup>

## Household

### Family structure

- Approximately 1 out of 4 undergraduate students has a dependent of their own. About half of those are single parents. There are 3.9 million students who are parents, of which 1.9 million are single parents.<sup>79</sup>
- Pet ownership in the U.S. has more than tripled from the 1970s, when approximately 67 million households had pets, to 2012, when there were 164 million owned pets. In other words, in 2012, 62% of American households included at least one pet.<sup>80</sup>

### Family stats from 2013 U.S Census data

- Seven percent of American households are maintained by a cohabiting couple. More than one-third (37%) of cohabiting-couple households contain children under 18.
- Most children under 18 (64%) live with married parents; 96% of children under 18 live with at least one parent.
- Black (55%) and Hispanic children (31%) are more likely to live with one parent than non-Hispanic white (20%) or Asian children (13%).
- Children living with neither parent (47%) or with a mother only (45%) are most likely to be below poverty, followed by those living with a father only (21%), and those living with two parents (13%). The estimates for children living with neither parent, nor those with a mother only are not significantly different.
- Of the 73.9 million children in the United States in 2013, approximately 7.1 million (10%) lived with a grandparent. Of children living with a grandparent, 20% did not have a parent present.
- Forty percent of married parents with children under 18 had at least a bachelor's degree.

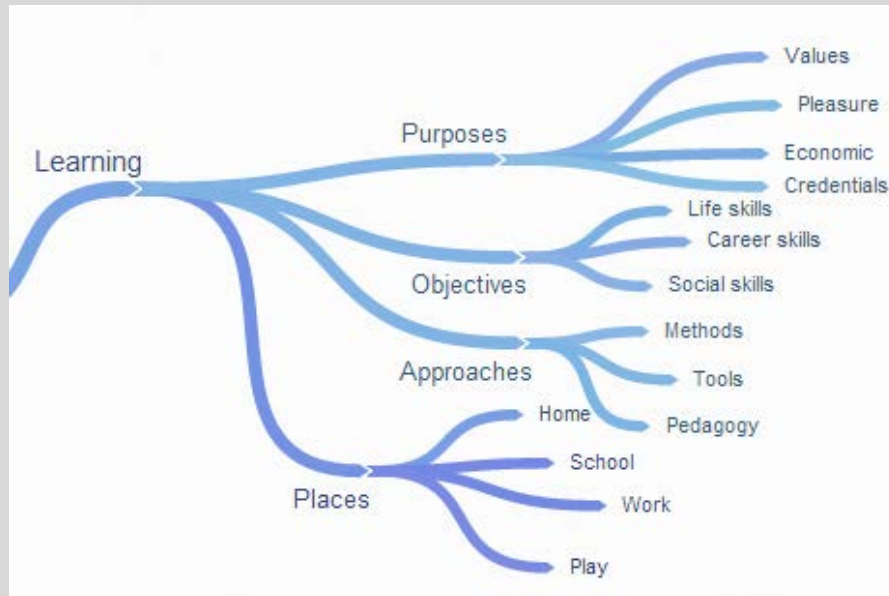
### Living accommodations

- Suburban US settlement patterns tend to be very energy inefficient. For instance, living in a single family home with a long SOV (single occupancy vehicle) commute leads to higher energy consumption than someone living in a smaller home in a mixed-use urban setting where you walk or take transit to work/activities.<sup>81</sup>
- Dorms have more amenities, luxury, and more of “apartment-like” living.
- Adult students will tend to live at home especially if they are part-time and commute to campus or take classes remotely.
- They may have dorm rooms to sleep in during the school year, but many college students are technically homeless -- with no place to call home when classes are not in session.<sup>82</sup>
- On campus, room and board averaged close to \$8,400 for public four-year colleges and universities in the 2012-13 academic year and about \$800 more for privates. And though these charges haven’t been rising as fast as tuition -- what students pay to live on campus has increased by about 65% in the past decade.<sup>83</sup>
- The current level of homeownership marks a decline from 68% in 2011. For most of the prior decade, roughly seven in 10 Americans reported owning their own home. While the recession and financial crisis took place in 2008-2009, homeownership rates did not begin to reflect the bursting of the housing bubble until 2010, when 65% of Americans reported owning their own home -- the lowest level recorded before this year.
- Man caves and technology wired homes (smart homes) are highly requested.
- There is increasing experimentation with less costly forms of housing such as modular homes and micro-homes.

## The Learning Domain

Learning explores the learning needs of students however they might be met in the educational landscape. It includes individual intrinsic and extrinsic needs for accessing a high-quality relevant education at an affordable price, as well as an investigation of support structures, credentialing, and the desire for meaningful experiences. While traditional institutions have more respected credentials and stronger networking among alumni, many students may choose to go other routes to gain the skills needed. Many more will choose their education because they are concerned with learning about the environment and how to tackle important global issues.

### Domain map



### Stakeholders

Stakeholder	Description	Interests
Students	Huge diversity in age, background and subjects	To learn, gain experience & knowledge To interact with others To start a career
Families	Parental interest for children and youth as well as funding learning experiences	To support students To be proud of their success
Professors and Universities	The traditional method for students to acquire learning	To teach students, conduct research, perform community service Build up one's reputation
Online providers	Providers of Massive Open Online Courses (MOOCs)	Gain reputation Get accredited Grow and make money
Textbook and text publishers	Providers of materials to assist in and assess learning	Make money
Private learning org's and tutors	Assistance in the education of students	Grow Make money
Government agencies	Regulators and supporters of educational institutions	Increase quality and accessibility of education

Educational non-profits	Funding and consulting to improve education	Increase quality and accessibility of education
Regional accrediting assn.'s	Regulators and supporters of educational institutions	Maintain quality of education

## Learning Current Conditions

### Purposes

- Some short-term degrees command higher salaries than bachelor's degrees. In Texas, new graduates from technical associate's degree programs earned average salaries more than \$11,000 higher than those for graduates with bachelor's degrees.<sup>84</sup>
- Higher tuition does not necessarily lead to higher salaries. In Colorado, first-year earnings for graduates of Colorado State University's flagship campus in Fort Collins averaged \$36,777, slightly lower than the average \$37,726 earned by graduates of CSU's Pueblo campus.<sup>85</sup>
- The "S" in STEM may be oversold. In Virginia, technology engineering and math degrees commanded starting salaries ranging from \$38,673 to \$52,200. Degrees in biology averaged earnings of \$27,893, lower than sociology (\$30,044), psychology (\$29,040) or English (\$29,222). Average earnings for chemistry majors were only slightly higher (\$31,070).<sup>86</sup>
- It is often "hard to find good help." Fifty-three percent of employers say they are finding it difficult to find qualified employees (though 69% say colleges are doing a good job preparing candidates).<sup>87</sup>
- 35% value college degrees more than they did 5 years ago.<sup>88</sup>
- Racial minorities are more likely to believe that a college degree is necessary to success than whites.<sup>89</sup>

### Objectives

In 2008, college faculty believed the "very important" or "essential" purposes of an undergraduate education were:<sup>90</sup>

- develop critical thinking (99.5%)
- help master knowledge in a discipline (95.1%)
- prepare students for employment after college (81.5%)
- develop creative capacities (81.5%)

In 2008, college faculty reported that they "frequently" encouraged students to do the following to build and reinforce positive habits of mind:<sup>91</sup>

- ask questions in class (94.6%)
- support claims with a logical argument (82.8%)
- seek solutions to a problem and explain them to others (74.7%)
- seek feedback on academic work (73%)
- evaluate the quality or reliability of the information they receive (73%)

- seek alternative solutions to a problem (65.1%)
- revise papers to improve writing (58.8%)
- explore domains on their own, even if not required for class (52.1%)
- acknowledge failure as a necessary part of the learning process (49.5%)
- take risks for potential gains (37.4%)

## Approaches

The Internet has given students many new ways for them to gain an education, such as: iTunes University (an affordable mobile education library), Duolingo (which suggests gamification of learning can be free, productive, and more effective than university courses), E-mmerision (adaptive digital textbooks K-Doctorate), and Udacity (short module video/quiz pedagogy).

Some current statistics concerning educational approaches:

- 89% of public four-year universities offer online courses; 60% of private four-year universities do; 91% of two-year colleges do.<sup>92</sup>
- The number of college students taking at least one online course nearly doubled, from 23% to 45%, over the last five years.<sup>93</sup>
- 700 MOOCs were offered in 2013, with Coursera as the largest provider with 47% of all MOOCs.<sup>94</sup>
- Coursera now offers “Signature-Track” classes that cost \$100, have a final exam, and provide a certificate.<sup>95</sup>
- Forty-three percent believe online courses are worse than traditional colleges at offering high-quality instruction from well-qualified instructors, 45% believe they are worse at offering rigorous testing and grading, 49% believe they are worse at offering a degree that will be respected by employers.<sup>96</sup>
- Fifty-six percent of employers prefer a candidate with a traditional college degree over an online degree.<sup>97</sup>
- A five-year study issued in 2011 that tracked 51,000 students at community and technical colleges found that those who took higher proportions of online courses were less likely to earn degrees or transfer to four-year colleges.<sup>98</sup>
- Seventy-seven percent of academic leaders rate the learning outcomes in online education as the same or superior to those in face-to-face classes.<sup>99</sup>
- A meta-analysis of more than a thousand studies regarding online learning (mostly in higher education settings) by the U.S. Department of Education in 2010 found that students in online-only instruction performed modestly better than their face-to-face counterparts, and that students in classes that blended both face-to-face and online elements performed better than those in solely online or face-to-face instruction.<sup>100</sup>
- Seven in ten “young Millennials (13-17) say, “I learn how to do things on YouTube” or “I go to YouTube for DIY videos.”<sup>101</sup>
- In 2008, college faculty reported using the following evaluation methods in all or most courses (percentages): short answer response (45.5), term/research papers (44.3), multiple-choice exams (33.1).<sup>102</sup>

- In 2008, college faculty reported using the following pedagogical methods (percentages): small group/cooperative learning (59.1), using real-life problems (55.7), group projects (35.8), multiple drafts of written work (24.9), student evaluation of others' work (23.5), reflective writing (21.7), extensive lecturing (46.4).<sup>103</sup>
- Advocates of 21st century skills favor student-centered methods — for example, problem-based learning and project-based learning — that allow students to collaborate, work on authentic problems, and engage with the community. These approaches are widely acclaimed and can be found in any pedagogical methods textbook; teachers know about them and believe are effective. And yet, teachers do not use them. Recent data show that most instructional time is composed of seatwork and whole-class instruction led by the teacher.<sup>104</sup>
- 46 states have adopted Common Core Standards and its computer-based adaptive testing.

## Places

- Some facts about American college and universities (2013):
  - 21.8 million students (6.5 million increase since 2000)
  - 12.5 million females and 9.3 million males
  - 13.4 million full-time and 8.3 million part time
  - 8 million at 2-year institutions, 13.8 at 4-year institutions<sup>105</sup>
- Average in-state tuition at public, four-year colleges and universities is \$8,893 and average tuition at private four-year colleges is \$30,090.<sup>106</sup>
- As of 2013, the high school dropout rate in the U.S. is about 7.9%, while as of 2010 the high school completion rate is somewhere between 74.7%-78.2%.<sup>107 108</sup> The college admission rate is 66.2%.<sup>109</sup> The total number of post-secondary students is approximately 21 million.<sup>110</sup>
- In 2011, percentage of college students who were White (61.2%). Black (15.1%) Hispanic: (14.3%).<sup>111</sup>
- More than 820,000 international students came to U.S. colleges in 2012-2013.<sup>112</sup>
- About 59% of full-time, first-time undergraduates graduate within 6 years.<sup>113</sup>
- Online education is becoming more popular, but there is some controversy about the success rates for their students. For instance, the Chronicle of Higher Education reported that “countless studies showing success rates in online courses of only 50 per cent—as opposed to 70-to-75 percent for comparable face-to-face classes...”<sup>114</sup> At this point, claims are made for one or the other being higher, depending on how the analysis is carried out.<sup>115</sup>

Students are creating a variety of experiences for themselves beyond the boundaries of their schools. They are taking classes at other colleges, taking online courses, and participating in internships:

- In 2010, three-fifths of those who earn bachelor's degrees attend more than one college, and the percentage is slowly rising.<sup>116</sup>

- Federal data show that about 15% of four-year college students take classes at community college, chiefly in the summer.<sup>117</sup>
- About three-fourths of all college students have had internship experience by the time the graduate. Experts estimate that this number has risen 40% in the last 25 years.<sup>118</sup>
- Sixty-three percent of the class of 2012 completed one internship; 28% completed two or more.<sup>119</sup>

Schools are narrowing their offerings and/or partnering with other institutions to offer other opportunities for students:

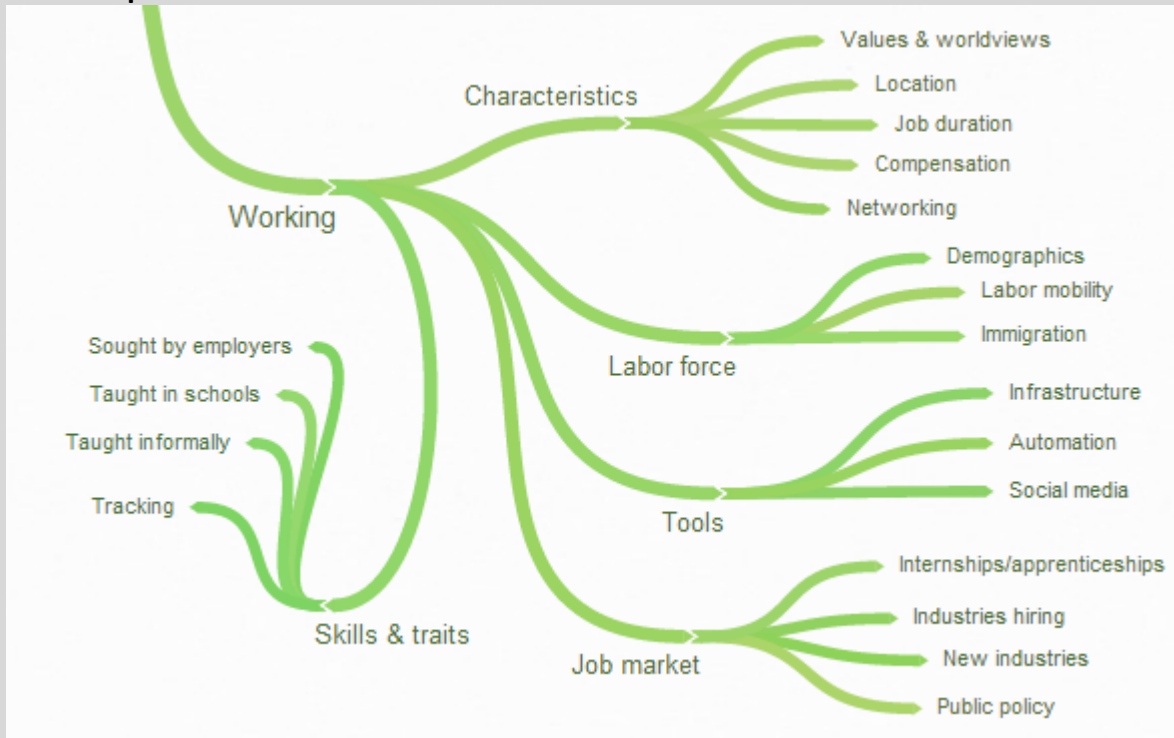
- The University Professional and Continuing Education Association identified seven universities that will offer transfer credit from free, ACE-approved MOOCs, a mix of public and for-profit universities: American Public University system, Central Michigan University, Kaplan University, Regis University, the State University of New York's Empire State College, University of Maryland University College, and Western Carolina University.<sup>120</sup>
- Northern Kentucky University is partnering with Gateway College, a local community college, to dual-enroll students so they can flexibly create a degree plan.<sup>121</sup>



## The Working Domain

Working explores how students will prepare for work in the future, what the job market and labor force will look like, what tools they will use, and what skills they will need.

### Domain map



### Stakeholders

Stakeholder	Description	Interests
Graduating students	Students graduating with a college degree and entering the workforce.	Well-paying, satisfying job, with a minimum of effort to find it.
Non-traditional students	Students entering the workforce with skills obtained from non-college training systems.	Well-paying, satisfying job, with a minimum of effort to find it.
Potential employers	Any industries/companies/organizations hiring new graduates	Skilled employees, who are willing to work for low wages
Parents	Parents/family of graduating students entering the labor market	Their children's success
Politicians	Politicians and government employees who are held responsible for or have power over the employment rate	Less unemployment, increasing tax base, personal political success

Post-secondary institutions	Colleges and universities	Reputation for producing skilled graduates with high employability
Non-traditional educational organizations	Apprenticeship programs, Skilled-trade training programs, MOOCs, etc., that provide a post-secondary education but are not university	Reputation for producing skilled graduates with high employability
Secondary ed institutions	High schools	Reputation for placing a high percentage of high school seniors into college
Communities	The communities that graduates live in	Employed, happy, engaged members of the community
Labor organizations	Unions and other forms of organized labor	Higher membership, more political/bargaining power, better benefits for members
Immigrants	Immigrants (legal and illegal, educated and uneducated) who wish to work in the US	Easier access to legal residency, education, and employment, better employment prospects

## Working Current Conditions

### Characteristics

- The average hours worked per week in the US in 2012 was 36.1.<sup>122</sup>
- Almost 80% of secondary students take at least a part-time job and on average work 19 hours a week.<sup>123</sup>
- The average college graduate obtained a degree in 2012 with \$29,400 in student debt, up from \$18,750 in 2004.<sup>124</sup>
- The age at which young adults are hitting median wage earnings has increased from 26 to 30 between 1980 and 2012.<sup>125</sup>
- The younger Boomers held an average of 11.3 jobs from ages 18 to 46. (In this report, a job is defined as an uninterrupted period of work with a particular employer.) On average, men held 11.4 jobs and women held 10.7 jobs.<sup>126</sup>
- Sixty-eight percent of workers had employer-provided health insurance in 2011; this will change due to the Affordable Care Act.<sup>127</sup>
- The median income of US households in 2011 was \$50,054.<sup>128</sup>
- The union membership rate is 11.3% of the workforce.<sup>129</sup>
- Forty-one percent of college graduates are living with parents (2011, 18-30 year-olds).<sup>130</sup>

- Women are paid 77% what men are paid; disparity increases over a lifetime as women have more interruptions to their careers.<sup>131</sup>

### Labor force

- The US labor force was at 155,613 in May 2014 with a 6.3% unemployment rate.<sup>132</sup>
- Considering the future labor force:
  - Between 2000 and 2010, enrollment of students 25 and over rose 42%.
  - Americans turning 18 recent peaked in 2009, and will decline through 2016.<sup>133</sup>
- The current retirement age is 61.<sup>134</sup>
- The male / female ratio in the labor force in 2012 was 53.1% to 46.9%.<sup>135</sup>
- The number of immigrants in 2011 was 40 million, including 11.7 of undocumented.<sup>136</sup>
- The number of immigrants with post-secondary educations (2012):<sup>137</sup>
  - associates/some college (19% )
  - bachelors (17%)
  - graduate degree (12%)

### Tools

- Forty-seven percent of US jobs are at “high risk” for automation/ computerization.<sup>138</sup>
- Ninety-two percent of employers are using/planning to use social media for recruiting.<sup>139</sup>

### Job market

- Overall, unemployment/underemployment was at 6.7%.<sup>140</sup> By degree of educational attainment, the figures are<sup>141</sup>
  - High school grad (7.1%)
  - Associate degree (6.1%)
  - 4-year degree (3.3%)
- Workforce participation was at 62.8% in December 2013:<sup>142</sup>
  - % of workers self-employed: 17.7 million (some variance according to source)<sup>143</sup>
  - % of workers in part-time jobs: 19%<sup>144</sup>
  - % of workers working gigs/temporary jobs: 12%<sup>145</sup>
  - % of workers working at home: 9.4%( in 2010)<sup>146</sup>
- 57% of employers prefer new hires that have intern experience.<sup>147</sup>
- Manufacturing employment shrunk 2.4% annually between 2002 and 2012; from 10.7% of the labor force to 8.2%.<sup>148</sup>
- One in three workers are contingent (freelancers, contractors, temps, etc.).<sup>149</sup>
- Thirteen percent of adults were involved in a startup in 2012.<sup>150</sup>

### Skills & traits

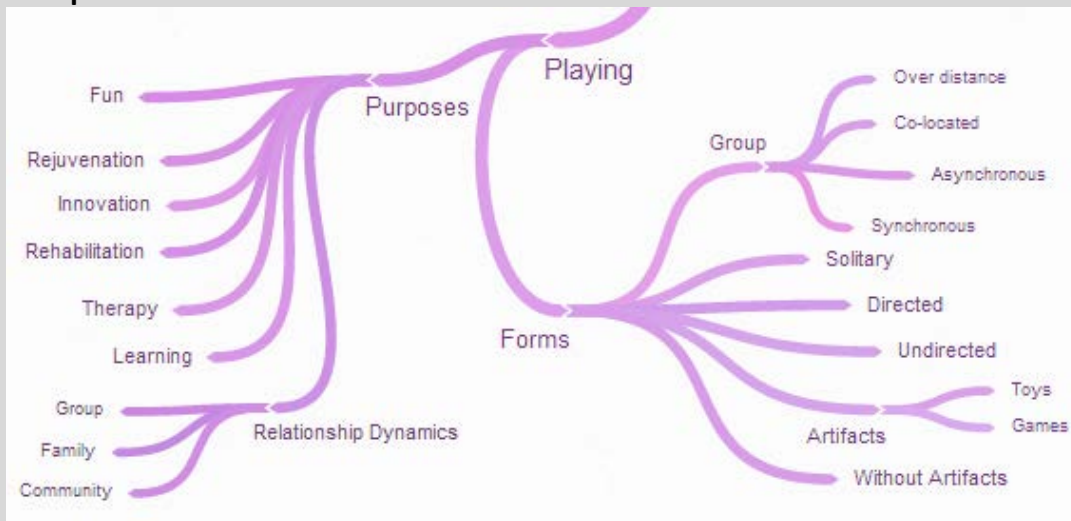
- 52% of companies report difficulty filling jobs (2011)<sup>151</sup>

## The Playing Domain

Playing explores the future of play for students. Key concepts are:

- *Leisure*: the freedom from encumbrances from being able to do what one desires. A prerequisite of play and a key contributing factor in the future of play.
- *Recreation*: What one does with leisure time; can include play as well as many other activities.
- *Fun*: An ephemeral mental state of enjoyment resulting primarily from play (though can also arise from work and other activities); is thought of as spontaneous and unforced.

## Domain map



## Stakeholders

Stakeholder	Description	Interests
Play advocates	Interest groups with a viewpoint on play, such as Institute of Play; <sup>152</sup> Right to Play <sup>153</sup> ; The Strong (educational institution devoted to the study and exploration of play); Play Works <sup>154</sup> ; “Play Consultants” and advocates for Play in the workplace	Expanding the understanding and value of play in society.
Toy and game Industry	Video game industry; video game design community	Commercial indicators of success, breakthrough graphics and hardware.
Planners of public spaces	Parks, playgrounds	Maximizing budgets while designing safe and friendly community places.
Educators	K-12 educators; university gaming studies programs <sup>155</sup>	Exploring the uses of play in teaching and learning. Identifying the right balance of play and work in schools.

## **Playing Current Conditions**

### **Purposes**

#### Fun, rejuvenation, rehabilitation

- The idea of Sabbath in the Judeo-Christian Tradition -- man needs to rest and renew himself.
- In Greek philosophy, Hedonism saw leisure as the highest goal and Epicurianism saw leisure is the best life.
- The Puritan/American Work Ethic is source of tension between the idea of play and the need for productivity.
- An “enlightened” idea is that play can be used for work, therapy, and education.
- The “Magic Circle” is a key concept in play theory that represents the separate and independent nature of true play, in which the outside world is suspended during play.

#### Innovation

- The agendas of the ones who set the context of play may conflict with those of the players themselves.
- Play has emerged as an industry/marketplace.
- Twentieth century consumer culture has led to the mass marketing of toys and games.
- "Play Value" is a term used in the toy and game industry to describe the amount of time a child (or target audience) can engage with a product until they become uninterested.

#### Learning & therapy

- Play as education.
- Play as productivity.
- "Behavioral Cusp" is concept related to the "benefits" or "uses" of play. A behavioral cusp is a learned skill that opens up a heretofore unavailable world of opportunity and further learning at a higher level, e.g., teaching a person the principles of, say, making sauces opens up a world of cooking previously inaccessible to a person who only cooks from recipes. This idea supports the idea that play can be “productive,” sometimes in unanticipated ways.

#### Relationship dynamics

- Enlightenment Era children start to be seen as people, too. Toys started to be made by adults for children. Adults become more formally involved in child’s play.

### **Forms**

#### Games

2013 sales, demographic and usage data:<sup>156</sup>

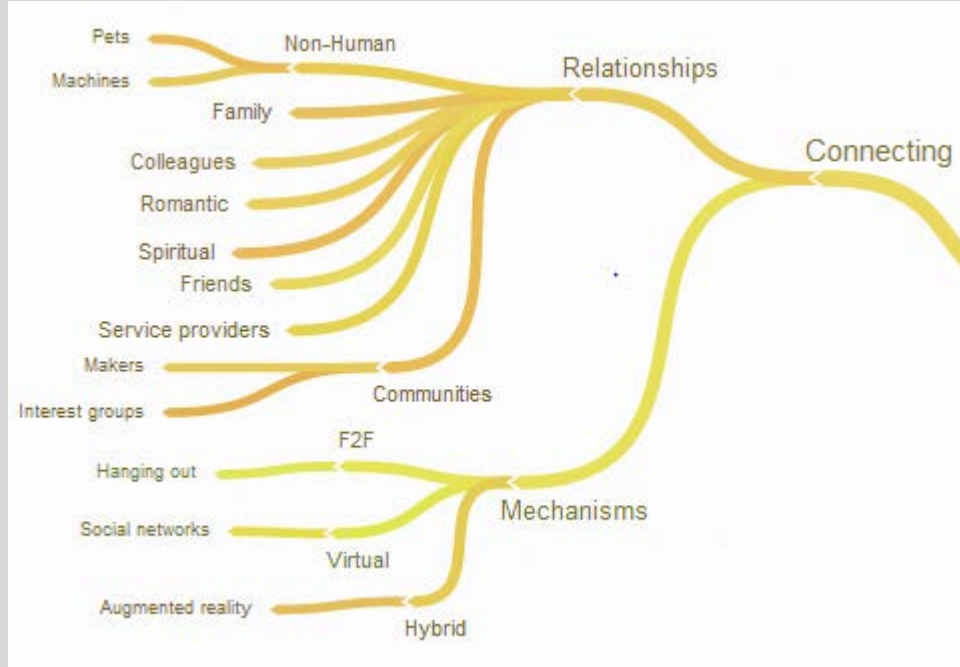
- Sixty-two percent of gamers play games with others, either in-person or online.

- Women 18 or older represent a significantly greater portion of the game playing population (31%) than boys age 17 or younger (19%).
- The average number of years gamers have been playing video games is 13.
- Fifty-two percent of parents say video games are a positive part of their child's life.
- Video and computer game purchases declining, as alternative formats grow, such as subscriptions, digital full games, digital add-on content, mobile apps, social network gaming and other physical delivery.
- Top reasons why gamers say they purchase a computer or video game:
  - quality of game graphics
  - an interesting storyline
  - a sequel to a favorite game
  - word of mouth
- Online usage:
  - 34% puzzles, board games, game shows, trivia, card games
  - 26% action, sports, strategy, role-playing
  - 19% casual, social games
  - 14% persistent multi-player universe
  - 8% other
- Gamers playing more video games than they did three years ago and are spending less time:
  - Playing board games (58%)
  - Watching TV (49%)
  - Going to movies (47%)
  - Watching movies at home (44%)
- Top 5 video game genres (by units sold)
  - Action (22.3%)
  - Shooter (21.2%)
  - Sport games (15.3%)
  - Family entertainment (8.6%)
  - Adventure (8.3%)
  - All the rest (24.3%)

## The Connecting Domain

Connecting explores how students connect using various mechanisms and tools within an ecosystem of relationships, from family to friends to significant others to communities.

### Domain map



### Stakeholders

Stakeholder	Description	Interests
Communications companies	Provide communications technologies	Encourage use of devices Make money
Social media	Provide connecting platforms	Promote use of their platform Make money
Virtual communities	Aggregate people with common interest	Promote traffic Communicate with like-minded people
Organizations using communications technologies	Provide platforms and techs for their customers/community to use	Satisfy user needs at lowest cost
Tech users	Seeking to connect	Have a satisfying experience at reasonable cost



## Connecting Current Conditions

### Relationships

#### Non-human

- *Pets*: A majority of pet owners (91%) say they consider their pet to be a member of their family, and (57%) say they frequently let their pet sleep in the bed with them. Just under one quarter (23%) of pet owners shun sleeping with their pet.<sup>157</sup>
- *AI/Robots*: the theme of human-machine relationships is entering public discussion and pop culture, for example the movie *Her* explores a relationship between a writer and an “operating system.”<sup>158</sup>
- *New technology*: Two-thirds of Americans are opposed to nanotechnology, likely on the grounds of religion, while military buffs, engineering geeks and video-game recruits find it “way cool”.<sup>159</sup>

#### Family

- Younger family members (age 13-25) are significantly more likely than older relatives to prefer to increase use of social media for staying in touch with family (52% vs. 21%).<sup>160</sup>
- Three in ten grandparents (30%) and teens/young adults (29%) agree that connecting online has helped them better understand one other.<sup>161</sup>

#### Friends

- The day-to-day connectivity in teen friendships is predominantly via text. The frequency of daily communication among teens from greatest to least is:<sup>162</sup>
  - Text (63%)
  - Cell phone (39%)
  - Face-to-face socializing outside of school (35%)
  - Social network site messaging (29%)
  - Instant messaging (22%)
  - Landlines (19%)
  - Emailing (6%)
- Comparatively, 24% of online teens use Twitter.<sup>163</sup>
- Friendships are growing in the US -- the average American has approximately two good friends, a modest but notable increase since 2008. Similarly, the number of who say they lack close friends has declined. On average, 20% say they added a new close social tie over the past two years.<sup>164</sup>
- An interesting finding suggests that "what draws and keeps both chimpanzee and human friends together is similarity....suggesting that preference for self-like friends dates back to our last common ancestor..."<sup>165</sup>
- A 2013 survey discovered that three-quarters of Americans feel less than satisfied with their friendships, while over 60% lack confidence in their friendships. Twice as many respondents said they would prefer deeper friendships to gaining more friends.<sup>166</sup>

- In terms of the influence of social media, most contemporary research supports the idea that Facebook is relatively benign; it neither promotes close bonds nor proves detrimental to friendships.<sup>167</sup>
- A friendship study that pre-dates Facebook found that “over a period of seven years the average size of personal networks was found to be strikingly stable. However, during the course of seven years we replace many members of our network with other people.” About half of the friends in year one of a snapshot of a person’s social network will still be there in seven years.<sup>168</sup>
- Social ties are the total number of other connections a person has, in terms of family members, coworkers, and other acquaintances:<sup>169</sup>
  - The average American has an overall network of 634 social ties
  - The average Internet user has 669 social ties, compared with non-users with 506.
  - Mobile phone users average 664 ties, and those who have Internet access through a mobile device have about 717 ties.

### Romantic

- Some data on American singles:<sup>170</sup>
  - Forty-four percent of adults are single.
  - The ratio of single men to single women is 86 to 100.
  - Forth-three percent of single have Googled someone on the Internet before a first date.
  - Forty million use online dating services.
- Some data on having sex:<sup>171</sup>
  - The average person has sex 103 times per year.
  - 44% are fully satisfied with their sex lives.
  - 82% of those sexually satisfied say they feel respected by partner during sex.
  - 39% are looking for more love and romance
  - 36% would like more quality time alone with their partner
  - 31% would like more fun and better communication and intimacy with their partner
  - 29% want a higher sex drive.

### Spiritual

- Social support is related to psychological well-being, meaning that the more one feels they have friends and family who are there for them, the less likely they are to feel depressed and anxious.
  - Older adults with a chronic illness who had medium levels of social support had 41% less chance of death than those with low levels of social support.
  - High levels of social support resulted in a 55% lower chance of death.
  - High levels of social support predict more job satisfaction and longer job tenure than low levels of social support<sup>172</sup>

- Research into “unfriending” looked specifically at the consumer-business Facebook relationship and discovered that the reasons consumers unfriend, or unlike, a business was based on both online and offline impressions.<sup>173</sup>

## Community

### *Interest groups*

- Traditional religions continue to slowly lose membership; the biggest “gainer” in the religious competition was “the unaffiliated.”<sup>174</sup>
- People are generally interacting with more individuals and groups. Whereas in the past one usually had small, tight social networks, the emerging world is oriented around looser, more fragmented networks. These networks provide on-demand succor and create new efficiencies and affordances in the ways people solve problems and meet their social needs.<sup>175</sup>
- Social networks “consume” 27% of the time people spend online.<sup>176</sup>
- Nationally, 71% of all fraternity and sorority member graduate, while only 50% of non-members graduate.<sup>177</sup>
- Members of fraternities and sororities have a GPA higher than the overall collegiate GPA.<sup>178</sup>

### *Makers*

- Community interaction and knowledge sharing are often mediated through networked technologies, with websites and social media tools forming the basis of knowledge repositories and a central channel for information sharing and exchange of ideas, and focused through social meetings in shared spaces such as hackspaces.<sup>179</sup>
- The two flagship Maker Faires in the Bay Area and New York were attended by 165,000 people in 2012. The vast majority attend with children.<sup>180</sup>

## **Mechanisms**

### F2F

- Some suggest that teens spend so much time online that they are no longer able to handle the messy, intimate task of hanging out face-to-face.<sup>181</sup> This assumption seems to be challenged by the data.
- In a recent survey of 1,162 pupils (age 9-11), 18% admitted to meeting up with someone in the real world they have previously talked to only online.<sup>182</sup>

### Virtual

- There were 326.4 million wireless subscriber connections as of December 2012:<sup>183</sup>
  - Annual wireless data usage is 1.5 trillion MB
  - Monthly text messages are 171.3 billion MB
  - Annual voice minutes are 2.3 trillion

- Internet connections overall are growing. Despite the strong growth of total mobile connections, fixed connections continued to dominate among those with higher download and upload speeds. Growth is particularly high in mobile Internet subscriptions, but fixed-location connections also continue to increase. The number of mobile subscriptions in 2012 grew to 153 million (up 28% from June 2011) while the number of fixed-location connections increased 4% to 90 million.<sup>184</sup>
- Both fixed and mobile services are shifting to higher speeds. The share of fixed connections with download speeds at or above 3 Mbps and upload speeds at or above 768 kbps increased from 56% to 64% of total fixed connections. Among mobile wireless subscriptions, the share increased from 14% to 28%.<sup>185</sup>
- Today, 95% of teens use the Internet, 78% of teens have a cell phone, almost half (47%) own smartphones, 23% have a tablet computer – levels comparable to the general adult population.<sup>186</sup>
- Eighteen to twenty-nine year olds are more likely to have a lap top (79%) compared to 65+ year olds (41%) while the 65+ age group is more likely to have a desktop computer (58%) compared to (41%) of 18-29 year olds.<sup>187</sup>

### Virtual social networks

- Of the approximately 2,500 online dating sites in the United States, fewer than twenty-five are considered “major” (over 1M users). The largest online dating sites in the United States are Match.com, eHarmony.com, and OKcupid. Some sites located outside of the United States, like Plenty of Fish, also have millions of members from the United States.<sup>188</sup> The target demographic for these services is the 90 million singles that are between 19 and 45. Forty percent of frequent dating site users are already married.<sup>189</sup>
- Older Internet users are driving the growth of social networking. Social networking site usage grew 88% among Internet users age 55-64 between April 2009 and May 2010. For the 65 and older demographic, social networking presence grew 100% percent in the same time period.<sup>190</sup> (Of course, they are starting from a lower base).
- A Pew Research social media snapshot of American adults as of September 2013:<sup>191</sup>
  - 71% use Facebook
  - 18% use Twitter
  - 17% use Instagram
  - 21% use Pinterest
  - 22% use LinkedIn
- Drilling down on demographic differences:<sup>192</sup>
  - Social network site users are disproportionately female (56%). Women also comprise the majority of email users (52% women), users of instant message (55%), bloggers (54%), and those who use a photo sharing service (58%).
  - Nearly twice as many men (63%) as women (37%) use LinkedIn. All other SNS platforms have significantly more female users than male users.
  - The average adult MySpace user is younger (32), and the average adult LinkedIn user older (40), than the average Facebook user (38), Twitter user (33), and users of other SNS users (35).

- MySpace and Twitter users are the most racially diverse mainstream social network platforms. However, a large proportion of users of “other” social network services are racial minorities.
- MySpace users tend to have fewer years of formal education than users of other social network services, whereas most LinkedIn users have at least one university degree.

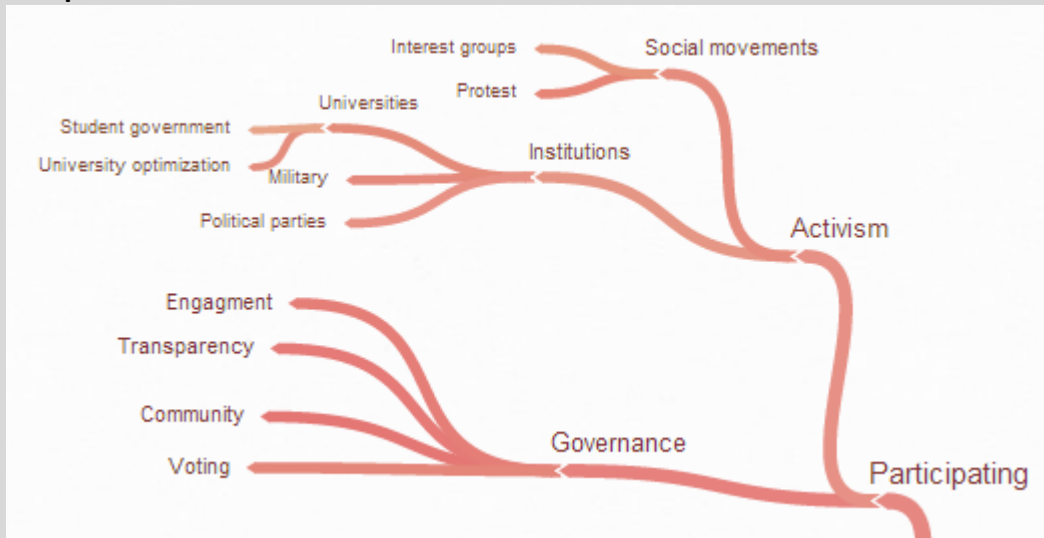
### Hybrid

- Google Glass is inspiring a wide range of potential applications for augmented reality and wearable computing, from education to medicine to communicating to gaming and getting around.<sup>193</sup> For instance, Google announced its entry into the wearable market with an operating system for wearable products.<sup>194</sup>
- Mobile geo-location apps are flourishing, building on the success of Foursquare, evolving far beyond the original Foursquare.<sup>195</sup>

## The Participating Domain

Participating explores how students will engage in civic participation by looking at how they become active citizens and how they engage civically with the university, in communities, and with the government. It explores voting, engagement, transparency, and strategies designed to improve the community, as well as the role of universities as hub for activism, and municipal and federal outreach.

### Domain map



### Stakeholders

Stakeholders	Description	Interests
Universities	Student governments, student activists, personnel, research labs	Increase awareness of larger political climate outside the university; obtain/retain public funding
Governments	Local, State, and Federal	Balance engagement with healthy democratic debate and dialogue; increase voter turnout and protect integrity of elections
Communities	Groups of people live close to each other or that come together for common goals	Discovering common goals; find consensus on issues with local impact; organizing to gather attention or funding for projects
Tech companies	Companies that specialize in websites and digital/computer/cellular technology	Collecting and analyzing big data, generating technological solutions as services
Investors	Start-up funders, crowdfunding, fundraisers	Social change through grassroots efforts
Tech activists	Civic hackers (hacktivists), app builders, Maker Movement	Populism through information technology
Advocates	Interest groups or organizations, such as businesses	Get legislation or regulation that benefits them or relief from some grievance

## ***Participating Current Conditions***

### **Governance**

#### Voting

Local participation in elections:

- United States is ranked 120<sup>th</sup> out of 169 countries in voter participation.<sup>196</sup>
- Voting has remained steady or declined slightly for years.<sup>197</sup> Voting turnout peaked at 75% just after the Civil War, and has declined steadily to about 58% today.<sup>198</sup>
- Though the number of eligible American voters keeps growing, turnout is on the decline -- some 93 million eligible citizens did not vote in the 2012 Presidential election.<sup>199</sup>
- The average turnout for mayoral elections was just 25.8%.<sup>200</sup>

#### Engagement

- Youth activism appears in local chapters for national and international issues.<sup>201 202 203</sup>
- America's youth participate for engagement rather than duty.<sup>204</sup>
- Youth participation is increasing and is linked to early participation in student government in elementary school.<sup>205</sup>
- Voting behavior and youths are generally directed by alienation and lack of trust in systems and government according to British study.<sup>206</sup>
- Social media usage does not appear to be directly associated with traditional forms of student civic participation. Indirectly, it was found that students who used social media more frequently were more likely to access information about news online, which had a positive impact on levels of civic participation.<sup>207</sup>
- Students who identify with social responsibility are more likely to engage civically than those who do not.<sup>208</sup>

#### Community improvement

- Some companies, such as Oracle and IBM, provide professional app building/programs for local government which include smart city processes, city platforms, and resource management applications.<sup>209</sup>
- E-participation is coming into focus as e-government gains traction, and citizens are increasingly supporting it.<sup>210</sup>
- Apps and social media are emerging and being used for a wide range of purposes, such as for traffic management, as well as more general e-government policies and plans.<sup>211 212 213</sup>
- Social media in local governments is increasingly used to promote government services.<sup>214</sup>
- E-government is still moving slowly and incrementally.<sup>215</sup>
- Open source software, such as E-Gov Tech enables local governments to link to rapid innovation concepts in city planning.<sup>216</sup>
- In the 2012 presidential election year:<sup>217</sup>
  - 153,157,000 citizens reported as registered to vote



- 132,948,000 respondents reported that they voted
- 54,531,000 reported that they did not vote
- 5,098,000 did not respond to the question.

Among youth voters (age 18-29):<sup>218</sup>

- 45% of young voters voted in 2012 (23 million youth)
- Young women are more likely to vote than young men, with 48.6% of young women voting in 2012 compared to 41.5% of young men
- Married youth are more likely to vote with 52.5% of young married females voting and 48.5% of married young men voting in 2012
- While 60% of 18-29 year olds voted for Obama in 2012, their level of support for him varied greatly by gender and race:<sup>219</sup>
  - 82% of voting young Hispanic females
  - 66% of voting young Hispanic males
  - 98% of voting young black females
  - 80% of voting young black males
  - 48% of voting young white females
  - 41% of voting young white males
- According to a 2008 poll, students feel the country is moving in wrong direction but most do not vote.<sup>220</sup>
- Furthermore, a strong correlation exists between youth voting and education level<sup>221</sup>
  - Youth with less than a high school diploma represent 14% of youth population, but only 4% of them voted in 2012.
  - Youth with a high school diploma and no college represent 26% of youth, and 24% of them voted.
  - Youth with some college education represent 40% of the total youth population, and 35% of them voted.
  - Youth with a bachelor's degree or higher represent 20% of youth, and 37% of them voted.

### Engagement

- According to the 2012 Obama Campaign Legacy Report, roughly 22 million people volunteered with the Obama Campaign.<sup>222</sup>
- Obamacare, student debt, and inability for government to work seen as major issues for youth.<sup>223</sup>
- In terms of fundraising, a summary of campaign donations in the 2012 election, Obama raised \$1.20 billion, and spent \$1.11 billion.<sup>224</sup>
  - \$289m came from the DNC, \$733m came from campaign donors, \$92m came from super PACs, and the rest is undisclosed
  - Smaller individual donations funded Obama's campaign. The DNC raise more money from donors giving \$5,000 or less, and Obama's campaign raised more money from donors giving \$200 or less
- Romney raised \$1.18 billion, and spent \$928 million

- \$351m came from the RNC, \$479m came from campaign donors, \$225m came from super PACs, and the rest is undisclosed
- While the RNC raised more money from donors giving \$5,000 or less, the Romney campaign raised more money from individual donors giving over \$2000

### Transparency

- Regarding trust in elected leaders:
  - Gallup poll shows that 81% of Americans are dissatisfied with the way the nation is being governed.<sup>225</sup>
  - When asked, “How much of the time do you think you can trust the government in Washington to do what is right?” 81% of respondents answered “Only some of the time/Never”.<sup>226</sup>
  - Only 12% of Americans approve of the way Congress is handling its job.<sup>227</sup>
- In a national survey of college students, only 24% are “confident” in overall political leadership of the United States.<sup>228</sup>

### **Activism**

#### Social movements

##### Volunteering in the US:<sup>229</sup>

- One in four Americans volunteered in 2013. Those 64.5 million Americans served 7.9 billion hours at an estimated value of \$175 billion.
- The most popular volunteering activities were fundraising (26.2%); collecting, preparing, or serving food (23.6%); engaging in general labor or transportation (20.3%); and tutoring or teaching (18.2%).<sup>230</sup>
- Occupy Wall Street started in September 2011 as a small encampment of mostly young activists that exploded into a nationwide series of demonstrations, and spurred spin-offs such as Occupy Colleges and Occupy Education.<sup>231 232</sup>

#### Institutions

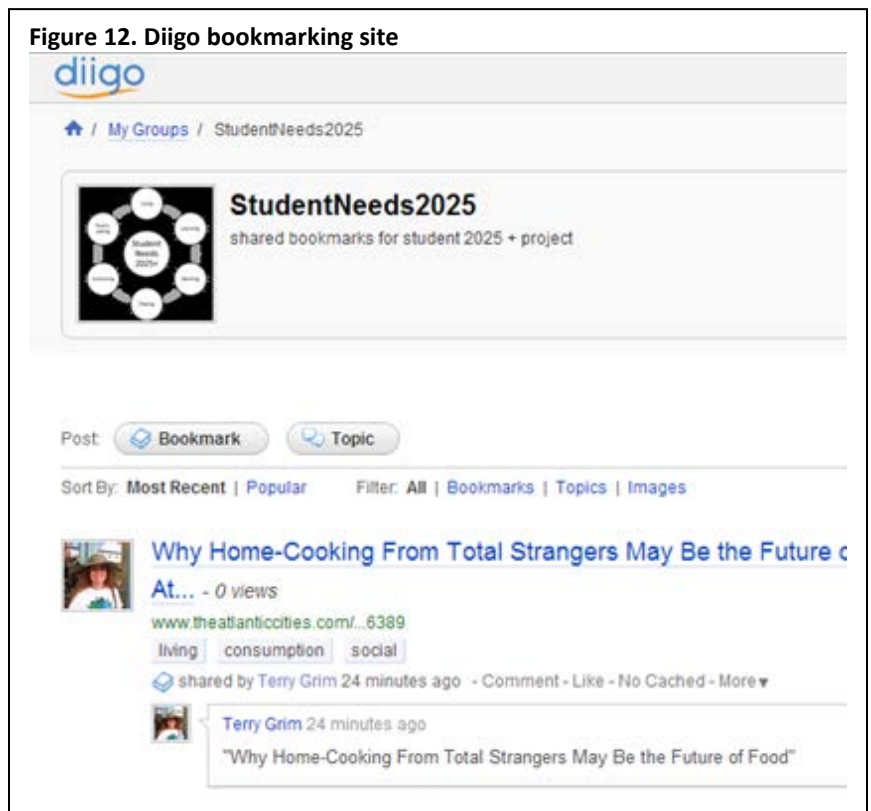
- *Universities.* College is a breeding ground for activism. Students get involved when they see a change is necessary such as when they take a class or have a professor who engages issues or broad inequalities such as Occupy Wall Street.<sup>233 234</sup> High school students taught history of issues show propensity for activism,<sup>235</sup> and often youths, riding a wave of global activism, become involved in global protests and are even apt to run for public office. Online activism acts as a means for students to protest and has implications for activism in the sense it is interaction but not action.<sup>236</sup>
- *Political parties.* College Republicans report 1,800 campus chapters with over 250,000 members<sup>237</sup> College Democrats of America report roughly 500 campus chapters with 100,000 members.<sup>238</sup>

## A note on scanning

Each of the six teams was asked to scan for “signals of change” in their topic. While the “current assessment” covers the current status of the topic, scanning is about identifying how the topic might change out to 2025 and slightly beyond. Scanning is a bit more art than science. Some hits will be closer to the present and may inform the baseline future (present trends continued). But most will be closer to 2025 and be a part of the alternative future.

There are currently more than 700 scanning hits posted to our Diigo bookmarking site. Access to the site will be made available to Lumina. Figure 12 is a snapshot of the project’s landing page, with a sample scan hit from the “Living” team. Each hit is tagged by following the topics on the domain map to ease searching around topics of interest. A brief annotation describes the subject of the each scan hit.

Figure 13 shows a “tag cloud” of popular tag, and shows how the six main topics: Living, Learning, Working, Playing, Connecting, and Participating are the most popular. This makes it easier for a reader to quickly find all the hits relating to a particular topic.



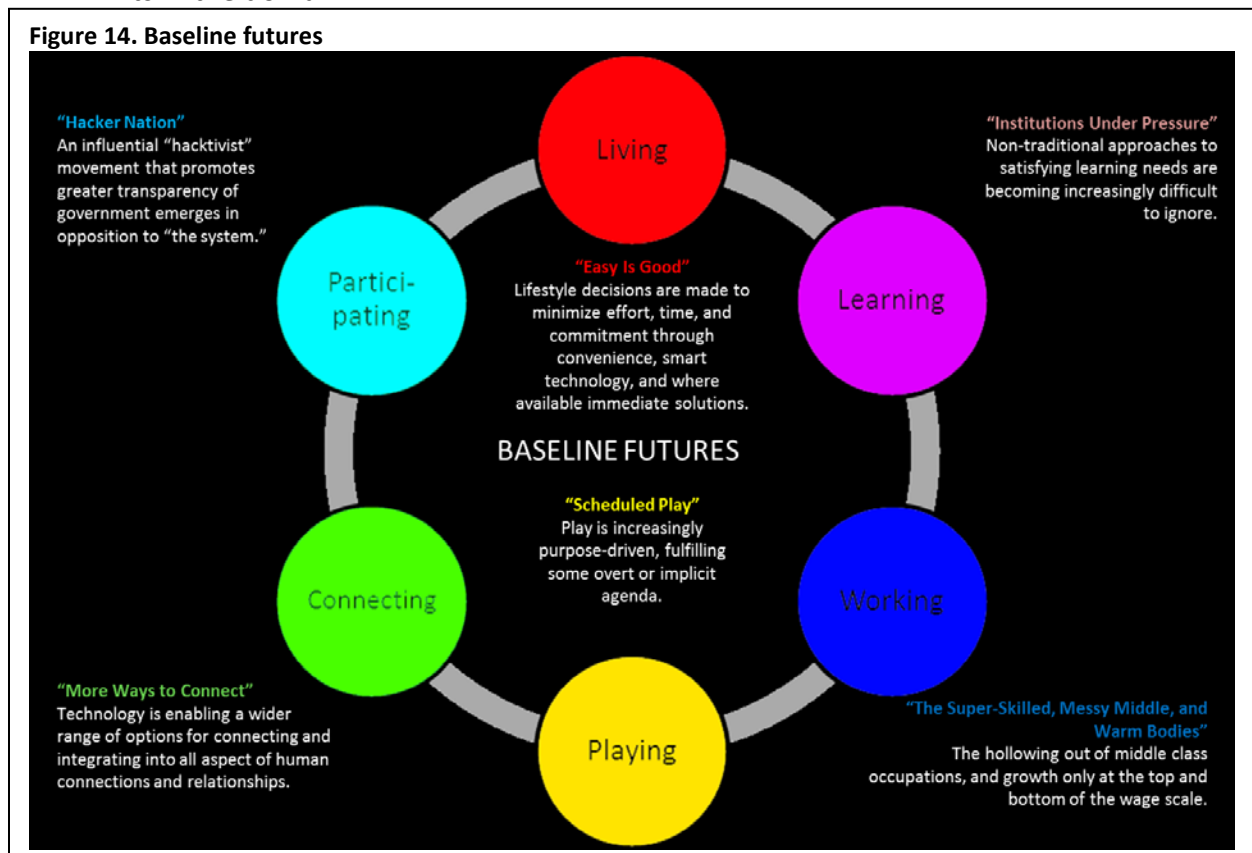
**Figure 13. Scanning hit tags**

Top 10 Tags	View All
Living	183
Working	114
Participating	112
Connecting	106
playing	92
Learning	75
Consumption	57
Relationships	46
Purposes	45
Activism	42

## Chapter 4. Baseline Futures

The baseline future grounds the exploration of future possibilities and outcomes by identifying what the future would look like if present trends continued, major plans are fulfilled and there are no major surprises. Of course, it is unlikely that there will be no surprises, thus the alternative future(s) describe what the future might look if there is a surprise or disruption. The baselines are summarized in Figure 14 below. Each of the six domains is described first by a table of “inputs” about its future:

- *trends*: long-term, incremental changes in some variable or condition
- *plans*: announced, publicly available plans by influential stakeholders about what they intend to do to influence the future of the domain
- *projections*: publicly available forecasts about the domain from credible sources
- *scanning hit sampler*: graphical summary of key points for some interesting scanning hits in the domain



The baseline future is then summarized in a brief template (title, abstract, and key drivers) and is followed by a narrative describing its future. The narrative is written from the viewpoint of 2025 and explaining how the domain turned it and how it unfolded. As will be explained further in Chapter 5, Alternative Futures, we anticipate the most Baselines Futures will be “disrupted” before then, that is, we expect that the baselines will come to fruition well before 2025 – displaced by the alternative futures described in Chapter 5.

## Living Baseline Future “Inputs”

The exploration for the Living baseline revealed that student life was likely to be characterized by more choices and greater complexity, suggesting a search for ways to ease or manage the complexity. Dealing with the growing array of choices and decisions opens up the possibilities for sophisticated AI- or software-based personal assistants to emerge, especially if institutions and support systems are not up to the task.

## Trends

### Consumption

- Shopping is going more mobile and virtual.<sup>239</sup>
  - Mobile devices are increasingly used for shopping both in purchase and selection continues.
  - Online and social media of trusted references are influencing buying decisions.
  - The Internet is driving global shopping, encouraging sales by smaller companies, emerging economies, and crowd funded start-ups.
  - More disruptive technologies are causing elimination of certain shopping options, retail chains, and businesses, such as Linens N’ Things and Borders Books, due to lack of relevancy and other easier access options.

Figure 15. Living scanning sampler

## LIVING on less, but with new strategies and needs



tags:  
Living  
households, family structure and  
needs, consumption  
Learning

In 2012, the cost of child care in the U.S. grew as much as **eight times faster** than family income.

Source: NPR, "Childcare Costs, already high, Outpace Family Earnings," Nov. 4, 2013

Since 2000, college textbook prices have increased by 82%, or three times the rate of inflation. A recent study found **65% of students decided against purchasing a college textbook due to price**. Of those who opt out, 94% reported worse academic performance.

Source: U.S. Public Interest Research Group, "Survey Shows Students Opting Out of Buying High-Cost Textbooks," Jan. 27, 2014

Creative solutions to the problems of higher living costs include the phenomena of Bay Area **mansions being leased to groups of young entrepreneurs and run as communal living spaces**. *Could other expenses (like textbooks and childcare) be easier to bear through a similar spirit of sharing and community?*

Source: NPR, "Bay Area's Steep Housing Costs Spark Return To Communal Living," Dec. 19, 2013

*A consumer disruption on the horizon? Watch for the slowing or reversal of online shopping growth.* Research suggests an evolution of retail is transforming how people buy, and "seventy-one percent of Gen Xers and Ys say they **would rather shop in brick-and-mortar stores** than online.'

Source: PSFK, "Why Retail is Returning to the Brick-and-Mortar," Nov. 27, 2013

- More companies are looking for ways to monopolize online sales, creating unique brands and offerings to grow traffic to online sources, such as online-only brands.
- There is increasing e-access to healthy shopping and eating options.<sup>240</sup>
- Fast food is continuing to drive eating out, but people are increasingly looking for ways to aid health and performance through what they eat.<sup>241</sup>
- People are increasingly looking for food to help make them healthier through nutraceuticals, additives, or knowledge of which foods to eat in given situations.
- There is growing concern for safe water and safe food.
- Smart media is gobbling up even more of a person's available time.<sup>242</sup>
  - Individuals are spending even more time with technology and looking for ways that technology can support their activities.
  - People increasingly want media that recognizes who they are and where they are, and is accessible – so more mobile and more imbedded.
- More shopping choices are not leading to more companies producing goods.<sup>243</sup>
  - Big box grocers are feeling pressure as only a few companies control most goods, despite increased offerings and seemingly unlimited choices.
- Crowdfunding is increasing -- \$2.7 billion was raised this way in 2012 and projected to reach \$5.1 billion in 2013, ranging across more than 1 million individual campaigns.<sup>244</sup>

### Personal care

- Weight problems and lifestyles continue the decline of individual health, which has not been offset by the increasing use of prescription drugs.<sup>245</sup>
  - Trends suggest a continued decrease in the health of individuals through obesity, diabetes, and other diseases of affluence.
  - Trends suggest a growing vigilance in tracking a health indicator for one's self or another individual, including growth of tracking as a means of motivation when it comes to health.
  - Busy lifestyles are continuing to challenge the ability to get enough sleep.
  - Smoking is decreasing in part because there are fewer places that permit smoking, and the market is reflecting more consumers moving to e-cigarettes, mostly for convenience.
  - People are increasing the amount of prescriptions they take to address a host of different issues.
- Gamification is attempting to make exercise and fitness more fun. Blue Goji has introduced a workout/gaming system that combines a small Fitbit style clip-on activity sensor, two hand controllers and a variety of iOS games that makes that makes exercise more fun.<sup>246</sup>
- The grooming story is about the growing desire for convenience and access.<sup>247</sup>
  - Convenience continues to drive decisions on personal products.
  - Products that both celebrate and help with aging are increasingly important.
  - Equitable access to dental care is a growing concern.
- Quality of life is generally seen as improving except for job-related stress.<sup>248</sup>



- There is growing concern that campus students have significant psychological problems (anxiety and depression).
- Stress levels caused by one's job continue to grow, but overall stress levels are declining.

### Household

- Households are having fewer children, but more pets.<sup>249</sup>
  - Pets are increasingly seen as family members.
  - Family households are decreasing, and one of the biggest decreases is in married couples with children.
  - The average number of people per household continues to decline.
  - Rates of cohabitation are increasing.
  - More dads are staying home.
- Home ownership is on the decline but the size of the home continues to grow.<sup>250</sup>
  - Use of the home for office work is increasing and people are buying homes that have home offices.
  - There are different experiments going on with size of home, but home sizes are on the increase.
  - The biggest growth in housing requests is urban homes with amenities.
- Dorms are adding amenities and becoming more like apartments.

### **Plans**

- Adopting universal healthcare for citizens through Affordable Care Act.
- Government has plans to support larger urban areas.<sup>251</sup>
- Products such as Sony's "Life Space UX" will integrate the real and virtual open the door for the digitization of more common tasks. This product uses laser projectors to augment walls, table surfaces and the ceiling into immersive digital lifestyle experiences.<sup>252</sup>
- Cargill is developing convenience foods that are quicker and easier to prepare.<sup>253</sup>
- The National Action Plan includes a long-term aspirational goal to achieve all cost-effective energy efficiency by the year 2025. Based on available studies, the cost-effective energy efficiency resource available may be able to meet 50% or more of the expected load growth nationally.<sup>254</sup>
- *Smart Cities*. Navigant Research estimates that the global market for smart city technologies will grow from \$6.1 billion annually in 2012 to more than \$20 billion in 2020, a compound annual growth rate (CAGR) of 16.2%.<sup>255</sup>

### **Projections**

#### Consumption

- E-commerce is expected to account for 10% of all retail sales by 2017 in the US -- up from \$231B in 2012 to \$370B in 2017.<sup>256</sup>



- Fast food in U.S. continues to grow at 3% constant value.<sup>257</sup>

### Personal care

- Type 2 diabetes will soar by a further 64% between 2010 and 2025 – afflicting 53.1 million citizens.<sup>258</sup>
- Convenience stores are expected to grow at 11% CAGR. The need for convenience stores is continuously rising despite bad economics.<sup>259</sup>
- Personalization of health care needs and monitoring will be accomplished through health kiosks and personal technology devices.<sup>260</sup>
- 500 million smartphone users worldwide will be using a health care application by 2015, and by 2018 50% of the more than 3.4 billion smartphone and tablet users will have downloaded mobile health applications.<sup>261</sup>

### Household

- Future levels of new household formations will set new records.<sup>262</sup>
- Millennials value parenthood over marriage and are less likely to link the two, potentially leading to a decline of marriage.<sup>263</sup>
- Homes will employ more automation.<sup>264</sup>
- Population growth will increasingly be in urban areas.<sup>265</sup>
- Living and work spaces will increasingly be combined.<sup>266</sup>
- Increased small mobile living space for students could offset rising costs of tuition and housing.<sup>267</sup>

### **Living Baseline Future Summary: “Easy Is Good”**

Lifestyle decisions are made to minimize effort, time, and commitment through convenience, smart technology, and immediate solutions where available.

#### **Abstract**

Easy is good is about choosing options that simplify or automate life, providing students with more time, in theory, to do other things. Students are looking for those short-cut answers or conveniences that speed them through their day and their life. Technology has enabled them to shop quickly, efficiently, and directly as needed. They can access apps on their phone, their person, or in their car to give them information needed to make on-the-spot decisions. They like products that they can use quickly and discard or leave for the next person. They carry much of this approach into the more important aspects of their lives as well: they look for pills and additives to provide health and weight management, and are more inclined to cohabitate than marry.

#### **Key drivers**

- Convenience, driven by busy lifestyles, dominates lifestyles and consumption.
- Technology as the great enabler of convenience is a kind of mixed blessing in providing convenience, but also introducing new capabilities that provide more things to do.
- Convenience in food leading to health issues, such as poor diet, over-reliance on

pharmaceuticals, and lack of sleep.

- Household formation driven by more practical considerations, leading to a proliferation of “alternative” arrangements.

### ***Living Baseline Future Narrative: “Easy Is Good”***

*The living landscape of the future portrayed here includes personal care, consumption -- in particular shopping and health, and the household. The key theme that pervades this domain moving into the future is a somewhat elusive quest for convenience. Busy student lifestyles put pressure on time and drives students to seek convenient solutions, although the results of this quest are mixed. Sure, they save time in some places, but as one activity is freed up, another is poised to take its place.*

Technology as the great enabler of convenience is a kind of mixed blessing in providing convenience, but also introducing new capabilities that provide more things to do. Smart media provides convenience while it in effect gobbles up the student’s available time.

While in many cases, convenience means doing more with less, in some cases it just means doing with less. Students are less inclined to material goods consumption for “the sake of it,” and in general are more judicious spenders than their predecessors. This predisposition is reinforced when doing with less can be married with an environmental benefit. Convenience usually trumps the environment in a one-on-one showdown, but if an environmental benefit can be shown without paying too much of a price, as the old saying goes: “that’s a good thing.”

#### Shopping increasingly mobile and virtual

An amazing flip has been underway: communication technology was once the consumer’s primary research tool before buying at the store, but now the stores are used for research, and purchases are increasingly made on devices. And more often than not the store is bypassed, as online environments can simulate the store experience, at least for purchases that are at the quick-and-easy end of the spectrum. Of course, students tend to be early adopters, given their embrace of technology and their desperation to save time.

Consumer expectations continue to rise and the competition for their dollars drives a fierce competition to deliver faster than the others. Skills in managing delivery logistics have become paramount. It is fair to day that delivery times have replaced “supply chain” efficiency as a key differentiator for retail. As expectations for rapid delivery are met in one area, they raise the bar in others. Thus, few sectors remain untouched, unless they have an offering so in demand that waiting for it actually becomes a differentiator. On the one hand, consumers demand rapid turnaround for the bulk of their purchases, but they also enjoy the quest for hunting down exclusive offerings that speak to their identity.

Students pay little attention to mainstream brands, and they shop based on price and

convenience, except where they feel the offering is something special and worth their time, attention, and even extra dollars. If everyone else has it or wants it, convenience is king. If it's deemed special, then shopping becomes more of a sport or leisure pursuit – something worth investing in.

Establishments that counted on people coming into a store to shop and buy struggled to survive. Chains are particularly hard hit, as all but the most popular are viewed as generic so losing out to niche competitors. Niche boutiques flourish, but the turnover is turbulent since being popular today did not mean that they would be popular tomorrow. A veteran CEO of a dozen wearable computing boutiques quipped, “So this is what the gurus meant by continuous innovation.” For some goods and services, particularly those trying to relate to identity and self-expression, an often successful strategy is to deliberately create exclusivity and shortages to drive demand -- a great strategy when the scarcity creates demand, but of course it doesn't always work.

The net result is that convenience is king for the vast bulk of purchases, even when the overall net benefit to the consumer is questionable in terms of their overall time spent.

#### “Costs” of convenience

The evidence continues to mount that eating fast-food tends to be at the expense of one's health. Fast food continues to be vilified, but also continues to provide a tough-to-beat combo of convenience and taste. So fast food continues to grow slow and steady. The busy-ness of student lives means eating out and grab-and-go, but it's not all junk food. Perhaps the biggest growth in the convenience food sector is in “healthy” performance options that have cracked enough of the fast-food formula to gain a noticeable share of student diners. Health for students is dominated by concern for performance in the present more than long-term overall health. They are looking for quick energy bursts to get them through to their next activity.

In fact, the quest for convenience leads to longer-term adverse health impacts. In addition to harmful effects on diet, super-busy lifestyles also mean getting less sleep. Weight problems and lifestyles continue to proliferate resulting in an overall decline of individual health. Sure, there will be a minority for whom health and wellness are central, but their numbers are overshadowed by those who are too busy to care.

Nearly 70% of Americans are on at least one prescription drug, and more than half take two. While those taking prescription drugs are older, it must be remembered that students are increasingly older as well. In fact, they become almost ravenous users of pharmaceuticals, which are seen as quick-fixes for a variety of issues. Can't sleep -- pop a pill. Putting on weight -- I could go to the gym, or there's a pill for that.

Related to deprived sleep, which leads to a search for OTC, prescription, and often illegal drugs, is a general quest for “pop-a-pill” solutions. Indeed, pharmaceuticals are increasingly effective and customized – perhaps too much? The student view is not to worry since they assume new technology will be developed to fix any problems that arise in the longer term.

The grab-and-go culture has changed other aspects of student life. Student housing, for instance, rarely included a conventional kitchen. This kitchen-less living arrangement now encroaches beyond dorm life, as an increasing share of apartments are now kitchen-less – with just a small fridge and microwave.

### Getting by on personal care

Convenience continues to drive decisions on personal products. Time spent on personal care continues its long-term decline – something has to be sacrificed given increasingly crowded schedules, and it continues to be personal care. There is a bit of paradox here, as the attention to personal care has not necessarily decreased, but the time devoted to it has. Here money is used to buy time. Personal care products and services boom, as they promise to provide the benefits sought by students without dipping into their time. For instance, students are early adopters of a trend to extended-wear clothing that requires less laundering. Not only does this save time, using less water and “chemicals” is seen as good for their environment.

### More varied households

Household formation is being driven by more practical considerations, leading to a proliferation of “alternative” arrangements. For instance, the rates of cohabitation are increasing. Both single-person and multi-generational households continue to grow. The alternatives grow at the expense of the “traditional family,” such as married couples with children.

Homes employ more automation. Here too, convenience drives the adoption of technologies. While there have been a few fringe groups celebrating the aesthetic experience of hand-held vacuums, they will go the way of the buggy whip and the CD, as automated devices take their place. More and more household chores are replaced by smart machines -- everything from keeping the kitchen counter clean to smart sheets which have antiquated the practice of having to make one’s bed.

Smart homes are capable of much more, and some early adopters are using them for loftier purposes such as maximizing indoor air quality, but labor-saving devices will be the drivers in the early stages.

Students increasingly view housing as an excessively burdensome cost. They are less inclined toward ownership, preferring instead to retain the flexibility to move around and “see the world.” They get increasingly used to crashing, not only with friends but with those they find in their social networks. Crashing is still supplementary to the need for a home base, but that home base is increasingly less important and cared about – who wants to be stuck home when there is so much to do?

## Learning Baseline Future “Inputs”

The Learning landscape for students is characterized by a mix of innovative experiments, lots of talk of change and reform along with some action and some inertia. The developments could be synthesized into two “worlds,” that is, one could build a case for an emerging world of dynamic change on the horizon and another where existing approaches and institutions are able to absorb or co-opt any changes or threats on the horizon. Students are caught between these two worlds, or perhaps more accurately “lost in the shuffle.”

## Trends

- College completion rates have been slowly increasing in recent years. In 2011, the percentage of Americans (ages 25-64) with two- or four-year college degree was 38.7%, up from 37.9% in 2008.<sup>268</sup>
- Certificates appear to be growing. The first solid estimates of the number of high-value postsecondary certificates suggest that an additional 5% of the U.S. adult population hold a postsecondary certificate with significant economic value.<sup>269</sup>
- The overall cost of education is expected to decrease [eventually] due to competition from for-profit models. One might argue that for-profit universities could have competed on the basis of price for a long time because they are more efficient, and they have no full-time, tenure track faculty who do research most of the time. Rather they chose to set their price just under ordinary state university rates so they could maximize their margins.
- Curriculum reform is growing. For instance, 44 states and Washington DC have adopted the Common Core State Standards.<sup>270</sup>
- There is increasing focus on 21<sup>st</sup> century skills and competence. There is growing support for competency-based education as a more efficient and cost-effective way to deliver needed skills and competencies.<sup>271</sup>
- The tools and technology for learning are improving:
  - For instance, Georgia's Gwinnett County Public Schools is working with IBM to test “Personalized Education Through Analytics on Learning Systems” (PETALS) that applies big data analytics and deep learning principles (connections in different types of data) to help students learn better.<sup>272</sup>
  - Tools such as mobile devices, wearable technology, and augmented reality (AR) are offering real-time feedback that help students by telling them how well they are doing and focuses their attention on key information that they might normally miss.<sup>273</sup>
- There is growing examination of teachers with rating sites and recording videos of teaching style. For instance, RateMyProfessors.com claims to have more than 14 million ratings of professors.<sup>274</sup>
- Venture capitalist funding in education is increasing, but it is raising concerns of a bubble. Ed-tech startups have exploded in the last five years, with \$600 million invested in 2012 alone.<sup>275</sup>

- Online courses are growing. Ninety percent of schools offer are planning to offer online courses in the next 3 years, up from 74% today.<sup>276</sup>

## Plans


- OECD's policy recommendations include student-centric (student as core participant) learning that is attuned and customized to each individual's motivations, emotions and skills. It should be sensitive to individual differences and be challenging, without overloading, and using new assessment means to promote horizontal connectedness across subjects.
- MOOCs are increasing in number and generating interest in traditional universities; while only 13% schools offered them in 2013, 43% plan to do so by 2016.<sup>277</sup>
- Udacity has partnered with Georgia Tech to offer a Bachelor's degree in computer science for \$6,600 based on MOOC's rather than class instruction.<sup>278</sup>
- Udacity, in conjunction with AT&T, is now offering "nano-degrees," highly intensive six month training on specific job skills, like programming, with jobs at the end reserved for those who best.<sup>279</sup>

## Others plan to:

- include 21<sup>st</sup> century skills based around inquiry-centered learning, problem solving and critical thinking, as well as social emotional learning (BC Curriculum Reform).
- build Self-Organized Learning Environments (SOLEs) and Schools in the Cloud (Mitra).
- promote online learning (e.g. Khan Academy).
- increase US degree completion by adults to 60% through addressing multiple channels of education reform, regulatory frameworks, tuition assistance models, and minority recruitment (Lumina Foundation).
- use cloud-based cognitive technology for personalized learning to be fully implemented by 2020 (IBM).

Figure 16. Learning scanning sampler

# LEARNING as a way of life



tags:  
Learning approaches  
Working skills and traits

How might "Just-in-time education," affect the broader culture? Other than enhancing work skills and knowledge, *interpersonal skills and relationships might be similarly improved through a practical worldview that values the potential of all individuals to continuously grow and learn.*

Source: Slate, "The New Lifelong Learners," Apr. 14, 2014

A computer program to **measure individual function at basic info worker job skills** (like being able to "effectively comprehend memos, instructions and other authentic workplace documents") uses realistic workplace scenarios to prepare future staff. *If work roles can be precisely anticipated and trained for, and instantaneous performance feedback simplifies knowing where improvement is needed, what is the role of education as a precursor to work?*

Source: PBS, "Certification test focuses on readying students for work, not college," Jan. 22, 2014

Creativity is now being taught as an academic subject. *With "soft skills" in demand, creativity might end up becoming a suitable preparation for jobs that require emotional and social intelligence. Such courses are apt to enhance learning in other subjects. Is the idea that creativity "can't be taught" becoming phased out?*

Houston **FORESIGHT: Preparing Professional Futurists** *Think Outside the Box,* Feb 7 2014



- increase efficacy of educational outcomes by 2018, including plans to have research, monitoring, and an understanding of needed solutions within 5 years (Pierson Education).
- Increase ease of online collaboration for students, educators, and providers (Google Apps for Education), including doubling users every 2 years with 20 million U.S. student users and usage in 72 of top 100 universities as of 2012.

## Projections

[NOTE: Several forecasts of the future of higher education are listed in Appendix A1]

- *Knowledgeworks 2020 Forecast* suggests:<sup>280</sup>
  - Vibrant Learning Grid – high resources, large diverse network
  - System for Global Competitiveness – high resources, high control
  - Learners Forage: low resources, small diverse network
  - Schools as Centers for Resilience – low resources, high control
- *Knowledgeworks Forecast 3.0*: Recombinant education, from and for diverse learners, from diverse learning agents (educators), and through a whole new host of learning ecosystems, will be the future of learning centers.<sup>281</sup>
- OECD's *Think Scenarios, Rethink Education*: Learning Spaces will take over (new schools) in a learning intensive knowledge based society. There will be personal digital spaces that are connecting and social. There will be transparency and verifiability to increase trust, motivation and openness of controllable collaborations.<sup>282</sup>

### Learning Baseline Future Summary: “Institutions under Pressure”

Non-traditional approaches to satisfying learning needs are becoming increasingly difficult to ignore.

#### Abstract

The current education paradigm is being challenged by the plethora of options and increasing opportunities available to the would-be student, partially driven by pressure put on the educational system by the learners themselves. Two main shifts that affect all student types are happening in the learner environment. The first shift is from institutional outcomes toward satisfying the actual learners’ needs as the goal of the educational system. The second shift is for traditional students, who have access to the “best” content” seeking more varied and diverse educational opportunities, while non-traditional students, who by necessity have had a wide variety of experiences, are seeking greater access to the “best” content. The pace of these two shifts will have a direct bearing on the future: a slow pace maintains the baseline forecast, but a rapid space could propel the move to an alternative future.

#### Key drivers

- Technology development are increasing the options for student learning
- Growing online course availability and growing acceptance of “non-traditional” offerings and approaches



### Slow Progress on Educational Environment

- Shift #1 from institutional outcomes to satisfying learner needs
- Shift #2 toward greater availability of learning approaches and options

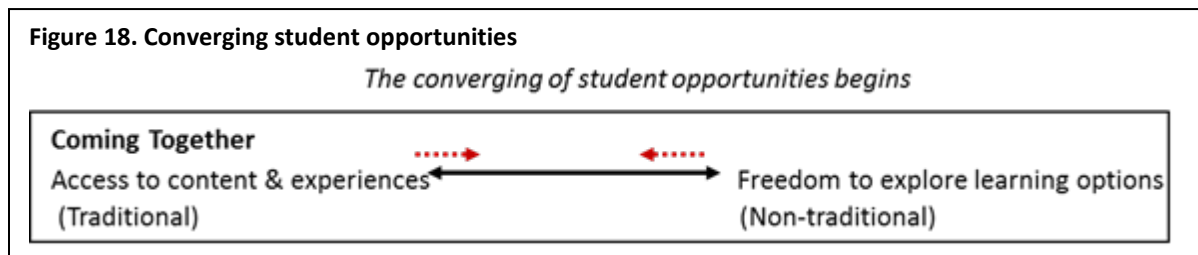
### Learning Baseline Future Narrative: “Institutions under Pressure”

*The learner environment is under pressure to change to satisfy various learner needs. Historically, the higher education system erected barriers for entry and constrained students of all types from getting their extrinsic and intrinsic needs met. Outcomes dictated by the institutional bureaucracy have been the main focus of the education system, with little regard for the student’s individualized learning needs satisfaction. This scenario highlights the idea that students of all types share, to some degree, a broad spectrum of intrinsic and extrinsic learning needs, and envisions a learning environment making some progress toward meeting those needs.*

Historically, students chose a college based on institutional reputation, availability of meaningful experiences, and the ability to earn an accredited credential. This was partly because college was traditionally seen as a way to "make a living" and as the only path to a good job and a comfortable life. Students were funneled into a narrow system with few choices along the way and accepted this as the only path to obtain a quality education.

Figure 17. Extrinsic & intrinsic needs	
Sample extrinsic needs	Sample intrinsic needs
Access to educational opportunities	Creativity
Credentials	Critical thinking
Guidance/support	Collaboration
Individualized instruction	Communication,
	Emotional stability
	Leadership
	Problem solving

As full-time jobs became scarcer and less attractive (due to technology-assisted work flexibility, students' changing mindsets about work, and the divorce of healthcare from employment), students increasingly began to see higher education as a way to "make a life." They started to choose educational options to meet their intrinsic needs, allow them to learn what they want, and that were affordable enough so their money was spent on more worthwhile pursuits (i.e. traveling, inventing something, starting a charity, etc.). The trend is toward more self-



employment and proprietors, from 11% in 1970, to 16% in 2000, to 21% in 2011.<sup>283</sup> (But that still leaves 80% employed by someone else.) The largest job growth is in establishments with less than 50 people, highlighting the need for more self-employment skills. Looking back, it is

clear that traditional students always had the most content but the least room to explore. Meanwhile the non-traditional students, particularly independent learners, had the most freedom to explore but the least available content. Traditional students have also had greater opportunities for the most meaningful college experiences, less so for the non-traditional students. In 2025 and beyond, the outer ends of the continuum are moving more toward the middle.

Learning options have increased significantly, mainly due to online course availability, tools for delivery, and an increase in corporate involvement in education expanded the range of choices for all students. The online-degree market has grown substantially to fill the accessibility void and has brought with it a host of for-profit education companies. It is commonplace for learners to graduate or accomplish other credentialing goals without ever sitting in a classroom. Learning feels less like “school.” Supporting personal development, pursuit of one’s passion and delivering high-quality experiences are growing areas of concern for the institutions of higher learning. Older generations would compare it to the sensation of being on a year-round summer break: the satisfaction once limited to a brief three months of independent self-exploration is becoming the norm of day-to-day college life in 2025.

While the reputation of Ivy League and other “name” schools is still strong, other student types are benefiting from the greater acceptance of non-traditional programs. One major for-profit education company uses a simple motto: “*A triad of service, quality, and price.*” Indeed, they are run more like businesses than like schools, and think of students as customers who seek value for their dollar. This ideology has had a direct impact on closing the gap somewhat on several student needs previously ignored: relevant content, learning support, and real-world problem-solving application. Non-traditional students in particular often lacked the needed support for their goals.

For-profit education companies have a more learner-as-customer type mentality that tends to improve company support for students – for non-traditional students this has been a vast improvement. Lacking the infrastructure and bureaucracy of traditional institutions allows for more rapid adjustment of course offerings and content. They are thus able to drive the adoption of a host of student-centered learning technologies. For-profit companies thus gain an edge in utilizing digital technologies. In many cases, a better understanding of employer demands ensures that the content of curriculum is current and relevant to the knowledge worker of today. Of course, there are innovative institutions within the system trying to drive change as well, though their efforts are often overshadowed by their more conservative brethren. Together, the pressure from inside and outside is forcing traditional institution to at least reconsider their strategic approach.

By and large, all student types are more focused on real-world problem solving and individual needs satisfaction than they used to be. The learning environment is still shifting from being focused on the outcomes dictated by educational institutions and more toward increasing options for satisfying individualized learning needs. The convergence of diverse learners will continue to break new ground, but clearly there is still a long way to go.

## Working Baseline Future “Inputs”

### Trends

#### Characteristics

- The meaning of a “career” is continuing to shift into a collection of different jobs, rather than being one continuous trajectory.
  - There is a growing market for temporary work and freelance jobs, as well as a changing technological landscape, will mean that adaptability is crucial for success. Workers are increasingly able to find their own niche (and will need to do so repeatedly, as technology and the market change), rather than hoping to get a job and stay in it for the rest of their career.
  - Working from home or a collaboration space is increasingly common. In 2010, 9.5% percent of all workers worked at home at least once a week, while 4.3% did a majority of the time.<sup>284</sup>
  - Co-working spaces are increasing in popularity,<sup>285</sup> as are home-based start-ups and established businesses.<sup>286 287</sup>
  - There is an increasing need for adaptability, insight, and innovation as a skillset in order for workers to be able to make a good living.<sup>288</sup>
  - Organizations are continuing to search for a balance between virtual and physical preference. Millennials, for instance, are indicating a preference for in-person collaboration when possible.<sup>289</sup>
  - Metro areas (or at least those with good education systems or a way to attract highly educated workers) are continuing to dominate workforce growth.<sup>290</sup>
  - There is an increasing emphasis on temporary work as a mainstay of the job market: gig-work, freelancing, part-time jobs, etc.<sup>291 292 293</sup>
  - There is an increasing emphasis on saving on labor costs by cutting benefits & healthcare, even for skilled jobs (also feeds into the rise in the use of interns, temporary workers, & part-timers).<sup>294</sup>
  - Personal branding and social media savvy are increasingly becoming a necessity for career success in some fields.<sup>295 296</sup>

#### Job market

- Technology growth and the retirement of the Baby Boom generation is creating more demand for IT and healthcare workers. Employers are demanding considerable experience from new hires, and students will in turn demand access to unpaid internships in order to gain that experience, despite the legal questions about internships being unpaid labor.
  - An increase in healthcare and IT jobs is especially noticeable.<sup>297 298 299</sup>
  - There is a continued emphasis being placed on work & internship experience from employers as well as students.<sup>300</sup>
  - Sporadic legal issues with unpaid labor continue, but are not likely strong enough to impact general trends.

- The 2011 Global Entrepreneurship Monitor (GEM) U.S. Report found that entrepreneurial activity in the U.S. is growing, up more than 60% and at highest level since 2005. Twelve percent of the U.S. adult population engaged in entrepreneurial activity, and the study also finds that education plays a key role in the formation of entrepreneurs.<sup>301</sup>
- New business growth continues to grow. Between 1996 and 2010 the US created nearly 600,000 businesses every month. The US ranks 2nd in the world innovation index, after Sweden.<sup>302</sup>

### Labor force

- The growth of the labor force is slowing.<sup>303</sup>
- There is an increase in “pink-collar” workforce, caused by both increasing demand for workers in those fields and increasing supply of men willing and trained to work in them.<sup>304</sup>
- There is an increasing percentage of women in the workforce, combined with a decreasing percentage of men.<sup>305</sup> BLS projections say both genders’ workforce participation is shrinking, with men shrinking faster than women.<sup>306</sup>
- Women are increasing as a percentage of the workforce, although growth will begin to slow and actually reverse, slightly.<sup>307</sup>
- There is decreasing labor mobility in the US<sup>308</sup>, with people tending to move to markets with lower housing prices.<sup>309 310</sup>

### Tools

- Automation is becoming an increasing part of the workplace, affecting manufacturing even more than previously, and increasingly replacing routine service industry jobs.
  - Net investment in infrastructure continues to lag behind economic growth.<sup>311</sup>
  - The capabilities and use of robots & automation in manufacturing are increasing.<sup>312</sup>
  - The presence of robots & AI-like software in government, information, and service-sector jobs is increasing.<sup>313</sup>
  - Robots and AI are encroaching upon “non-routine” type tasks.<sup>314</sup>
  - Automation is disrupting more and more sectors of the economy.<sup>315 316</sup>
  - Big data is increasingly being used as a recruiting tool to help reduce turnover and improve productivity.<sup>317</sup>
- Interconnectedness and social media are continuing to transform the workplace, as well as the way people find jobs (or are found by recruiters).
  - Social media is increasingly used of as a tool for both job-hunting and recruiting.<sup>318</sup>
  - Improvements are continuing and usage increasing for expert systems (e.g., diagnostic programs), reference tools (e.g., wikis & search engines), and personal assistant software (e.g., Siri, but for business),


- The use of social media as a business strategy, demanding working knowledge and fluency with various social media platforms from workers is increasing in certain fields. For example, a recent study of Fortune 500 social media adoption found them lagging smaller businesses, but “the general message is one of an increasing confidence in the utility of social media” and found that 77.4% of now have at least one corporate Twitter account.<sup>319</sup>

### Skills & traits

- Increasingly widespread automation suggests workers in more and more jobs will need enough IT skills to coordinate and complement the automation in their workplace.
- Creative and technical skills continue to be in extremely high demand, further increasing the wage-premium for those who have them.<sup>320</sup>
- Generation Y & Z are entering the workforce with too few workplace skills, lacking “personal responsibility” and “work habits” compared to Generation X.<sup>321</sup>
- There is a slight but noticeable shift by employers towards training staff themselves, rather than depending on HR to cherry-pick the very best candidates.<sup>322 323</sup>
- There is growing demand for multi-talented technical and professional workers, with knowledge and skills in a broader array of fields (who have the experience on their Internet-resume to prove it).<sup>324</sup>
- There is continued disparity between skills taught in universities and skills sought by employers, although a few universities are making an effort to change.<sup>325</sup>
- There is sporadic but gradually increasing use of skill-tracking systems to aid in job-search and recruiting.<sup>326 327</sup>

Figure 19. Working scanning sampler

## WORKING ... but looking for more than just a job



tags:  
Working  
internships, meaning of work,  
job market, labor force

According to a recent survey by the National Association of Colleges and Employers, 57% of **employers prefer applicants who have experience from an internship.**

Source: USA Today, "Colleges Throwing Up Internship Road Blocks" Sept. 9, 2013

Half of employers are either currently **accepting applications from high school students for internships**, or plan to over the next year.

Source: Main Street, "Interns are Getting Younger as Companies Hire from High Schools," Feb. 4, 2014

SponsorChange **reimburses volunteers by paying down their student loans.** And, participants gain useful work experience along the way.

Source: Pluck Magazine, "Refreshing Solutions: A Closer Look at Sponsor Change," Mar. 22, 2012

A new Harvard study suggests that, "If the gender pay gap is to be closed, workers must obtain **greater autonomy in determining their schedules.**"

Source: Money News, "Harvard Study: Flexible Workdays Would Narrow Gender Gap," Jan. 5, 2014

**"Rent an M.B.A."** on web sites designed to match business school grads with companies seeking short-term help and temporary talent for projects. *Might the online dating model meet hiring practices?*

Source: Wall Street Journal, "For Smaller Projects, Try Renting an M.B.A.," Jun. 9, 2013

## Plans

- Government<sup>328</sup> and many large corporations<sup>329 330</sup> are making plans to “re-shore” manufacturing jobs in America, although though the impact on employment may not be quite as impressive as the hype would imply - automation will mean the number of new jobs gained will be less than were lost by the original offshoring.
- Attempts to reform immigration system will continue to be made, though actual effectiveness has yet to be seen.<sup>331</sup>
- Companies are starting to plan on using “next-shoring” in which they arrange their supply chain based on proximity and fast response time to demand and innovation, rather than wherever labor/supplies are cheapest.<sup>332</sup>
- A number of high-tech companies are investing heavily in robotics, Internet-of things, & AI development.<sup>333</sup>

## Projections

- Below are several projections based on computerization:<sup>334 335</sup>
  - 47% of the jobs in the job market are estimated to be at high risk, facing a 70% or higher chance of being partially or totally replaced by computerization; 18% are at moderate risk (between 30% and 70% chance), and 33% are predicted to be at low risk (<30% of computerization).
  - Manufacturing in particular continues to be at high risk of automation.
  - Transportation and material movement is a sector that is facing growing risks of computerization because of advances in automated vehicles.
  - Other occupations at high risk of being replaced by computerization include low-skill sales, service, and administrative jobs.
  - Low-risk fields are those where human contact, people skills, creativity, and judgment cannot be replaced by computerization, such as management, healthcare, education, programming, etc. and high-skill service and sales positions, in which human labor will remain relatively irreplaceable.
  - Several projections point to much cheaper and more-easily-taught robots.<sup>336 337</sup>
- By 2020, some forecasts have the portion of contingent workers rising to 50% of the labor force.<sup>338</sup>
- “People analytics” will increasingly be used in hiring.<sup>339</sup>
- There will be growth in “customized work,” which is the ability of an individual employee to shape a career path within an organization, enabled by collaboration platforms and changing behaviors management around following from the front.<sup>340</sup>
- “*Personalized Professions*” suggest a provocative view of knowledge work that has a transformative effect on how work is done, leading to a future in which all workers are thought of as knowledge workers.<sup>341</sup>



- *Personal Branding*: Sites like LinkedIn will replace job boards and resumes; personal and professional lives converge; recruitment process will have a mandatory online presence background check; online influence can be a determining factor of whether one gets a job.<sup>342</sup>
- Some outlines of the future of work:
  - *“10 Skills for the Future Work Place*: sense-making, social intelligence, novel and adaptive thinking, cross-cultural competency, computational thinking, new media literacy, trans-disciplinarity, design mindset, cognitive load management, virtual collaboration.”<sup>343</sup>
  - *“8 new jobs people will have in 2025:*” Digital Death Manager, Unschooling Counselor, Arm Chair Explorer, Microbial Balancer, Corporate Disorganizer, Digital Detox Specialist, Urban Shepherd.<sup>344</sup>
  - *“10 business that will boom in 2020:*” Data Crunching, Counseling and Therapy, Scientific Research, Computer Engineering, Veterinarians, Environmental and Conservation Science, Some healthcare fields, Management, Finance, Entrepreneurship<sup>345</sup>
  - “Five industry sectors are projected to have decreases in employment: manufacturing (-549,500); federal government (-407,500); agriculture, forestry, fishing, and hunting (-223,500); information (-65,200); and utilities (-56,400).”<sup>346</sup>

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**Working Baseline Future Summary: “The Super-Skilled, Messy Middle, and Warm Bodies”**

The hollowing out of middle class occupations, and growth only at the top and bottom of the wage scale.

**Abstract**

Students entering the job market will find themselves in a well-paying job, a struggling middle-class career, or employed as an under-paid warm body - all depending on the skills they obtain, whether via a traditional university, an online accreditation program, an apprenticeship, or some combination thereof. They will need the skills required by their primary job description to get hired as well as a broader skill base and the ability to adapt and innovate in order to advance (or even to survive, if the job requirements change too fast). Technology and access to information will make the labor market more adaptable, but also more cut-throat.

**Key drivers**

- Increasing productivity of capital and reduced need for labor
  - More automation at work, resulting in severe competition for “middle class” jobs requiring routine or algorithmic performance (office or factory)
  - Continued competition from foreign workers and machines, meaning less wage growth
  - Move to a network model leading to fewer traditional, full-time jobs; more temporary, contingent, part-time work
  - Lack of sufficient job training in formal educational institutions
-



## **Working Baseline Future Narrative: “The Super-Skilled, Messy Middle, and Warm Bodies”**

*Students entering the job market, depending on their credentials, find themselves in a well-paying job, a struggling middle-class career, or employed as an under-paid warm body. This all depends on the skills they get during their education (whether that education is via a traditional university, an online accreditation program, an apprenticeship, or some combination thereof). Overall, there is a decreasing ROI for university education, which is failing to keep pace with rapid changes in job and skill requirements.*

Regardless of their major, students need training in soft skills in order to fit into a typical 2025 workplace setting. Unsurprisingly, computer literacy and information technology skills are a must to deal with the abundance of technology in the workplace. Of tremendous importance is guidance in the selection of major/education/ training to find a rewarding and profitable career.

Many employers have trouble finding people capable of dealing with a changing technological landscape and emerging technologies. Workers need the skills required by their primary job description to get hired, but simultaneously need a broader skill base and the ability to adapt and innovate in order to advance (or even to survive, if the job requirements change too fast).

The mismatch between what universities teach and the needs of employers is continuing to grow in spite of increased efforts to reverse the trend. Employers have trouble finding “perfect”

### **Some forecasts from the BLS (Bureau of Labor Statistics)**

#### Jobs requiring post-secondary

- Nineteen of the 30 occupations projected to grow fastest from 2012 to 2022 typically require some form of postsecondary education for entry.
- Occupations typically requiring postsecondary education generally had higher median wages (\$57,770 in 2012) and are projected to grow faster (14%) than occupations that requiring a high school diploma or less (\$27,670 and 9.1%).

#### Jobs not requiring post-secondary

- “Two-thirds of the 30 occupations with the largest projected employment increase from 2012 to 2022 typically do not require postsecondary education for entry.”
- “Occupations that do not typically require postsecondary education are projected to add 8.8 million jobs between 2012 and 2022, accounting for more than half of all new jobs. These occupations employed nearly 2/3rds of workers in 2012.”

#### Jobs requiring an apprenticeship

- “Occupations that typically require an apprenticeship are projected to grow 22.2% percent from 2012 to 2022, faster than any other on-the-job training assignment.”

#### Growing jobs

- The health care and social assistance sector is projected to grow 10.8% or 15.6 million jobs from 2012 and 2022, accounting for nearly 1/3<sup>rd</sup> of the total increase.
- Employment in the construction sector is projected to grow 2.6% annually or 1.6 million new jobs from 2012-22, the most among goods-producing sectors and third most among all major industry sectors.

#### Workers

- Projections for 2022 are for men and women both to have lower workforce participation, although women will drop less than men; women as a percentage of the workforce to shrink by .1% from 46.9% to 46.8%.

Source: <http://www.bls.gov/news.release/ecopro.nr0.htm>

candidates, and are thus increasing efforts to train “okay” candidates with proven ability to learn, adapt, and innovate in the skills needed for the job. Experimenting with the use of skill- and experience-tracking systems is likely to become more commonplace, enabling employers to find and recruit the right people without depending on less-precise filters like diplomas and resumes. Personal values and goals are what determines a student’s area of interest, and how much meaning and value they place on their future career decisions, but the increasing distinction between high-paying and mediocre-wage careers plays a vital role in their choices. Students skilled in social media are favored in professional and creative fields, as employers increasingly rely heavily on online profiles for hiring. Emerging technologies, such as recording one’s skill and experience, allow employers to gain extensive insight into prospective employees. Data analytics are commonplace: employers sift through masses of applicants for the best fits for the job, placing incredible pressure on students to create an impressive whole-person presence online. Learning machines (e.g., Watson) comb through an individual’s credentials and online data to recommend a decision to the person hiring. Nothing is sacred when Big Data converges with Big Brother in the human resources department.

Expectations for careers are less and less similar to those of the 20th century. Workers are much more likely to have multiple careers, jobs and projects in the same amount of time. In this rapidly fluctuating environment, adaptability and networking are critical for success.

Technology and access to information makes the labor market more adaptable, but also more cut-throat. Those that do not stay on top will have a notably harder time succeeding. For the rest, it’s all about the Messy Middle.

## **Playing Baseline Future “Inputs”**

The exploration of play suggests a growing incursion of the virtual world, or is it play that is migrating into the virtual world? Increasingly powerful technologies bring an incredible range of options for making virtual play increasingly “real” and in turn increasingly integrated with real life. The new gaming tools are also reinforcing the trend toward serious or purposeful play, setting the stage for a growing influence of gamification on other domains.

### **Trends**

- Leisure time (socializing, relaxing, active) is increasing by about 5 hours a month as the average amount of time working has decreased by almost 8 hours per month between 1965 and 2003.<sup>347</sup>
  - On a monthly basis, time spent working decreased from about 1,900 hours on average in 1950 to about 1,700 hours today.<sup>348</sup>
- Play time is increasingly bounded and supervised. At the extreme, some parents are hiring play date consultants to organize their children’s play.<sup>349</sup>
- Money spent on recreation was \$897 Billion in 2009 or 9% of total personal consumption -- an increase from \$304 Billion and almost one percentage point compared to 1990.<sup>350</sup>
- Long-term trends suggest potential market saturation:<sup>351</sup>
  - of play enabling technologies (wireless access, smart phones, game consoles, Google Glass, "Fitbits" and related athletic computing, home exercise equipment, etc.)
  - of various types of games (video games, mobile video games, casual gaming, online role playing games, card games, lawn games, children’s games, parlor games, arcade games, group games, etc.)

### **Forms**

- The games industry continues to outgrow movies and music.<sup>352</sup>
- Some video game industry trends include:<sup>353</sup>
  - Increased spending on video games.
  - Advergaming – advertising inside video games.
  - High level of innovation in the video game industry.
  - High demand/competition for game production talent.
  - Increase in academic programs for game development.
  - Increase in academic programs that teach design and “sensory literacy.”
  - Blockbuster games franchises to rival blockbuster movie franchises.
  - Decline in console games.
  - Mobile gaming on the rise: 79% of parents with children aged 2 - 14 report that they or their children own some type of mobile device, such as a traditional cell phone, smartphone, or tablet; up from 63 percent last year.<sup>354</sup>
  - Decline on “traditional” games e.g. Mattel, Hasbro.

- As a countertrend, there is the rise of indie gaming culture.
- Some toy industry trends include:
  - Changes from tools that enable imagination play, necessities (gloves, food) to items that are entertaining in and of themselves and focused on a purpose.
  - Toy sales continue to be flat: \$23.4B (1996) and \$23.9B (2010), which actually represents 2.3% a 26% decrease in real dollars.<sup>355</sup>
  - Electronics and arts & crafts had the largest increases in sales.
  - In 2013, youth electronics and arts & crafts experienced the most significant increases at 18% and 8% respectively.
  - Toys have become more of an offshoot of the television and film industries than elements of play. “One result is that a toy comes with a prepackaged back story and ready-made fantasy life....mean that “some of the freedom is lost, and unstructured play is limited.”

## Purposes

- Gaming culture is increasingly influencing mainstream culture.
  - Emerging cultural phenomena are surrounding play and games.
  - Game characters/avatars are increasingly seen as extensions of identity e.g. App Tracks Your Face to Control a Game.<sup>356</sup>
  - Video games are emerging as an accepted art form.
- Gaming is emerging as a spectator event/sport. A nascent phenomenon of video games is drawing spectators to watch exceptional players in competition.<sup>357</sup>
- Gamification, the phenomena of overlaying game elements on top of other activities to make them more engaging or playful, continues to expand.<sup>358</sup>
- Cosplay (Costume Play) is emerging; it involves making and dressing up as video game and entertainment characters and acting out scenarios from game/entertainment products.
- Worldbuilding continues to grow. Fan generated fiction, images, and other artifacts that expand or add depth to the settings of games and entertainment products. These fan generated products are sometimes reincorporated into the original.
- Machinima, using video games to create videos and act out story lines not necessarily related to the game, and sometimes involves hacking, is expanding. These innovations can become products of their own, e.g., Red vs. Blue animated TV series generated using the Halo game generator software.

## Genres

- Exercise gaming is being aimed at:
  - non-exercisers -- Nintendo Wii and Xbox Kinect use video game technology to entice players to exercise to achieve game goals.
  - exercisers -- Products related to “gamification” of regular exercise and transforming exercise equipment into games (e.g., Goji Play).
- Casual gaming growth coincides with “snack culture” and decreasing time for more complex games and the rise of mobile gaming.

- Puzzle/Physics games are growing more popular as a result of mobile gaming, e.g., Angry Birds, Cut the Rope, etc.
- Massive online competitive games like Word Hero are motivating thousands of people to play the same “Boggle”-like board and compete for rank by score.
- Asynchronous games played over time with opponents, usually friends or family such as Words with Friends or Draw Something.
- Conventional games are going online, particularly with older populations, e.g., Scrabble, Spades, Bridge, and the like.<sup>359</sup>
- Serious games are growing. These are games aimed at achieving a positive real-world outcome e.g. “Friends Help You Defuse a Virtual Bomb in Nerve-Wracking 3D Game.”<sup>360</sup> In “Food Import Folly, one takes the role of the FDA inspectors in a world of increasingly numerous food imports and tries to protect the country from contaminants in foreign food imports.”
- Empathy games are growing. These games intended to help the player identify with another person via an immersive scenario or experience. For example, “Disaffected!” puts the player in the role of employees forced to service customers under the particular incompetence common to a Kinko’s store.”<sup>361</sup>
- Political games are emerging. This is a genre of games created and designed to raise social awareness, champion the oppressed, and challenge socio-political power structures. For example, “Points of Entry” game explored the idea of awarding Green Cards under the Merit-Based Evaluation System (which was recently debated in Congress); these games are serious political statements that challenge the status quo.<sup>362</sup>
- Contemplative games are emerging. These are games that have no goal to “win” but instead set out to affect a peaceful or placid mindset in the player.
- MMORGs and virtual worlds are growing especially vigorously.
  - Strong growth in collaborative gaming in virtual worlds.
  - Increasingly aimed at children, such as Minecraft.
  - Kaneva is the first virtual entertainment world that unifies the 2D web with a 3D experience by integrating social networking, shared media, and collaborative online communities into a modern-day, immersive 3D Virtual World.
- IRL Play Events – Immersive play experiences growing in popularity.<sup>363</sup>
- Fun Runs with gaming elements are increasing, e.g., Zombie Runs, Color Runs, Mud Runs.
- Role-playing Adventure Events, beyond murder mystery dinners, are growing, such as “The Purge” event in Los Angeles last year and “Zombie Apocalypse” Events.<sup>364</sup>
- Technology is integrating into the IRL experience, e.g., high-displays in stadiums..
- Google launched a series of mini-games for its high-tech Google Glass specs that allows players to use their heads as rackets to play a round of virtual tennis or slice shapes out of thin air like a karate master.<sup>365</sup>
- Gamification of fitness, e.g., Fatworld is a game about the politics of nutrition. It explores the relationships between obesity, nutrition, and socioeconomics in the contemporary US.
- There is increasing innovation in exercise forms, e.g., Aerial Yoga, Hot Pilates, etc.

- Sports mashups are increasing, e.g., Football Golf, “Flo-yo” (paddleboarding and yoga).

**Figure 20. Playing scanning sampler**

**PLAYING to improve on reality, virtually or otherwise**



*The human-game interface is becoming more complex and personal. And, playing is no longer just for children. Ranging from real-world applications of games designed to solve big social problems to digitally enhanced playscapes for melding “real life” and virtual experiences, play is growing much more serious than ever before.*

For example, In 2012 gamers achieved the **first crowdsourced redesign of a protein.**  
Source: Scientific American, “Online Gamers Achieve First Crowd-Sourced Redesign of Protein,” Jan. 22, 2012

A revolutionary new personal interface for human computer interaction comes by way of a headset that can sense your “brain waves” and send them wirelessly to a computer, allowing you to **control it with your thoughts, mood, or facial expressions.**  
Source: You Tube, “Emotive Mind Control Headset Setup & First Impressions” May 10, 2013

Sports stadiums are **implementing digital upgrades to foster fan engagement and enhance the live-game viewing experience.** From next-generation football stadiums to fan-focused digital technology and real-time 3D environments, *spectators are no longer passive participants.*  
Source: Google Think Quarterly, “The Future of Play,” Jul. 2012

**Tags:**  
 Playing forms, purposes toys, games

## Plans

- The Gleeve is a technology-enabled glove that seeks to shift participants from merely players in games to designers.<sup>366</sup>
- “A new state bill could give children more gaming time in an unlikely place: school. Senate Bill 6104 would create a committee to examine how interactive gaming can boost student involvement and achievement, and create a pilot program for integrating games into K-12 curriculum.”<sup>367</sup>
- Hospitals are developing programs to treat gaming addiction.<sup>368</sup>
- Hi-Rez – Massively Multiplayer Gaming will emerge.<sup>369</sup>

## Projections

- According to a list of “30 Things We Will Know About Video Games By 2040,” there is hope for “a great video game that was developed by someone who lives in the Third World,” and expect “a popular video game character to come out of the closet,” by that time.<sup>370</sup>
- Features that will be integrated into gaming in the future: assertive display, virtual and augmented reality, motion sense technology, second screen, more mobile and sharing and social.<sup>371</sup>



### **Playing Baseline Future Summary: “Scheduled Play”**

Play is increasingly purpose-driven, fulfilling some overt or implicit agenda.

#### **Abstract**

The iconic post-secondary student in 2025 will most likely have grown up with an experience of play that is bounded, scheduled, and supervised by parents and educators. Their play most often will take place in the context of some defining agenda such as learning or skill development.

#### **Key drivers**

- IRL (In Real Life) cannot escape the digital; the digital experience is weaving into the real in-person experience.
- Collaborative curation via social media
- Technology becoming more intimate and ubiquitous, e.g., Ambient Intelligence, sensor networks, and ubiquitous computing
- Improved interface, such as glanceable and gestural
- Mobile gaming on the rise
- Decreasing privacy and anonymity

### **Playing Baseline Future Narrative: “Scheduled Play”**

*Most mainstream students in 2025 and beyond will have been brought up in a setting where most play was scheduled, with online environments, such as online gaming worlds and social media, being the chief source of unsupervised play. After school play most likely involved scheduled activities, sports, and classes. The pressure on parents was to find ways to supervise their children in this kind of play, drawing parents into these environments after their children, which in turn often led students to look for other places to play. This dynamic between parents who set the context of play and students’ quest for their independence is a defining dialectic for the play domain.*

Aside from a minority of students exposed to progressive or niche subcultures, the average student has grown up in a culture that looks askance at truly unsupervised, unstructured play. Many students do not feel comfortable, or are downright “bored” by play opportunities that do not have a defined structure and goal. Imagination play that is not aligned with some sort of entertainment product or franchise is increasingly rare.

With rapid progress in communications and human interface technologies, children and adults are presented with a dizzying array of options for entertainment and play, especially in the electronic toy and game sector. For students, gaming is a lifestyle that competes with school and leisure activities for their limited free time (not to mention, money). The gaming consumer has no shortage of wants and needs to experience the full spectrum of entertainment and excitement on offer. Furthermore, college is a time to break free from parental supervision in the world of play.



But there are some gloomy side-effects to this explosion of diversion. Gaming addiction continues to gain attention in the media amidst frequent complaints from adults that children are failing to develop acceptable face-to-face social skills.

For those of more limited means, the options are less dizzying. There are still plenty of public play resources such as parks and playgrounds. Many seek access to free and subsidized play experiences (e.g., subsidized mobile devices with “free to play” games) which reinforces the provider-setting-the-context-of-play dialectic. Not surprisingly, the innovative world of technology games is mostly for those with plenty of extra cash.

Play experiences will usually come with an agenda, usually commercial, set by the providers of the services. Increasingly children’s play, especially online, has become a rich target for “monetization” -- efforts to derive income or other business value such as harvested marketing data, brand loyalty, or even “fan labor.”

A small portion of innovative players have found a way to appropriate the toys and games in a way that diverts from the intended agenda. Mashups, hacks, and fan-derived modifications abound. Providers are increasingly compelled to respond, either by trying to quash unauthorized modifications or by attempting to tap and subsequently “monetize” the innovations (see: “Fan Labor” above).

A discernable pattern characterizes most dynamics within the domain of play: the dialectic between those who set the context of play (parents, providers) and the players themselves (children, consumers). Largely, play is driven by trends in the transactional environment – income inequality, rapid technological innovation, demographics, educational policy, and parenting practices. Despite these broad variables, a core mechanism (the parent/child or provider/consumer dialectic) ensures that play is still an inherently personal, deeply social, and psychologically unique experience.

For example, there are active niches in the culture devoted to promoting and restoring undirected, agenda-free play. There is also an emerging movement to establish play as an intangibly valuable activity for responsible adults. But neither of these seem to have gained traction outside of the subculture of progressives with ample education and social capital.

The mainstream view of play upholds the concept of its commercial value as its prime benefit. The idea that games are a form of leisure for the young endures in the culture, and so do suspicions that play is somehow deviant. Fears of the ways in which games exert a corrupting force on youth still exist, only now blown up to antisocial, even sociopathic, proportions. This perception reinforces the pattern of controlled play. The children keep on playing as the older generation, and commercial providers, look on.

## Connecting Baseline Future “Inputs”

The powerful trend of people seeking more connections continues to grow. The exploration for the baseline identified more and more ways for people to connect, and more individuals, groups, networks to connect with – even expanding into connection with “machines” or “AI” as its capabilities grow. It’s still more of a quantity story – the purposes and means of connecting are mostly about more, thus leaving issues of quality of the connections inadequately addressed.

### Trends

- The megatrend in this space is “more ways to connect.” Beyond f2f, voice, email and text, there is tagging and info sharing, the maker movement, games (video games, MMPORGs, Cosplay, Geocaching, laser tag), ride sharing, reviews, reputation ratings, image-based social media, video chat (Skype, Google Hangout, eventually holograms), on-line education, matching services, and political/social interest groups.

### Relationships

- Virtual friendships are growing. A 2007 study for MTV found that 25% of 12-24 year olds made no distinction between their physical and online friends.<sup>372</sup>
- Online dating is becoming the “new normal.” Eleven percent of American adults now use online dating sites -- up from just 3% in 2008. 4 out of 10 adults who are “single and looking for a partner” are looking online.<sup>373</sup>
- The debate over privacy norms continues to grow.
  - It may be that parents and educators are more concerned than students, who seem largely indifferent. For instance, a nationally representative sample by Brunswick Insight found that more than four in five (84%) parents report they would be likely to take action against online tracking in schools (companies who monitor Internet behavior in order to target advertising to them), including 50% who say they would be “very likely” to take action.<sup>374</sup>
  - While teens are taking some steps to protecting their privacy, they are also sharing more information about themselves on social media sites. For the five different types of personal information measured by Pew Research in 2006 and 2012, each is significantly more likely to be shared by teen social media users.<sup>375</sup>
- Casual cohabitation is “gaining” vis-à-vis commitment.
  - Marriage is on the decline, particularly among young adults.<sup>376</sup>
  - Intimate moments are becoming “snack media,” as in Khoaliti's Vine upload.<sup>377</sup> “As relationship cycles speed up, breaking up becomes much easier to do.”<sup>378</sup>
  - “Stayover relationships” are a growing trend among college-aged couples who are committed, but not interested in cohabiting.<sup>379</sup>
  - Single-adult households growing as well as ‘living apart together’ (middle-aged and older monogamous couples who maintain their own households).<sup>380</sup>

## Service providers

- People are increasingly connecting to news through social media. They are also sharing and commenting. As a result, news format and content are progressively being reconstructed around social media channels.
- Students are increasingly connecting to causes. For instance, social justice concerns are growing. A recent study found that “students’ attitudes toward CSR are in line with their liberal attitudes on other social issues: the Corporate Social Responsibility (CSR) index shows that 85% of the students in the sample agree with the idea that business has broader responsibilities to society.”<sup>381</sup>
  - In addition, some 70 million Americans are connecting their values to their consumption -- making choices in the marketplace as “values-driven consumers.”<sup>382</sup>
- Nontraditional partnerships are creating a new human services ecosystem.
  - An extension of this partnership climate, pay-for-success contracts are gaining traction as an alternative funding mechanism for human services programs that pays providers of goods or services when outcomes are met.
- Predictive analytics, using big data inputs to predict outcomes, are increasingly being experimented with and adopted by individuals and organizations.<sup>383</sup>

## Virtual

- Smart phone usage is continuing to transcend age and income level.
  - Across all demographics, smartphones have been most rapidly picked up by the youngest members of households, and in those with incomes over \$125,000.
  - Adoption rates accelerating among lower income families and older members of the population<sup>384</sup>
- Internet connections are growing, getting faster, and going mobile.
  - Internet connections are growing; connections with speeds over 200 kbps in at least one direction increased by 18% annually to 243 million.
  - Mobile Internet subscriptions are growing rapidly – up 28% to 153 million from June 2011, while fixed-location connections increased 4% annually to 90 million.
  - Fixed connections are dominant for those seeking higher speeds. Fixed connections with download speeds at or above 3 Mbps and upload speeds at or above 768 kbps increased from 56% to 64%. For mobile, the share increased from 14% to 28%.<sup>385</sup>
- Social networking platform churn continues
  - Social media has overtaken porn as the No. 1 activity on the web.<sup>386</sup>
  - Facebook is dying for age 30 and younger but still carrying on for older; just 56% of US teens claim to be active on Facebook in Q3 2013, down 35% from Q1 2013.
  - 45–54 year-olds are fastest growing demographic on Facebook (46%) and Google+ (56%).<sup>387</sup>
  - The fastest growing demographic on Twitter is the 55–64 year age bracket, growing 79% since 2012.
  - Snapchat is driving the disappearing social media trend.<sup>388</sup>

- There are a growing number of online users flocking to private networks such as LuLu (women-only app (iOS / Android) that makes it easy to rate guys).<sup>389</sup>
  - Image-based content will continue to drive social media engagement.<sup>390</sup>
- Companies are using Likes and Views as central part of their marketing for movies, songs and apparel.<sup>391</sup>
- Smart Devices/Internet of Things are proliferating. “You can be damn sure that all things nano will be making big waves in the next decade or so -- particularly when new generations of tiny automatons begin to think for themselves.”<sup>392</sup>
- Technology is becoming increasingly feminized. Production and marketing of more female-friendly technology products, since women typically control 70-80% of household spending.”<sup>393</sup>
- Brand loyalty (a form of “connection”) continues to decline.
  - “Consumers have unprecedented access to the information they need to make more-informed decisions about switching between brands.”<sup>394</sup>
  - A Deloitte survey identified a decline in brand loyalty each of the last three years.<sup>395</sup>
  - Distrust of institutional authority is such that what communities say about brands is more important than what brands say about themselves.
  - “The consumer market is shifting online, but consumers still expect a multichannel brand experience.”<sup>396</sup>
- Technology use is accounting for increasing share of consumer spending.
  - Technology use is self-reinforcing and taking a bigger share of consumer spending.
  - But two-thirds of the market can be considered later adopters who are slower to absorb new services and digital interactions.<sup>397</sup>
  - Technology is becoming simpler with more frequent upgrades; consumers expect regular and increasingly frequent product upgrades (structural acceleration).
  - The consumer market is becoming progressively less tolerant of complexity.<sup>398</sup>
- The digital divide is morphing. “Over time, there has been a closing of the classic ‘digital divide’ between the haves and have-nots in terms of access to basic technology products and services. However, new digital divides have opened up, especially inequalities in relation to the social graph and consumers' ability to access and manage — or not manage — real-time, nonstop ubiquitous connectivity that is the product of technological acceleration.”<sup>399</sup>
- Technology is a growing component of fun
  - More than 1 billion unique users visit YouTube each month, with over 6 billion hours of video watched each month.<sup>400</sup>
  - Connecting via tagging and content sharing is identifying and creating communities of interest.<sup>401</sup>
  - Geocaching is increasing popular. The modern day treasure hunt is run via a geocaching app on a smartphone, where coordinates of each site are given. Participants then follow the coordinates to find the treasure.<sup>402</sup>

- The use of technology for fun may, however, have a short shelf life. The “flashmob” phenomenon, for instance, is already viewed as passé.<sup>403</sup>

Figure 21. Connecting scanning sampler



- Social movements -- in part enabled by technology -- are growing.
  - This is driven by a need to feel for people to feel that they are a part of something socially bigger than themselves.
  - The slow food organization spawned by that initial movement (1986) has expanded to over 83,000 members worldwide with 16,000 members in the U.S.A.<sup>404</sup>
  - Makerspace is getting bigger, evolving and finding niches.
  - Cosplay<sup>405</sup> is more accepted and common as the cosplay generation gets older and better off.
- Transportation is increasingly mediated through technology and social networks.
  - The cost of shared travel and transportation is higher because of increased taxes, but while these competitive forces have nearly forced price parity, traditional modes remain. Students will be able to get help for cost of owned vehicles<sup>406</sup> and share the transportation of others through mobile apps and social media.<sup>407</sup>
- Personal robots are beginning to infiltrate relationships.
  - Investors and customers are more interested in the potential as the technology improves the performance of robots and suggest they are ready to take off.<sup>408</sup>
  - Interest in service robots growing.<sup>409</sup>

## Plans

- Google Glass has many loud critics, but plans for implementing Glass in education, medicine, communicating, gaming and mobility could enhance the positives.
- Applications to help the disabled and to allow real-time language translating are positioned to reduce barriers to connecting.<sup>410</sup>
- Of the 200,000 applicants to the Mars One project, there is now a team of 24 participants being selected to undergo 10 years of training before embarking on an eight-month journey to Mars in 2025.<sup>411</sup> The not-for-profit seeks to establish the first human settlement on Mars.<sup>412</sup>

## Projections

- Use of infotech and biotech to guide relationship compatibility, such as:
  - searches for lovers that are genetically compatible.
  - big data as tool to find compatible lover (and it might not be human).
  - services that match people with complementary genes and gut.<sup>413</sup>
  - an active cross-species communication system, enabling some species to talk to each other as well as humans.<sup>414</sup>
- Use of infotech in relationships, such as:
  - wearable technologies that transform social interactions: "sex and relationships are fertile new frontiers for measurement" of personal and relationship success.<sup>415</sup>
  - more physical sex surrogates.<sup>416</sup>
  - becoming more in tune with personal data (i.e., Nike Fuelband) and those who provide it and help analyze it.<sup>417</sup>
- Use of infotech to evaluate relationships, such as:
  - quantifying not only oneself but one's relationships.
  - big data providing insights into why relationships work and fail.<sup>418</sup>
  - services for indexing relationship performance. "Once you finished a relationship, you report it and get an analysis of what went right, and what you need to optimize next time."<sup>419</sup>
- Spiritual concerns are "making a comeback."
  - Megatrend tracker Patricia Aburdene suggests that "the focus on spirituality has become so pervasive that it stands as "today's greatest megatrend." Its impact on personal lives is spreading into institutions. And spirituality in business, she contends, "is converging with other socioeconomic trends to foster a moral transformation in capitalism."<sup>420</sup>



### **Connecting Baseline Future Summary: “More Ways to Connect”**

Technology is enabling a wider range of options for connecting and integrating into all aspect of human connections and relationships.

#### **Abstract**

Technology is increasingly useful in aiding human connections. It is being used a tool for enhancing, rather than replacing, human connectivity. While the young are key drivers, its usage is increasing across all age groups.

#### **Key drivers**

- Growing use of technology creating a positive feedback loop further promotes its growth
- Social media churn and evolution
- More connection options, e.g., matching sites, games, education, etc.
- Technology increasingly integrating into more “personal” decisions
- Desire to connect to something bigger driving exploration options

### **Connecting Baseline Future Narrative: “More Ways to Connect”**

*Smart phones opened the door to a world of ubiquitous connection as they spread beyond just the tech-savvy and reached across all ages, income levels, and degrees of expertise. While it used be fashionable to complain about not being able to program one’s VCR, few complain about not being able to work their smart phone; in hindsight, it may be viewed as the instigator of a major shift in how people connect. While it may be popular to bemoan the loss of face-to-face contact, the evidence suggests that virtual connections are not only booming, but they are also indirectly expanding the average person’s number of face-to-face contacts. The future for most is one of growing connections, both physical and virtual, with the distinctions between the two becoming less important.*

Looking back, the progression of ubiquitous technology seems somewhat counter-intuitive: the more pervasive it became, the more it simply melded into the background. The next big shift, after phones and pads, was wearables. While retail “wars” were fought over favored designs and combinations, the net outcome is technology integrated into nearly all clothes and accessories and, among the leading-edge, physically integrated via implants and even smart tattoos.

Students have been key drivers of many of these innovations – and sometimes they even use technology for learning, too! But it is much more than just a practical convenience; they have a seemingly unquenchable thirst for connection, and are happy to use their technology to reach out and make contact.



## As the world churns

Social media is characterized by a few mainstream platforms standing above a boiling cauldron of smaller platforms that are here today and gone tomorrow. The rule of thumb continues to be that once the adults start using it, the kids go elsewhere. Students pride themselves on being the first to find the hip, new, virtual hangout, and more and more often, it is students who are designing them.

This mentality spills over into consumer product lifecycles, which become shorter and faster and more convenient. And, of course, with a new spin on product personalization enabled by providing tools and templates, so users complete their “prosumer” tasks -- part producer, part consumer. But such consumers, especially students, take on this role only in cases where they care about the product, not a simply a “quick and dirty” purchase. There is a constant “move on” mentality, e.g., “which option provides more bang for the buck in ways where I have more needs met and personal control?” Design thinking will mainstream as creative tools become increasingly available and user-friendly. Co-creation began in the digital sphere, but in the future “me and my robot” can make practically anything: after all, there is plenty of support from the Maker community, financiers, and tools that go beyond 3D printing.

## Expanding social circles

Search in the emerging AI-engine future has greatly improved the odds of making a connection; that is, finding those with similar interests, no matter how obscure. In a world of eight billion people, there is bound to be someone else who shares one’s interest. This may turn out to be the most compelling pro-technology argument: opponents emphasized its isolating potential, and neglected its connecting one. Where one’s sphere of connections used to be limited geographically, they no longer are. Meanwhile, the highly specific “likes and dislikes” shared among geographically or demographically diverse “friends” create a social bond unlike those that exist in real life.

Thus, the more people that students meet, the more their horizons widen and their expectations grow. Attempts to limit connection by institutional authorities can raise the ire of a community and initiate a backlash that can be challenging to resist. Those with authority over students, for instance, often complain that they have little to control them with. The student response is that they don’t need to be controlled. In essence, more connecting and connections raises expectations of greater participation and autonomy; a network ethos has wreaked havoc with hierarchies.

## Love connection

Technology is helping people to choose, rate, and evaluate their relationships. Casual cohabitation has grown, while at the same time trending toward shorter and more frequent relationships. The “stayover” and “living apart” relationships give more personal control. And

big data helps one find compatible partners, taking a lot of the painful waiting and randomness out of the equation. Everything is quantifiable these days, so crunch those numbers and someone will emerge as “the one” .... or at least find the best sexual surrogate!

Connecting via technology translates to fun and often educational experiences. These activities make travelling more interesting, and going places to meet new people more attractive. School itself is much more interesting since gaming was adopted. Even the educational system can be fun -- that’s a no-brainer. For those that want to go slow and/or go the route of analogue, it’s live and let live. Some say that the online world is becoming more visual and more feminine: alongside the churn there are also opportunities and communities for more reflection, connecting and relationship building qualities -- like rating guys and gals, and of course arguing about that!

### Connecting to a higher purpose

The seemingly superficial uses that characterized the early years of the “tech-connect” explosion doesn’t mean that serious concerns are absent. The 2020’s decade is about expanding connections, with strong convictions to use these connections for a greater purpose. After all, it’s not just about money. Spiritual concerns are growing as students increasingly see, and seek, a connection to something bigger. It will not often look like a traditional religion, although it could be a religious mash-up. The quest might be characterized as piecing together elements of the puzzle as one goes, excited by the pursuit and not feeling constrained by the past. Interestingly, the search often turns up aspects of tradition and ritual that provide a sense of constancy amidst a rapidly changing world.

Concepts such as the Triple Bottom Line and social justice are increasingly built into the fabric of students’ lives. To a much greater extent than the past, a higher degree of concern for “making a difference” is met with action. Protests that lead nowhere will have little attraction. Most students take a very practical approach to investing their time in a cause or higher purpose: if they don’t see a probability of success, they won’t waste their time. Some older folks chafe at this bottom-line altruism. But it will be hard to argue with results. Students increasingly skilled in connecting and networking will be able to mobilize for good in a way that will be difficult to ignore. While still piecemeal, those with foresight see a bright potential future with the mainstreaming of such efforts.

## **Participating Baseline Future “Inputs”**

Of all six domains, Participating probably has the most uncertain future. In exploring for the baseline it was on the one hand fairly easy to find evidence of emerging movements to challenge the status quo. On the other hand it was just as easy to find evidence that little significant change is actually taking place and the resistance to change on the governance side is alive and well. While formal participation goes down, informal participation through single-issue politics, activism, and a key theme, hacktivism, goes up.

### **Trends**

#### Activism

- Paul Hawken’s *Blessed Unrest* research suggests a massive growth in social movements happening below the radar steadily growing and already more than 100 million people.<sup>421</sup>
- Volunteering has remained steady at roughly a quarter of the population volunteering annually over the last ten years.<sup>422</sup>
- There is growth in e-government services.<sup>423</sup>
- Youth awareness and activism campaigns are sprouting up nationally.<sup>424</sup>
- More young adults are actively supporting causes through participation in rallies, boycotts, and group events.<sup>425</sup>
- Neighborhood activism is increasingly seen as a way to promote change in local communities, and recent research finds it is an increasingly important form of activism.<sup>426</sup>
- The Occupy Wall Street movement starting in New York City’s Zuccotti Park spread to over 951 cities across 82 countries, and over 600 communities in the United States.<sup>427</sup>
- There is an increase in “hacktivism,” using IT tools and prowess to expose and intervene in governance.
  - The Obama administration created an open government initiative, Data.gov, which has almost half-a-million raw and geospatial data sets about everything from coal production to broadband Internet penetration that citizens can use for research or developing apps or visualizations<sup>428</sup>
  - Citizens emerging are increasingly turning networking and civic hacktivism to put pressure on government.<sup>429</sup>
- Civic hacking’s public “takedowns” is creating some fear that anyone could be a threat, not just the celebrity hackers.
- Digital activism is on the rise but some think it may deter from real change agents.<sup>430</sup>
- The growing, but piecemeal emergence of platforms being developed by activists for decoding legislation are enabling citizens to better understand legislation.<sup>431 432</sup>
- Activists are increasingly tapping into some of the massive amounts of freely available government data to develop online tools to alert, educate and disseminate information to the public<sup>433</sup>

- The proliferation of big data is providing more opportunities to hack. The era of Big Data is emerging (6 petabytes a year on our mobile networks alone, one petabyte equaling one billion gigabytes).<sup>434</sup>
- Social networking is providing a means to increase and more effectively coordinate activism.
  - More people are engaging in civic activities online.<sup>435</sup>
  - Governments and civic services are seeing that social media can be used to educate youth on issues such as presidential elections and other civic duties.<sup>436 437</sup>
  - Numerous startup accelerators are helping to create new social networking apps to promote engagement.<sup>438</sup>
  - Social media is being seen as a way to create both local and global action for change in youth culture.<sup>439</sup>
  - Interaction amongst youths is being increased via social media.<sup>440</sup>
- Growth in the maker movement is encouraging some to play a more active role in their economic lives.
  - The Maker Movement is an evolution of millions of people who are taking big risks to start their own small businesses dedicated to creating and selling self-made products – directly participating in the economy.<sup>441</sup>



## Governance

- There has been decreasing participation in formal political activities such as joining political parties and voting.

- Voting has stayed steady or has seen small declines throughout years.<sup>442</sup>
- Government services are increasingly being digitized.
  - Increasing demand by the public for digital interconnectedness.<sup>443 444</sup>
  - Government, federal and local, are increasingly using Internet and social media for fundraising, engaging and interacting with the public, organizing and mobilizing supporters, gathering voter data, reaching the youth vote, and disseminating information.<sup>445</sup>
  - “Leading-edge” cities and municipalities are increasingly using technology to inform citizens and encourage interaction.<sup>446</sup>
  - The federal government is increasing its digital presence and interaction with public.<sup>447</sup>
- Government funding woes are continuing and leading to continuous pressure to cut costs and reduce services.
  - Governments need to deal with doing ‘more for less.’<sup>448</sup>
  - States are increasingly cutting back services to citizens.<sup>449</sup>
  - Cities continue to cut spending on infrastructure and key services, and reduce personnel.<sup>450</sup>
- Government is increasingly using big data.
  - Big data seen as a way to track traffic, library, and other city services to aid in operations and communication such as Chicago’s Smart City.<sup>451</sup>
  - City apps are allowing government and civilians to create their data.<sup>452</sup>
- Governments increasingly struggle with citizen reaction against perceived attempts to have their information used against them.
  - Governments are increasingly equipped to snoop into every detail of our lives via big data.<sup>453</sup>
  - Governments are using data from sites such as Facebook to the possible detriment to the public at large.<sup>454 455</sup>
  - Young people viewed the NSA leak by Edward Snowden as the serving public interest.<sup>456</sup>
  - Concerns about privacy and the future of big data are seen as a negative.<sup>457 458</sup>

## Plans

- There are dozens, if not hundreds of city/community/urban planning visioning movement, along the lines of Vision 2020 and Vision 2025 projects.
- There are many initiatives underway to increase the voice of citizens in government:
  - City of Detroit’s strategic plan to for building civic culture.<sup>459</sup>
  - Artistic way to boost civic engagement.<sup>460</sup>
  - EPA has a college plan to increase sustainability.<sup>461</sup>
  - New York City’s public initiative to volunteering youths.<sup>462</sup>
  - White House awarding civic hacktivists, Kennedy bill Funding (private and crowd-sourced) for civic activities – Knight’s Foundation, neighborly.<sup>463 464</sup>

## Projections

- Within the next 5-10 years, there will be an erosion of privacy via big data.<sup>465</sup>
- Activism points to a more collaborative and participatory approach by citizens in the delivery of public services in 2020. Crowd-sourced solutions may fill the gap previously served by government, making the government appear as inefficient and ineffective.<sup>466</sup>
- The Institute for the Future created Citizens Make the Future, a map to help frame the national conversation around the next decade's most significant opportunities and challenges in civic governance. The map poses five futures—better governance, more resilient communities, a stronger economy, a more creative society, and healthier neighborhoods.<sup>467</sup>

### **Participating Baseline Future Summary: “Hacker Nation”**

An influential “hactivist” movement that promotes greater transparency of government emerges in opposition to “the system.”

#### **Abstract**

Governments weakened by ongoing funding woes are increasingly viewed as ineffective, unresponsive, and unable to keep pace with changing times. Hacktivists are symbolic of a larger grassroots social movement on the part of citizens to take a more active role in how their lives and communities are governed. While most is well-intentioned, there are abuses of this power as well, with some creating shadow networks, selling their skills to the highest bidder, and sometimes breaking laws and causing chaos. The mainstream is mostly apathetic and a bit wary of this increasingly powerful movement, but is perhaps even more distrustful of government.

#### **Key drivers**

Activism slowly rising, fueled by:

- Growing capabilities in hacking
- Growing availability of information enabled by Big Data
- Growth of social networks to coordinate larger-scale action
- Growth of maker movements fueling a do-it-yourself ethos
- Less trust and faith in government
- An “us-versus-them” ethos characterizes civic engagement

### **Participating Baseline Future Narrative: “Hacker Nation”**

*Alongside the long-term trend of weakening participation in the formal political process, there are several trends at the grassroots level gaining momentum that are shifting the future of the civic landscape. Inability to resolve government funding issues has led to a future where cost-cutting and cutbacks are increasingly viewed as the norm. While most people simply attempt to make do, a growing minority of so-called hactivists (an amalgam of hackers, social activists, makers, and social networkers) are taking matters into their own hands.*



It's not surprising that the Hacker Nation emerged alongside the movement where people share ideas, tools, expertise, and other resources in order to create and innovate and "make." The Hacker Nation is the pinnacle of a hacktivist-led (re)programming and repurposing of technology to better suit their needs. They have redirected their skills in manipulating data, information, and knowledge to raise awareness and mobilize an increasing numbers of citizens to take a more active role in shaping their fate.

A key hacktivist target is the desire for greater transparency of government operations. Governments tend to respond piecemeal, typically resisting until the pressure becomes too great, which reinforces the pressure and sets up an "us-versus-them" battle. It is increasingly becoming a no-win situation, since when a government entity responds by "cracking down," they simply end up pushing more of the mainstream into the hacktivist camp.

Hacktivism becomes more and more popular with the people each time their actions bypass the normal government bureaucracy. By working in collaboration, they are able to create a fix to problems that affect their communities, often less expensively and more efficiently than the government. They influence elections and political campaigns. For instance, they provide information on who is funding candidates as well as exposing secrets that politicians may not want to come to light. In more extreme cases, they enlist those who are sick of the government and help them remain off the government's radar by setting up proxy server networks to help them avoid the government.

The recruiting ground for hacktivists is further enabled by growing reliance on technology. Smart homes, with fully-integrated, interconnected, wireless, digital technology accessible from every room are increasingly common. Young people growing up in these environments know how to "LifeHack" technology to fit their needs at an early age. Simple hacking skills are a necessity. Schools begin teaching computer literacy, and even programming, at much earlier ages. The rapid advancement of information technology gives rise to cyber-savvy, tech-elites that understand and can manipulate the technology. Waning budgets have left the government unable to keep pace with the technological challenges and it has become ill-equipped to keep up.

The more governments resist, the stronger the hacktivist movement and their push for transparency grows. Extreme hackers shut down numerous cities and threaten to expose secrets and leak security codes unless their demands are met. Cyber-vigilantes begin exposing criminal activities which might have otherwise gone unpunished. For example, they use drone technology to expose perceived malfeasance or actual crimes.

The state of play at the turn of the quarter-century is an increasingly powerful hacktivist movement that has enjoyed some success in making government more transparent and responsive to its citizenry. But its sometimes questionable means have held it back in terms of mainstream acceptance, as people's dissatisfaction with government is in effect balanced by its fear of what unrestrained hacktivists might do, despite the fact that the vast bulk of the movement is operating in what most would consider a reasonable manner.



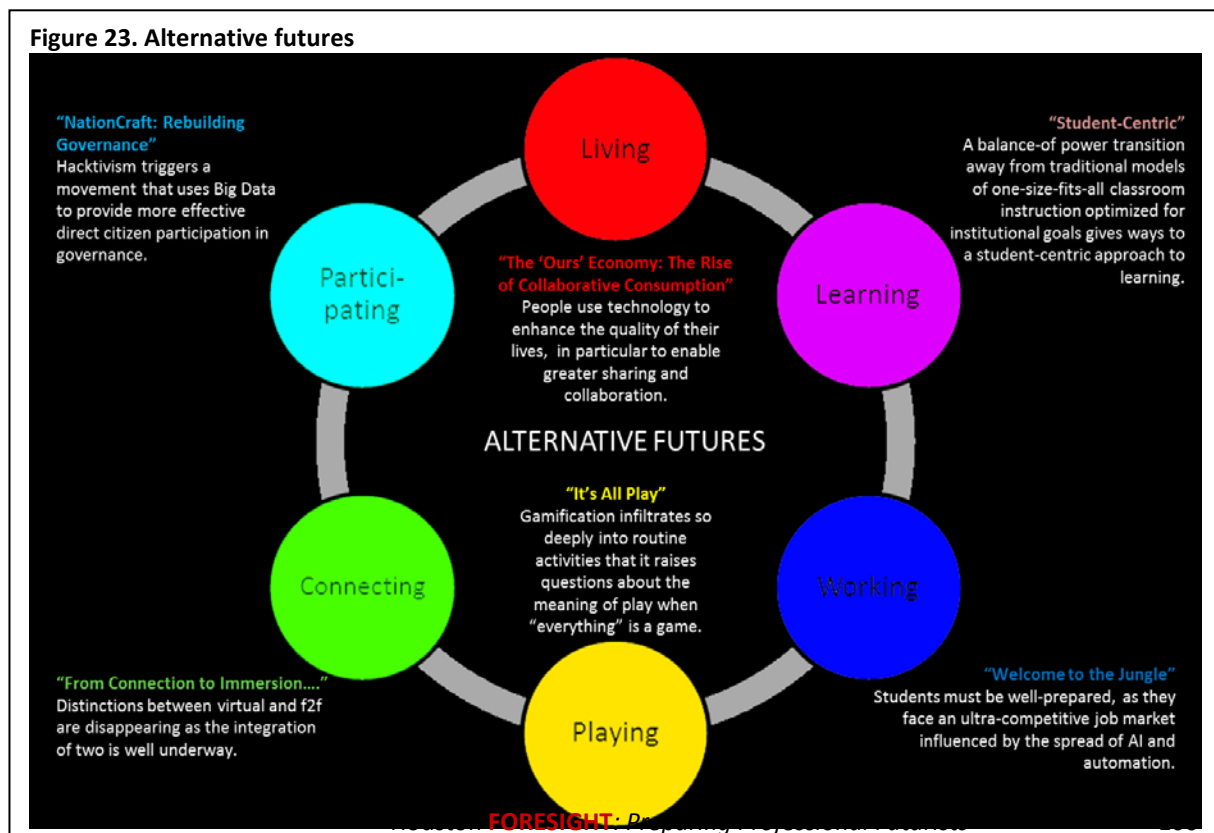
As one might expect in a stalemate, there are pockets of excellence (and failure) that portend hopeful possibilities. For instance, in some communities suffering from lack of government help, hacktivists have taken it upon themselves to mobilize support and help provide the needed services. Volunteer armies have mobilized to kick start do-it-yourself civic engagement projects that have reinvigorated dying communities. They have not reached critical mass....yet.

## Chapter 5. Alternative Futures

The alternative future forecast explores what might happen if – or one might say when – the baseline breaks down or is disrupted. To manage the complexity of six domains, teams looked at potential alternative future themes, but were asked to settle on one. To identify these alternative possibilities, the teams reviewed the baseline and looked for ways it could be disrupted, using several categories of concepts to stimulate these ideas. Thus, each of the six domains is described first by a table of “inputs” about its future:

- *Trend breaks*: Trends that go on for a while, but then they may stop or go in the opposite direction.
- *Events*: Expected or unexpected events and wildcards that would disrupt, change, and potentially end the current era.
- *Issues*: Issues that are currently being discussed and those that could become important (emerging) along with the various ways they could be resolved and the implications of each of those ways. *Ideas*: People and their ideas that present a new or insightful look at the domain, particularly about its structure, types and rates of change and plausible futures.
- *Key Uncertainties*: The quantities, potential events, issues and ideas that would have the greatest impact on the future, yet which are least predictable (i.e. most uncertain).

The alternative future is then summarized in a brief template (title, abstract, and key differences from baseline) and is followed by a narrative describing its future. The six alternative futures are briefly summarized in Figure 23 below.



## Living Alternative Future “Inputs”

Convenience was a key theme of the baseline future, in particular the use of technology to help students navigate through a complex environment filled with choices and options. We explored several ways that this baseline might be sidetracked, including less reliance on technology, but ultimately concluded that the momentum being generated by big data, AI, analytics, sensors, wearables, and the like, suggested an acceleration in their use was more likely than a reversal. Some challenging circumstances, such as the “popping” of the student debt bubble, a stalled move to universal health care, or even a double-dip recession, actually drive further use of technology, for instance, accelerating peer-to-peer collaboration. This notion of sharing fits with values shifts away from material goods accumulation and ownership, and a preference for interesting experiences and relationships. In effect, if or when existing systems cannot meet student needs, they increasingly turn to one another and their networks – fueled by technology. The net result is that students are part of the emergence of a sharing or collaboration economy.

### Trend breaks

- *People start buying more at brick and mortar stores again.* People enjoy the personal and intimate experience.<sup>468</sup>
- *Fast food consumption declines.* People find other ways, such as shared meals to provide the efficiency without the fast food model.<sup>469</sup>
- *“Sometimes it’s the journey.”* There could be a counter-trend to convenience. There is more perceived value in working hard rather than simply take a pill to lose weight, for example.<sup>470</sup>
- *Obesity rates reverse.* It is easier to monitor caloric intake with wearable technologies, and because of the focus on healthy eating and activity.<sup>471</sup>
- *Antibacterial backlash.* Mounting evidence that the germ-killing sanitizing fetish of the developed world may actually make us sick. In fact, exposure to less than pristine environments might be good for well-being.<sup>472</sup>
- *Living space requirements decrease.* Group housing and/or smaller home increase.<sup>473</sup> The size of households shrinks as the cost of housing increases.<sup>474</sup>
- *Shift to a renter, rather than homeowner, society.* The rental market is primed for a boom, unlike the owner-occupied housing market.<sup>475</sup>

### Unfulfilled plans

- People may not want more digitization or technology controlling their lives and may start to push back.<sup>476</sup>
- Universal healthcare may not be fully implemented.<sup>477</sup> This in turn could lead to people taking greater personal control over their health.
- Online-only brands may not have the appeal they were intended to have, perhaps creating a backlash against strategies to bifurcate consumers.<sup>478</sup>

- Amazon’s “targeting [of] one of the largest retail sectors yet to be upended by e-commerce,” groceries, could be a bust.<sup>479</sup> Nevertheless, someone else might “crack the nut.”

## Events

- The collapse of the student loan bubble.<sup>480</sup>
- Government starts regulating food consumption to alleviate health care costs.<sup>481</sup>
- Major illness or disease causes widespread illness/death and provokes a move to get serious about wellness.<sup>482</sup>
- Drastic changes in eating preferences because of problems as well as awareness of limited resources.
- Converging of robots and humans, as robots “defeat” each new attempt at a Turing Test,<sup>483</sup> while human increasingly incorporate smart prosthetics and implants into their bodies.
- Advances in pharmaceuticals periodically unveil a magic weight loss pills or food,<sup>484</sup> or potential breakthroughs enabling greater human performance.
- Anti-biotic resistant strains and superbugs run amok. Common illnesses are untreatable, often fatal and unpreventable, which spurs more attention to wellness to make one more able to resist.<sup>485</sup>
- Another housing bubble drives people away from home ownership and less investment in housing.

## Issues

- How will desire for greater access to information balance with individual privacy rights as regards personal information, listening, access, and data?<sup>486</sup>
- How will limited health care funds be allocated?<sup>487</sup>
- How will the needs of elderly be balanced with younger people and the need for growth?<sup>488</sup>
- How will the role of GMO’s in the food chain play out?<sup>489</sup>
- How will decision-making evolve? Will there be increasingly reliance on group decisions or AI entities?<sup>490</sup>
- How will global climate change influence daily life?<sup>491</sup>

## Ideas

- There could be a move to a much greater use of sharing resources.<sup>492</sup>
- Values trends suggest a greater focus on experiences rather than material goods consumption.<sup>493</sup>
- The potential for life extension could be undermined by less healthy lifestyles.<sup>494</sup>
- The expectation of living better than one’s parents is not necessarily holding true.
- Solar-powered apparel could reduce dependence on the grid, creating a personal source

of power for individuals.<sup>495</sup>

### Key uncertainties

- How far will the shift from ownership to sharing go?
- Will growing reliance on technology really improve decision-making and quality of life for students?<sup>496 497</sup>

### **Living Alternative Future Summary: “The ‘Ours’ Economy: The Rise of Collaborative Consumption”**

People use technology to enhance the quality of their lives, in particular to enable greater sharing and collaboration, such as forming communities to address their needs, sharing living spaces, finding group investment opportunities, and sharing consumer products.

#### **Abstract**

The use of technology makes a step change from being primarily a tool for convenience to enhancing one’s life – from easier to better. Some of this reliance arises from necessity as the college loan bubble bursts. The collapse of the senior housing market was in part a drive by the economy and in part by granny-tech: using technology to collaborate and avoid institutionalization.

People form communities to address their needs, ranging from shared living spaces, investment opportunities, and consumer products. Sharing of physical objects and material goods aligns well with an environment of more limited resources, increased focus on experiences, and an increasingly urban population. This so-called “Ours Economy” quickly gains ground, supported by new apps / technology, which shows how college students can group together to save money and reduce their debt burden and “boot strap” their lives. The “Ours Economy” becomes the norm, and those not in it by necessity join because it aligns with evolving values that propel the individual away from mere consumption and toward consumer experience.

#### **Key differences from baseline**

- Students’ use of technology goes beyond simply making their lives more convenient to more sophisticated uses, such as monitoring and improving their health.
- Sharing becomes a much more prevalent vis-à-vis ownership, enabled by sophisticated technologies for peer-to-peer approaches.
- Values shifts that put more emphasis on experiences and relationships and way from accumulating goods and ownership.
- Constant news on climate change and the environment have made students more aware of how precious some of our resources are and encourages a more proactive approach to sustainability

## **Living Alternative Future Narrative: “The ‘Ours’ Economy: The Rise of Collaborative Consumption”**

*The weak signals of a shift toward a collaborative economy have been abundant. Dozens of themes for the new economy and lifestyle have been proposed. At the heart of the shift are a search for new mechanisms of creating, measuring, and distributing value.*

How did we get here? First was the collapse of the student loan bubble putting pressure on education costs. At the same time consumer values shifted towards a greater emphasis on experiences and relationships, which became more valuable than “how many toys you own.” The final piece of the puzzle was the continuing bad news on climate change and pressure on resources. Put all this together, and student life in 2025 is characterized by using technology to enable informal, peer-to-peer economic networks for keeping track of the exchange of goods and services to minimize consumption.

Individuals, especially the Millennials, recognize that they can find energy, creativity, and a healthier, more abundant life if resources are pooled for common interests and purchases. Student focus is on the different communities they join and a bit less on their individual needs. They are used to being in many groups, having identified common interests in social media, getting funding for start-ups through various groups, and even sharing their reading lists. So, it is an easy to move this sharing into the physical world. Sharing also aligns with value systems that favor experiences and relationships over materialism and owning things. The more practical types note that since there are always new products being developed there is not a lot of advantage in being heavily invested in owning products that age quickly.

Housing or living accommodation space is no longer growing. People have less space so they share to have access to more space. Shared living accommodations with people with common interests provides an opportunity for friendship, shared expenses, shared used of resources, and shared common space. Networks allow them to borrow those appliances or tools that they need occasionally. And cooperatives provide a great way to acquire either cooked food or fresh food from the local producers.

Populations are increasingly urban, which makes it both easier and more necessary to share both living and storage spaces. For example, in this more urban setting, cars are often not needed, so they are rented by the day or hour. Thrift stores provide an easy way to vary wardrobes – trading in clothes one no longer wears for something new and different.

Technology has been a big enabler of the modern day household. So much of people lives are informed by technology that they don’t fully appreciate the level and subtle influence in all of their decision processes. By knowing their users as well (or even better!) than they do themselves, technology is able to recognize and recommend different communities and help people find where they best belong. Individuals thus rely on technology to help them make decisions. Students are constantly using apps and searches to find what they need and what

they should be doing that they rarely challenge the answers. Less actual choices about things in many areas are the reality in cases where services providers push or nudge users toward options that are in their best interest.

Some say the “real” currency of America in 2025 is one’s reputation or ratings in various social media. Students literally thrive on how many “likes” and how many friends and endorsements are collected on social media; living arrangements, dining options and access to goods can depend on a positive reputation. Meanwhile, companies use this influence and information to create reinforcing loops that encourage specific behaviors and purchases.<sup>498</sup> Since social media is about sharing and everyone rising together, it is sometimes criticized for creating new and different types of “divides.” Unfortunately, the “Ours” economy has a growing shadow of “Theirs” which reveals the importance of conformity to successful collaborative living. These dynamics will continue to evolve beyond 2025 as a formerly individualistic “Mine” culture transforms into “Ours.”

**Potential Alternative: Who’s Really in Charge?**

So much of daily life is informed by our technology that people don’t realize it has subtly taken over decision process by limiting information and distorting reality. Individuals become so dependent on technology for helping the make decisions -- constantly using apps and searches to find what they need and what they should be doing that they no longer wonder if it is even the best answer.

Different providers and corporations have extended their reach with money and with the knowledge gained from data analytics and use that to influence how people feel and what they do. The result is a future of less actual choices about things in many areas because people are “nudged” by their devices and info providers, without realizing it’s happening.



## **Learning Alternative Future “Inputs”**

The two key drivers of the Learning baseline: “resistance to change in the higher education environment weakens” and “pressure by learners for needs satisfaction increases” break from an incremental pace and shift into high gear. Students and new players put pressure on the existing education system by providing visible examples of how learning can be student-directed and deliver the needed competencies. As students’ sense of their needs expands beyond just learning, some new players make inroads by meeting non-learning or support-type needs. Social networks spread “success stories” and institutions have to respond. For some institutions, it’s not a problem as there are progressive ones out there already. For others, well...The holdouts had hoped that some of the new developments would fade over time, and were secretly happy when the edtech bubble burst. Even a recession, which typically drove higher enrollment, has the opposite effect as students look to alternatives here as well. The momentum to student-centered learning proves too strong to stop.

### **Trend breaks**

- The paradox of optimistic-complacency about their local schools and pessimistic-criticism about education in general breaks as young learners push the traditional education system to adopt student-centric approaches and technologies.
  - Most adults feel their local school is doing well but the nation as a whole is doing poorly.<sup>499</sup> This is not possible as more than half the schools must be underperforming if the whole nation is doing poorly.<sup>500</sup> Yet, this dual-belief leads to a form of optimistic-complacency, as most adults do little to really drive educational reform because of comfort that their local school is “okay.”
- The do-it-yourself movement cuts into university revenue by taking traditionally held research posts and laboratory roles away from those institutions.<sup>501</sup> DIY businesses obtain both credibility and credentialing capability.<sup>502</sup>
- Venture capitalist funding in education “bubbles” after explosive growth, but entrepreneurs and investors “learn their lessons” and the post-bubble startup success rates are much higher, and perhaps more importantly, more scale-able.
- MOOCs shift from an afterthought to a fairly routine offering in terms of providing introductory-level learning.
- Online learning survives a mini-backlash and integrates into curricula that routinely offer f2f, online, and hybrid options.

### **Unfulfilled plans**

- The educational system in general (public and private) focuses on a computer-based model of learning that gives way to new in-situ learning models of a generation brought up on augmented reality technologies such as Google glass.<sup>503</sup>
- Could the MOOC-ification of the higher learning sidetrack? NPR said “2013 might be dubbed the year that online education fell back to earth. Faculty at several institutions

rebelled against the rapid expansion of online learning...” And, because students were disillusioned by the absence of human connection, big MOOC providers like Udacity and Coursera are responding with social media and human-centric support. If these fixes do not engage effectively, the MOOC might become irrelevant.<sup>504</sup>

## Events

- Efforts to stimulate the adoption of edtech proliferate. For example, for each purchase of Glass, Google gives one away to middle schools.<sup>505</sup>
- The Internet goes down for long periods of time, and schools can no longer function because of reliance on online cloud-based materials -- due to climate change or hackers -- which in turn leads to massive investment in backup and redundancy.<sup>506</sup>
- A major data breach of cloud-based student data causes widespread distrust and flight from traditional education systems, which forces them to “get with the program....or die.”<sup>507 508</sup>
- Economic recession or even collapse occurs and funding is drastically cut for schools, putting further pressure on them to update their approach. Schooling is funded only for primary schools (mostly for their custodial function, so the children’s parents can go to work).<sup>509</sup>
- A Census report reveals that fertility rates have plummeted and there will be far fewer children left to educate. In response, the system weeds out the “weakling” institutions.<sup>510</sup>
- Biotechnology and neuroscience advance dramatically, which makes learning easier through the use of drugs or devices.
- Homeschoolers, unschoolers, and homeschoolers increase, creating a tipping point of declining enrollments in the system, which spurs a national initiative to respond.<sup>511</sup>

## Issues

- Perhaps the key issue that emerges is a heightened debate on the purpose of higher education. Is it to prepare for the next step of life? To build a functional society? To impart a love of learning? Or to simply get a job?<sup>512</sup>
- Will professors/teachers play the role of experts or become mentors -- more equal explorers or guides with students?<sup>513 514</sup>
- Will schools expand their focus to include more emphasis on life skills, such as social skills or social emotional learning?<sup>515</sup>
- Will students work more on relevant real-time projects, or is this too close to the description of a job?<sup>516</sup>
- Will values be taught to a greater extent? If so, what values?<sup>517</sup>
- What should the balance be between freedom and equity in regards to customization and standards?<sup>518</sup>
- How should students be assessed in a way that is fair to them as well as to potential employers?

## Ideas

- Watson & SIRI now educate your child from infancy using Google Glass and immersive technology. The next generation of learner is raised on in-situ learning with Watson-type AI always-on tutor.<sup>519</sup>
- Schools expand to include the whole community. For example, couples who are thinking of having a baby are supposed to start attending classes before they conceive.<sup>520</sup>
- Schools are reformatted as simulation centers, a place for interactive learning. Teachers are replaced by user interfaces.
- An OECD study offers six scenarios<sup>521</sup>:
  - Attempting to Maintain Status Quo
    - 1: Bureaucratic School Systems
    - 2: Teacher Exodus
  - Re-Schooling 1: Schools as Core Social Centers
  - Re-Schooling 2: Schools as Focused Learning Organizations
  - De-Schooling 1: Learning Networks and the Network Society
  - De-Schooling 2: Extending the Market Model

## Key uncertainties

- How does the debate about the purposes of higher learning play out?
- How will higher education respond to increasing pressure to satisfy learner needs instead of their institutional outcomes?
- How does the relationship between informal and formal learning play out?

### **Learning Alternative Future Summary: “Student-Centric”**

A balance-of power transition away from traditional models of one-size-fits-all classroom instruction optimized for institutional goals gives ways to a student-centric approach to learning.

#### **Abstract**

The always-connected wired-generation of learners pushes the rapid transformation of higher education by 2025. Student needs begin to converge as there is greater flexibility for all to tailor their educational experience. The educational environment shifts away from a focus on institutional outcomes to a focus on satisfying learner needs as constraints on domain content and learning modalities are lifted to allow for more individualized approaches to education.

#### **Key differences from baseline**

A move to designer education models enabled by key drivers resulting in big shifts.

Key drivers

- Expectations of “wired generation”
- Do-it-yourself movement
- Ubiquitous immersive technologies & artificial intelligence led by Google Glass and Watson

## Shifts

- Rapid progress on the shift from institutional outcomes to satisfying learner needs
- Rapid progress on the shift toward blending of learner approaches such as individualization and meaning

### **Learning Alternative Future Narrative: “Student-Centric”**

*Two main shifts, that affect all student types heading into 2025, are happening in the learner environment in which they satisfy their needs. The first shift is a movement from focus on institutional outcomes (protecting their own interests) as the goal of the educational system toward more focus on satisfying the actual learners’ needs. The second shift is a movement of Traditional and First Generation students toward more varied learning opportunities of choice (as opposed to constrained domain options) similar to Adult and Independent learner types.*

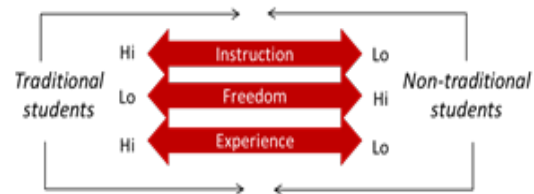
#### Revolutionary change in 2025 as both shifts accelerated rapidly

Universities have always led the way on meaningful experiences for students (sororities, clubs, athletics, social gatherings, etc.), and the future is no different in that regard. The same remarkable extra-curricular activities and social atmosphere once the exclusive domain of traditional students are now opening to all types of students – at least ones who want it. Accessibility to varied coursework for learners of all types is also at an all-time high thanks to a generation raised on Google Glass and Watson-type AI.

To satisfy their new needs and values, students are cobbling together their own higher education experience; some participate in the still top-down approach of traditional universities; others pick and choose; and some leave institutions altogether. Increasingly students can find courses in various delivery modalities to fit their preference. Gone are the days of sitting in a large lecture hall for hours on end. In fact the lecture hall has been refitted into collaborative spaces for students to engage with other faculty and each other. Greater transparency and availability of big data provide rich material around which to collaborate. Universities have increased the number of hands-on atmospheres for physical application, job training, and experiential based learning.

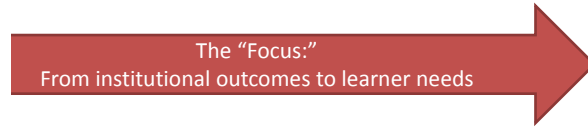
**Figure 24. The 1<sup>st</sup> shift: Converging opportunities**

The opportunities for traditional and non-traditional students increasingly converge in the future.



**Figure 25. The 2<sup>nd</sup> shift: New focus**

The opportunities for traditional and non-traditional students increasingly converge in the future.



Degree plans can be modified to a large extent, allowing for unique combinations of coursework, internship, and application. This flexibility in program design and mentorship for hands-on exploration can keep costs high. Even online students will find that government regulatory frameworks have made the cost of accreditation and credentialing excessive for providers, costs that ultimately the student must bear. Thus, affordability of a quality education can still be out of reach for many students. The challenge then becomes one of optimizing choices for one's needs whether practical, financial or personal, and the availability of "knowledge navigators" to help students through the plethora of options.

The plethora of choices can be overwhelming for the uninitiated, but non-traditional students will be delighted because they will find solutions previously unavailable. Internships are no longer just for summer as more and more learners are working adults engaged in keeping skills current. The separation between academic learning and workplace learning has begun to blur. There is growing social acceptance for an expanded mission that goes beyond just cognitive skill building to include social skill building, as well as acceptance of skill and character building as equal priorities. Learners find plenty of lab spaces unaffiliated with any specific university thanks to the Do-It-Yourself movement. Here a learner can find a space to conduct research, to test new skills, or find a mentor knowledgeable in the domain. Some DIY locations have reputations exceeding those of Ivy League institutions.

In a sense, the pieces are in place for a total revolution in designer education to completely meet the needs of learners but a plan and its execution are still missing. For instance, the funding situation has improved, but inequality persists, and the public seems increasingly intolerant of it. And looming over the near-term horizon are issues around neuroscience developments (drugs and devices) that have moved from science fiction to practical matters for consideration.

## Working Alternative Future “Inputs”

The Working baseline saw competition for jobs along the lines of today. It may have been called the gathering of the storm. Automation makes inroads, but is largely replacing routine jobs that no one is overly agitated about. Thus, the storm gathers quietly.

In this alternative, the storm strikes. Automation has made deep inroads into the economy. Alas, the first wave is likely to be implemented with an “old economy” mindset, which is the challenging part of this scenario within the 2025 timeframe. It’s bad news in the sense of not generating and providing jobs -- particularly full-time jobs. It’s good news in the sense that economic output is up, it’s more productive, and more wealth is being generated. The issue is how to distribute that wealth, when fewer people have jobs, or if you will, fewer people need jobs. These issues are unlikely to be solved within the 2025 timeframe, so the narrative describes a jungle. But for students, jungles might be seen as interesting, especially if they are not freaked out by the challenging job market because they can get by.

### Trend breaks

- *Automation and AI replace more work than expected.* Intuitive functions are all around us. Software is designed to replicate those functions, and is used to replace some of the work that humans are doing. Watson won at Jeopardy long ago, but it took a while to develop more affordable versions able to contribute to the workforce in 2025.<sup>522 523 524</sup>
- *Data-driven hiring “arms race.”* Using big data analytics for hiring runs into snags as people learn how to manipulate it. HR departments revert back to incorporating more human methods along with big data support. Any system can be gamed, and people will have a very good incentive to figure out ways to game this one (witness the explosion in the college entrance exam test-prep business, and subsequent plans to reform the SAT by the College Board).<sup>525</sup>
- *Privacy concern “outbreaks.”* Publicly-accessible social media systems suffer peaks and valleys because of privacy concerns, but still grow overall.
- *Competition stiffens.* The competition for middle-class jobs is much more severe than expected. Real wages for the third and fourth quintiles actually begin to drop, rather than simply stagnating. This trend *could* go the other way, though, depending on the balance of skill-levels in the labor market and the value of labor vs. capital.
- *Full-time a challenge.* Government policies increase the burden of hiring/firing workers (amplifying the trend of increasing independent and part-time employment). Current trends towards increasing part-time and gig-work jobs are caused by companies having the trend. The impact of either trend break would likely be minor, though.

- *Get 'em young.* Businesses, worried by the lack of action on the part of universities to improve the skill-levels of recent graduates,<sup>526</sup> reach out to more students at younger ages to guide them in their career choices and skill development. A current example is a special 6-year high school guaranteeing jobs at IBM for graduates and other programs that train students for specific jobs.<sup>527</sup> This practice could spread widely as more companies and business associations start to get nervous about their supply of talent.
- *Are degrees worth it?* Students (and their parents) begin to regard university degrees as risky commodities rather than mandatory -- handy to have, but not necessarily worth the price -- and they become more knowledgeable and discriminating about which majors and which skills lead to good jobs. The debate over whether a college degree is "worth it" is already happening.<sup>528</sup> It is a weak signal at the moment, but if current trends continue, this kind of attitude will be a natural outcome.

### Unfulfilled plans

The baseline does not include a lot of planning. Trends are in motion without much serious forethought for the long-term outcomes. Below are some possibilities that might emerge, but none are likely to derail the baseline momentum:

- Failure to reform the immigration process.
- "Reshoring" proves to be nominal, at best.
- Next-shoring proves uneconomical.
- AI & robotics hits diminishing returns; Moore's Law breaks down as higher-performance circuits become too small to manufacture reliably (unlikely on this time horizon).

### Events

- Google releases GoogleMed, a sophisticated medical diagnostic service utilizing advanced AI that physicians and patients can access on mobile devices.
- McDonald's announces plans to implement automated cooking equipment in high-volume franchises.
- Driverless cars have been approved for personal and commercial use by 37 state Departments of Motor Vehicles; the 13 others are in the process of granting similar approvals.<sup>529</sup>

### Issues

- What should govern the decisions students make regarding what to study? Interests? Talents? Profitability? Random chance?
- How does society deal with the workers displaced by automation?
- How much information are people willing to share with their employers or prospective employers? And how much control will they have over that?
- What skills are needed to take advantage of automation and AI, and what are the most effective means to train those skills?



- How much do employers need to intervene in the educational pipeline to ensure sufficient trained workers?
- How do higher ed institutions need to change to effectively give students the skills they need for employment?
- How do students market themselves online and in person in a rapidly changing information environment?

## Ideas

- *The golden ring.* It becomes increasingly difficult to know if that degree/certificate/internship/job that will (fingers crossed) get one on the path to prosperity.
- *The helping hand.* The emergence of industry reps emerge whose job it is to find promising students and steer them towards the training courses that will provide them with the skills their employer needs.
- *The Internet-as-sargasso-sea.* Nothing ever leaves; if anything is put on the web, it's permanently available, quite possibly to one's career's detriment.
- *The perpetual sell.* Every student has in mind the fact that they need to be able to sell themselves to employers – their online persona, their skills, their resume, their personal presence; everything needs to be tailored to getting their career started. What's more, they need to always be able to do the same thing again, should things change and the need arise.

## Key uncertainties

- Will the middle class rebound or further decline?
- How deep will the substitution of labor by automation and AI go?
- Will businesses take a more active role in ensuring a ready supply of talent?

### **Working Alternative Future Summary: "Welcome to the Jungle"**

Students must be well-prepared, as they face an ultra-competitive job market influenced by the spread of AI and automation.

#### **Abstract**

The decisions that students make regarding their education and career have become (metaphorically) life-or-death. The labor market has become ultra-competitive thanks to increasingly intense and widespread automation and AI in the workplace. Workers (and the students who are going to enter the labor market) must not only prove that they have the skills necessary to compete, but the ability to adapt to a rapidly changing environment. Students will need better coaching on what decisions to make and better preparation for the hyper-competitive jungle that the job market has become.

#### **Key differences from baseline**

- Higher AI/robotic capabilities, more flux in the technological skills needed to compete in

the workplace.

- Further weakening of the middle class.
- Highly active business presence in the talent pipeline.
- Increased importance of non-traditional higher education approaches

### **Working Alternative Future Narrative: “Welcome to the Jungle”**

*Students in 2025 are faced with a difficult set of choices after high school – whether to continue their education and, if they do, what to study, where and how to study it, what to do with the skills and knowledge they get, and how to get – or create – a job that uses what they’ve learned.*

The financial picture is clear: college diplomas are still a net gain in *average* lifetime earnings, but that average disguises the increasing gulf in outcomes between different fields and different levels of preparation. For many students the price of college is not worth the mere *possibility* of a good-paying job, especially when compared to a number of other avenues that have opened up.

The importance of choosing wisely has become vital, as the American middle class struggles. While the income of the top quintile leapt forward in the past decade, the second, third, and fourth are stagnating and in some cases dropping. (The net wages for the bottom quintile have actually gone up, thanks to government benefits and an increased minimum wage). Picking the right school, the right subject to study, finding the internships that will get one that entry-level job in their field, or having the chops and connections to set oneself up with their own business — every decision carries an enormous amount of risk and weight. Students are fighting tooth-and-nail for jobs, because... well, it’s a jungle out there.

#### Stronger, faster, smarter...

Automation and AI have severely disrupted the labor market. Some jobs are disappearing (taxi drivers and chauffeurs, for instance, are becoming rarer and rarer thanks to fleets of self-driving cars-for-hire), while others have been transformed. Diagnostic software now outperforms even the best clinical diagnosticians, so the emphasis in medical education is increasingly on training doctors to ask the right questions, interpret the diagnoses, and manage the care, rather than memorizing vast lists of symptoms of rare diseases. Similar tools are transforming many other jobs and professions. Simply mastering a vast store of arcana is no longer necessary or sufficient in many fields that we once thought of as too complex to be computerized.

Manufacturing has become divided between artisan crafts (things made exclusively by people, with price tags to match) and mass-produced goods made by robots. There is not much of a middle ground anymore. And technology continues to improve, creating a large amount of uncertainty about which professions are going to be squeezed next.

But one thing that has become clear is that the people who manage the robots and AIs, who provide them with information and instruction and make sure they aren't malfunctioning, are riding high. Tech skills are in high demand in nearly every business and profession, and many industries now require broad scientific and technological savvy even more than industry-specific technical skills.

**Vignette: Can't a person walk down the street without being offered a job?**

I get the emails, text, and calls all the time. Heck, once I was even stopped in the street. Job offers, companies wanting to recruit me. At first I was flattered, but now it's starting to feel like harassment. It wasn't always like this. You used to have to apply for the job, get an interview, and jump through some hoops, but now it's gotten to the point where you have to worry more about catching the "eye" of a hiring computer – or, in some cases, trying to avoid the flood of employment offers.

It started with the introduction of computerized courses into education, and the adoption of Learning Records Storage (LRS) systems. Nowadays kids are completing courses on their own with the help of tutor-AIs and the computers record their students' projects and achievements in a LRS, keeping track of what they've learned and what they struggled on. It doesn't matter which college a kid goes to, these days, but what the AI's database says he learned and accomplished there. Combined with the enthusiastic adoption of work- and project-tracking software in the corporate world, there's plenty of information available to base hiring decisions on.

So the human resources AIs scan the LRS databases for people with the best combinations of skills and personality, paying particular attention to those who show signs of being willing to accept a job offer. No interview is needed, in many cases – the computers can make pretty accurate predictions about how well you'd fit in a company based off who you've successfully worked with before. Now it's no longer a question of landing an interview – it's a question of having the right combination of skills and experience to top the list in an AI's search function.

... But still not human

The problem with robots and AIs, though, is that they're still too limited -- while they can be programmed to be capable of *specific* intuitive functions, they simply can't replace people in every capacity. While McDonald's may have replaced its burger flippers in major cities with robot cookers, sit-down restaurants are still hiring chefs (and fast food outlets are paying their shift managers more to have the skills to deal with their "workers"). Doctors certainly depend on their AutoDoc app, but they are still a critical part of treating patients -- the computer may be able to come up with a more reliable diagnosis, but it still takes skilled eyes, ears, and hands to gather the data and treat the patient. As a general rule, all industries that depend on *personal* services, like hospitality or business management, are still dependent on hiring talent with the right human skills.

Hitting a moving target

While the need for human skills remains fairly constant, the specific technological skills that have become a dominant factor in the labor market are in a state of flux. Whether students want to be accountants, doctors, managers, salespersons, or engineers, the software that they need to be able to use keeps changing, and their skill-set has to keep up if they want to be competitive. This complicates the decision-making for students, who have to make the choices

that will lead to having the *right* skills for the labor market after they've finished their education... which could easily be completely different from the skills needed when they begin. Combined with the sluggish response of the higher education industry to changing requirements by businesses, many graduates are left with skill sets that are completely unsuitable for the labor market.

### Supply and demand

The flux in the labor market has created a growing dichotomy in wages. There are too few who have the *right* skills, and the networks and/or capital to put those skills to use; so those who do make a lot of money. Those with lesser skills, or whose skills are out of date or in less demand, are left competing for a limited pool of jobs, which leads to depressed wages. A generic degree is worth less and less; the specifics matter more and more.

It is normal for wages for specific fields to rise or fall when the relative supply of people willing and able to do them is low or high. What's abnormal (compared to the 20<sup>th</sup> century in America, at least) is the scale of the population with mismatched skills. So many people have been trained in skills and professions that are no longer applicable in the labor pool that, while the top quintile continues to experience high wage growth, the second, third, and fourth quintiles are seeing real wages stagnate and actually *decline* slightly. A middle class job is still better than being in the bottom quintile, but it's definitely not as good as it once was. There are arguments that the quality of life has gone up despite this fact, thanks to technology, but many families find they have much less discretionary income than their parents did, and it's still painful to do without nice things that once seemed normal.

### Helping hands

Those in the middle class aren't the only ones getting a bad deal in the working climate of 2025. Fed up with the slow rate of change in university curriculum, and alarmed by the rate at which Baby Boomers have entered retirement without being replaced by skilled workers, businesses large and small have decided to take matters into their own hands. Large businesses have started their own corporate universities to train new workers; industry associations and groups of smaller companies have done the same.

Beyond corporate training centers, businesses have begun to hire "career guides," who have offices on or near university campuses and whose job it is to identify promising students and help them get the skills that they need to actually be employable. Some industries, especially those that don't strictly *need* workers to have a university degree, have taken to scouting high schools for promising students, and inviting them to attend multi-year internships and boot camps to get the skills they need, rather than going to college.

## It's just a piece of paper

Many industries have begun to discount the value of a college diploma. It's a sign that one had the money and determination to finish that university's curriculum, but not necessarily evidence that one learned anything useful. The best schools still have some cachet, but even then the reputation of the department increasingly overshadows the reputation of the school. And for university graduates as a whole, employers have become *much* more interested in how candidates have proven their ability to contribute in the current market than they are in the diploma or its source.

## Proving yourself

Other forms of post-secondary education have become much more popular as ways to keep up-to-date, and even as ways of getting the needed skills without going to college. MOOCs have become more formalized, with a large roster of officially accredited courses (with linked testing systems). They are regularly used as ways to fill in for missing or sub-par university courses. Organizations offer skill certification for a wide variety of software systems and other professional skill-sets: pass their series of tests and practical demonstrations and you get certified, regardless of how you gained the knowledge. Universities have found more and more opportunities to make money offering skill-oriented short courses, somewhere between a Master's and a certificate course. Indeed, the number of graduate degrees earned has dropped over the last five years, as more and more students decide that the possible gains are too meager to justify the time and money.

### **Vignette: The brand of "Me"**

Jane stays busy. She's got good reason to, since jobs are hard to come by. Most are temporary, and the full time jobs that do exist are reserved for highly skilled and highly trained professionals. Automation has taken so many of the jobs once reserved for the middle class, leaving too few conventional career options available. So what's a girl to do?

What Jane did was to become a company of one, selling the brand of "Me". Jane took jobs everywhere she could, sometimes working four gigs at a time. All the while, she documented *everything*. In order to get hired, Jane created a brand for herself. She had the same education as her peers, but what set her apart was that she had a certain cachet, built up with her work experience, feedback from past customers, and a wide-ranging social media presence. Keeping up her brand, tweeting and publicizing herself, took a lot of time and effort, but it's been worth it. You could hire anyone with the same skills to perform a job, but when you hire Jane you *know* what your money is getting you.

The people who hire her know that not only does she have the technical acumen for the jobs they need filled, but her soft skills, her ability to stay in communication, balance a multitude of tasks, to show up when she said she would and complete the job on time were second to none. She really is a company of one, busy selling the brand of "Jane".

The other part of proving yourself is the internship. It has become a mandatory right-of-passage, and finding the right internship(s) can make or break your chances of getting the kind of job you want after school. Returning and especially adult students face an additional

dilemma: work at an internship, in addition to studying *and* working their current job, or risk not being able to prove that they can do what their degree says they can do?

Partly as a response to the growing potential for abuse, unpaid internships are *strictly* limited to current students with documented learning opportunities to compensate them for their labor. Nevertheless, businesses still appreciate students who are willing to work for zero or minimum wage, and many (if not most) have incorporated a rotating set of interns into their personnel structure.

### Selling the package

Students need an internship, but they also need the online presence to catch and hold an employer's attention. The specific needs vary by profession (marketing students need huge social media presence, while engineers need more skill credentials and portfolio pieces), but the online resume is, in many ways, more important than the paper one.

The importance of an online reputation has been made even more true because of the incorporation of big data into the hiring process - sorting through applicants based on a wide variety of factors (location, temperament, work history, etc.) that tend to produce better employees. These systems have been around long enough that people have grown accustomed to gaming them, but they still offer employers an extra tool to sort through piles of applications. Students who ignore the need for carefully-tended online presence often end up with fewer choices than those who do.

"Carefully tended" also means reducing the possibility of negative impressions. While the tendency of young people to do stupid things and post evidence on the Internet hasn't disappeared, there has been a strong shift towards doing so on social media sites that feature stricter privacy rules than were the norm in the 2000s and early 2010s. "Gated Communities," as they are called, are not hack-proof, but they are still better than posting on openly-viewable systems like Facebook.

### Making it on one's own

Finding an employer isn't the only option after finishing education, of course. Working for oneself is the choice of many faced with an increasingly competitive and turbulent job market. The trade-offs are the same as they've always been (more independence in exchange for longer hours and a less-dependable income) but the market for (and supply of) independent workers in many fields has steadily increased over the last decade. The key factors behind success, though, are similar to those for someone seeking traditional employment: connections, proof of skill, and capacity to add value in an increasingly fluid work environment.

## Catching the Golden Ring

All of this adds up to a massive headache for any student contemplating making their way through higher education and into the workforce. Where there were once guaranteed high-paying jobs waiting for any graduate in certain fields, now there are question marks and, if you're not careful and/or lucky, disappointment. It's still quite possible to find that dream job and be successful – the economy has been growing at a healthy clip – but it's no longer the simple, straightforward path that it was for previous generations.



## **Playing Alternative Future “Inputs”**

The baseline future suggests a world of play that is characterized by purposes, productivity, and schedules, but some may ask – where has the fun gone? The answer in this alternative future is that play and fun shift from being discrete activities to being a part of almost everything. Gamification principles expand from playing to learning to working to practically every aspect of student life. The “virtualizing” of play in the baseline continues, but the trend shifts a bit in that virtual and “in real life” play becomes integrated and complementary. We diligently tried to come up with ways that play might be less digital, but ultimately concluded that integration was the much stronger trend – too many “cool” gadgets and devices emerge. So, if the fun is everywhere, the new question is whether it is actually nowhere.

### **Trend breaks**

- Play moves away from emphasis on online games and apps to more “in real life” (IRL) based play that incorporates virtual elements.
- Due to advances in robotic agility and human characteristics, robots become physical fitness and play partners (instead of just virtual partners). Robots could even become “coaches” who teach sports, musical instruments and other skills/hobbies. A robot could adjust its skill level to match that of the human opponent. Thus competition is always optimized for greater skill advancement. According to the Japan Robotic Association, by 2025 personal robots will be the bulk of the robotics market in the world. They are predicting a growth rate of over 200% in the industry between 2010 and 2025.<sup>530</sup>
- Personal mobile technology interaction with drones, jet-packs could bring about new types of games, spectator sports (air motor-cross), and hobbies.<sup>531</sup>
- New research into smart toys enables their integration with online apps.<sup>532</sup>
- Senior citizen gaming surges. As game interfaces become streamlined and enable less tech savvy/coordinated gamers to compete, expect changes to the demographics of online gamers. This would create a social shift where the countertrend becomes the trend, overturning the perennial association of gaming to youth.
- Serious Games gain traction (countertrend overtakes dominant trend). With the dwindling available “play” time for lower socioeconomic classes, work and school may provide the main outlet for games for large numbers of people. Playing and games are not just for leisure and enjoyment, but for serious reasons, e.g., education, health, etc. Serious games gain traction in segments of the workforce and education.<sup>533</sup>

### **Unfulfilled plans**

While we ultimately concluded that none of the items below were likely to be strong enough to derail the move to “ubiquitous and embedded, it is possible they could.”

- According to new Pew Research data, the Internet “will become ubiquitous and embedded in our lives — the same way electricity is today” by 2025.<sup>534</sup> If it is not, the gamification trend would suffer.

- Social resistance to the intrusion of the Internet into IRL -- caused by security, health, and privacy fears -- temporarily slows the availability of planned technology efforts to enable augmented reality, driverless cars, sensor networks, drones, social data mining; but the slowdown is temporary.
- The fall of Net Neutrality balkanizes the Internet and bandwidth delivery, temporarily impeding the conditions for ubiquitous computing. Alternately, geopolitical issues arise that “split up” the Internet into regional “Intra-inter-nets,” having a similar effect, e.g., Brazil’s reaction to NSA spying, successfully carried out.
- Developments in IP and privacy laws hold Internet providers responsible for the legal status of the information they carry and convey. These developments would make ubiquitous computing and augmented reality unsustainably expensive if everyone in the chain had to assure that the contents they pass on were free of legal restrictions. This burden could have a chilling effect that leads to its eventual repeal.

## Events

- A connection between online game play with Autism spectrum disorders is suggested, but doesn’t pan out.<sup>535</sup>
- Lawsuits related to gaming side-effects and addictions – for example, a gaming-induced coma because the trauma in the game is too real --<sup>536</sup> are advanced but they do not have more than isolated impacts.
- Commercial developments include:
  - Drones are made available. (“Drone delivered my Christmas gifts – the new Santa Claus. Only this time, I just made a mental wish list, and it was granted.”)
  - Haptic game development kits and accompanying interface equipment.
  - Piezoelectric interfaces.
  - Biologically implanted game interfaces.
  - Mind-controlled game controllers.
  - Availability of implanted memories and mental states. (Download and feel beneficial effects of play without physically playing the game, i.e., Digital/biological neocortex integration.)<sup>537</sup>
- Low-end of 3D printing makes desktop manufacturing commonplace in regular households, e.g., like a bread maker.
- Using your face to play a game: rise of “ambient Intelligence, sensor networks, and ubiquitous computing.”<sup>538</sup>
- First in-game currency becomes tradable on world currency exchanges alongside dollars and euros.
- Commercially available digital tattoos and other biological displays and sensors. Not neurologically controlled but can interact ambiently with other sensors and online entities.<sup>539</sup>
- Virtual-personal relationships felt physically – haptics/ teledildonics allow for intimate physical encounters (and violence) between online characters and real world people.

## Issues

- Will there be a technology backlash, potentially spurred by credible medical evidence of side effects of gaming?
- Will gamification be seen as overly intrusive by creating an environment where everything is competitive and there is relentless pressure to perform well at all times?

## Ideas

- The concepts of play and games upset traditional educational methods and redefine how students learn.<sup>540</sup>
- Customized gaming based on data mining / social DNA. Data mining to uncover "social DNA" as a way of targeting advertisements and game content. Could the "boss" you beat on the new first person shooter be your IRL boss? Could the nightmares/images on the hit new Horror game be targeted to your own phobias based on your social DNA? You get roaches, I get leeches?<sup>541</sup>
- 4D Printing: Advanced 3D printing of objects that unfold or evolve over time.
- Barriers to entry for creative production, even game programming, are significantly lowered. Everyone with an idea can make a game, and anyone with an agenda can be a spammer/hacker.
- Barriers to entry for manufacturing real world objects are lower.

## Key uncertainties

- Will the progress toward technologies that could revolutionize play (and help reconcile online play and IRL play) move quickly enough to significantly influence increased online play? (e.g., augmented reality, sensor networks and ambient computing, brain/machine interface, biological computing, implants, wearable user interfaces, haptics, teledildonics,<sup>542</sup> piezoelectrics).<sup>543</sup>
- Will socio-political resistance to technologies allowing the intermingling of the online and the real world significantly delay the rapid pace of technology development (e.g., health side effects, privacy, security, resistance from entrenched commercial interests)?
- Will gamification, driven by technologies such as augmented reality and ambient computing merge play/games and the rest of life – everything is "play," so nothing is play?

### **Playing Alternative Future Summary: "It's All Play"**

Gamification infiltrates so deeply into routine activities that it raises the questions about the meaning of play when "everything" is a game.

#### **Abstract**

Unexpected acceleration in technology and an unusually favorable commercial and social environment lead to an explosion of innovation in the world of games and play. These innovations allow intermingling of online and real world play to the point that actions in the offline "real" world (IRL) have seamless automatic impact in the online world enabling ambient, passive gaming on a widespread scale. There is no part of mundane IRL life that cannot be

“gamified” online. At the same time, actions in the online world are having more and more influence in the “real” world. There is no space IRL that cannot be turned into a “playground” or a “social network.” So that begs the question: if we are heading toward the idea that “everything can become a playground,” is that the beginning of the end of play itself? If “it’s all play,” is anything play?

### **Key differences from baseline**

- The impact of technology accelerates, as several ground-breaking technologies become advanced to the point of retail availability.
- Innovation explodes due to increased availability of these technologies to hobbyists, independent developers, and other “low-end” players in the domain.
- Technologies bridge the online and offline worlds -- haptics, beacons, wearable computing – and mainstream.
- Augmented reality matures, which means an integrated, interoperable data sharing infrastructure, relatively free of regulatory encumbrances.
- Lowered concerns of personal privacy and security risk are overcome by more sophisticated security practices and technologies.
- Piezoelectrics are developed to the point that they are commercially available to businesses and government institutions for public use.
- Robotic “proxies” are developed that allow for virtual experience of other IRL situations.
- Sophisticated data mining and analytics (enabled by the infrastructure mentioned above) enable the real time hyper-personalization of play experiences.

### ***Playing Alternative Future Narrative: “It’s All Play”***

*Where the baseline future told the story of increased growth in online play, especially with mobile gaming, and at the expense of in real life play, there are several possibilities that could change this. This alternative future scenario for play in 2025 allows for numerous futures to unfold at once as “vignettes,” anticipating that the future of gaming will be even more diverse than the present. The future of play is a multiplayer game with many competing agendas and strategies at work: It’s All Play.*

*The most interesting and overarching alternative is one of acceleration, in which several ground-breaking technologies could become advanced to the point of retail availability. In this alternative future, innovation explodes due to increased availability of these technologies to hobbyists, independent developers, and other “low-end” players in the domain. The shared theme among the vignettes to follow suggests progress significant enough to challenge the business model status quo for large game and entertainment players over the next decade.*

By 2025, significant progress had been made toward technologies that lowered the barriers to entry for game and entertainment production. People got their hands on all the visuals, desktop manufacturing, indie game programming, mobile programming, and a renaissance of sorts went down. Hacker culture “unlocked” versions of “walled garden” products and titles

(Apple, anyone?). Machinima, fan fiction, grassroots spinoff products, and MOOCs all became venues for the explosion of talent and creativity of the late 2010's.

It's not that people necessarily have more time to play in 2025, but modern daily activities increasingly take on an appearance of play. Gaming spills over into everyday life. Established stakeholders in the gaming space were able to manage this transition into what used to be non-gaming space and monetize the increasing innovation coming from its consumers (fan labor, challenges to net neutrality, IP lawsuits, mergers and acquisitions of indie upstarts, for example). The boundaries of play melted away as gamification moved into education, employment/vocational training, serious games and even compensated play. Today, it is common to become involved in gold farming, fan labor...a new income category based on playing for economic advantage (such as subsidies, product discounts, free goods and services) was been established as such behavior became the norm.

The generations following the Baby Boomers, having been raised on social media with lower inhibitions about privacy and fewer qualms about sharing their personas with an online presence, provide little hindrance to the social acceptance of these technologies and most of their applications. As long as providers present a good value proposition, Gen X, Millennials and their children are willing to exchange the metadata about their personal experiences for the goods and services they desire.

Several key technologies then become available as an increasingly accessible "toolkit." Pretty much any hobbyist with an idea and determination can create an interesting game. And with the advent of commercial haptics and piezoelectrics with access to open APIs for wearable computing platforms, ambient sensor networks, and the like, the boom in online/offline gaming has begun to blossom.

With so many new entrants into the cacophonous market, larger players find various ways to "mentor" and "incubate" small innovators in a fashion that looks like an updated version of fan labor (e.g. "Use our integrated development platform, our app store, and keep 75% of your proceeds...")

But the end result of all this is a renaissance in IT-enabled IRL games and play experiences such as:

- 1) High-tech versions of IRL "Paint Ball" and "Capture the Flag."
- 2) Augmented reality overlays that convert your block into the game venue of your choice.
- 3) Augmented reality overlays that convert the entertainment venue of your choice into a collaborative game/play experience.
- 4) Ambient "gaming" that "gamifies" mundane aspects of everyday life.
- 5) Piezoelectric playgrounds and equipment that complement the "green lifestyle" aspirations of young players.

*To illustrate the ubiquity of play (aka gamification), several vignettes are offered for how play “infiltrates” various aspects of daily life. First, we explore play moving into the economy via commercial apps, which we saw beginning decades ago.*

#### **The New Mobile Yukon (2025)**

The new “gold rush” is mobile app development. Development tools are sophisticated to the point that anyone with an idea can make an app. Many regular folks are lured into app development by the stories of instant celebrities who make thousands overnight by apps that go viral, often for rather unpredictable reasons. But these stories are one out of thousands. Just as common are stories of overnight successes for people who are not ready to deal with the sudden fame. Like “blogs” in the early 21<sup>st</sup> century, it seems like everyone has an app or two on the mobile platforms' app stores.

Because just about everyone has figured out how to “game” the online comments and reviews, these become useless as a means to figure out which of the teeming hoards of apps are worth attention (and money). Game companies increasingly buy the rights for apps from amateur app developers who are looking to make a quick buck. Very few of these apps make money, but the net yield is cheaper than developing games in-house. Game programmers who work for these big game houses resentfully call these apps “krill” because the big “whales” they work for gobble them up by the thousands and rely on the developers to sort through them and make a very small percentage of them into products they can market.

*Another development in the present, mash-ups is outlined. The scenario combines indie gaming, hacker culture, fan fiction, mobile programming and social trends towards instant gratification.*

#### **It’s a Mashed-Up World (2025)**

By the year 2025, advanced computer programming languages make it game fusion technologies commonplace. These technologies allow independently developed games to link with other games creating gaming experiences that are unpredictable and randomly generated. No two gaming experiences are the same, with game engines randomly creating games associations based on user preferences, like/dislikes or even independently developed fan scenarios.

This movement even takes on a rapid-fire fusion aspect. Think of Dr. Who morphing from one body into another...except gamers morph from one game world or environment into another with a limited time frame to beat the game before being thrust into a totally new, randomly selected one. It may not be as satisfying as finishing a game from start to finish (for some), but a thrilling method of play for others. Maybe next will be a rapid fire gaming throw-down scenario pitting random gamers against each other as they sit on subway train or in buses traveling next to each other in the middle of rush hour traffic.

*The next vignette explores how play influences the rather mundane aspect of- commuting.*

#### **Drive to Win (2027)**

Commuting has become the new fantasy football. Commuting to work has turned into a regional competitive game by ubiquitous sensor networks and intelligent modules installed in participants' cars. Drivers “compete” for spots on leader boards for categories like “safest driver,” “most fuel efficient route,” or “most considerate commuter.” Insurance companies subsidize the game infrastructure, supply prizes and rate discounts, and compete against each other trying to “recruit” the best commuters to their “teams.” In workplaces across the metropolitan region, co-workers' office talk consists of comparing standings, bragging about how low their insurance premiums are, and sharing driving tips and tricks to bring up scores and maximize insurance subsidies. Leaders of the various categories are minor celebrities in a world dominated by work.

*Here we explore how play influences the greater reliance on robotics.*

### **RoboVicarious (2028)**

Combining advanced robotics, Google Glass-like technology and remote gesture-control capabilities, people are able to control real world explorations of robot devices, see through their “eyes” and live through remote experiences. Imagine a robot that you control, being able to explore the darkest reaches of the Amazon or even the depths of the ocean while you sit safely at home. This fusion of technologies, uses the concepts of a virtual reality but combines them with natural environments that are difficult or even impossible for the average person to explore. Trips to the Moon or Mars are even possible. Advances in sensor technology enhance the experience to include audio or olfactory sensations to the visual ones.

Serving this need are businesses that specialize in robotic adventure rentals. Say you always wanted to see the Moon, but don’t have the money to travel there or afford a personal robot that you send there (somehow?). Luckily, there are companies that allow you to rent one for a couple of hours or days, so that they are completely under your control for only that period of time. The robots are durable and technologically advanced in such a way that they are reusable and difficult to destroy remotely, minimizing the danger of a robots being remotely crashed into mountains or thrown into volcanos.

The possibilities for play are numerous. Just sitting back and controlling a remote robot becomes a hobby for some, while others prefer the competitive/gaming aspect of robot challenges. The competitions like a treasure hunt, capture the flag or other challenges, pit humans against each other via their remote controlled robots. The allure to these games is that they are not carried out in a virtual world somewhere, but in real natural environments around the world. The combination of technical and natural create a gaming experience that is uninhibited, unscripted and not influenced by cheat codes.

*And games that law enforcement might wish away.*

### **Bang, You're a Nuisance (2032)**

Police have started to write tickets as part of a crackdown on urban hipster “Bangers” who fail to wear gloves with the correct color fingers or who attempt “hits” that disrupt the public peace. Bangers” was an old toy game from the early twenties that allowed kids to play an electronic game in real life that resembles the “cops and robbers” their great grandparents might have played as kids. They wore intelligent gloves that could detect when the hand they were on makes the universal “gun” formation. When the “banger” made the finger gun, pointed it at another participant, and said “bang” audibly, the haptic sensor on the opponent was triggered and the target felt a shot. In the old kids’ game, the “shot” sensation and a light on a cap indicated that the target was out of the game.

Fast forward about ten years and an enterprising designer hacked “Bangers” to create a mobile, social-enabled first person shooter game that could intermingle with your everyday routine. The inventor made the gloves interact with the new social-enabled digital tattoos that have started to become the new “killer app” for young professional adults. When the sensor gloves make the gun formation, the digital tattoo displays “Game On!” and immediately sends signals to alert the digital tattoos of any participants in range. Players are alerted that the game is “on” and join the game as well, or not. The digital tattoos (along with other networked wearable displays) keep each player aware of the location of other players and register the number of hits and relative scores, and links to social media sites that becomes part of the public record. Videos of surprised ambushed players, startled and none too pleased bystanders, and the occasional “epic banger fail” go viral online quite frequently.

Some curmudgeonly types long for the day that these whippersnappers just stayed inside and played their shooting games online. “I can’t believe we were worried about them not getting out to play more.”



*Finally, we expand a bit further into the future in exploring the potential for directly integrating with our brains.*

**Parallel Play (Wildcard scenario, 2040)**

A consortium of prominent MOOGs are requiring biometrics to verify that the biological version of a player is present when playing in the game realm. At first, the ability to download your brain into your avatar provided a sly way to “techno-skip” on a tele-work day full of meetings while you “played hooky” in your favorite world-building shooter game. You could always just upload the boring meetings into your brain that night so that you didn't miss the information.

But mainstream gamers started to complain when some competitors started to do the opposite – send their avatars in to play the game while the bio versions went to work and otherwise lived their lives. “An avatar player can play for longer hours and does not need to maintain a job or a girlfriend,” complained one avid gamer. “To get that kind of score (the avatars accumulate) you used to have to ruin your whole offline life. It's simply not fair!” Game providers responded and “bio-only” player rules were adopted. But these but were notoriously hard to enforce. Brain downloading rendered Turing Tests obsolete.

What started as an annoyance limited to the game world now has the law involved when stories surfaced about organizations that hire out players' avatars to play several prominent MOOGs on their behalf. These new “Gold Farming” syndicates are starting to become rich and powerful, since in-game currencies were now being traded on some global currency exchanges. Law enforcement and game producers are now developing game interfaces that require biometric identification to authenticate and play the largest, most popular MOOGs.

## Connecting Alternative Future “Inputs”

The baseline forecast suggests a future in which students and others are more and more connected to one another, to social networks, to virtual communities -- a much wider range of people, groups, institutions, and even “machines” that would bewilder their predecessors. Emerging technologies provide more ways to connect and the connecting capabilities outweigh the isolating ones for the vast majority. In this alternative future, technology passes the social tests of being “good for relationships” and thoroughly integrates into the mainstream. Privacy issues flare up, but overall the momentum toward transparency makes it less of an issue. Technologies for connecting are everywhere and a part of everything – ubiquitous and taken-for-granted like electricity. People enjoy connecting, and technology does not replace that, but makes it more possible.

### Trend breaks

- *“My best friend may not be human.”* Distinctions between physical and virtual trends blur to the point of being indistinct.
- *Augmented reality (AR) in daily life.* It could be driven by post military service personnel who have a traditionally higher rate of higher education enrollment and who will expect and drive high degrees of augmented reality content in education.<sup>544 545</sup> AR “sharing” rooms could provide a cost-effective alternative.<sup>546 547</sup>
- *Widespread use of virtual reality (VR).* Long, slow improvements finally reach a critical mass and accelerate.
- *The plateau of Internet adoption....* as it reaches ubiquity. For instance, 20% of participants in a survey said they were just not interested because of the expense, or it being too frustrating.<sup>548</sup>
- *Advertising everywhere.* Advertising has reached a level of life presence similar to product placement in movies, except that students are living in the movie.
- *Privacy protection reversal.* Students may experience a reversal of the privacies and protections they have so far been afforded as legally protected education consumers. As privacy erodes in most other parts of society, student data – such as monitoring the genetic code, social networks and the meta-network -- could become a much less sacred resource to universities.
- *Isolation.* Gaming, social networks, and computer-human interface devices (Google Glass and VR helmets) marketed as connectors are found to actually isolate, socially detach and depress.<sup>549</sup>
- *Disconnecting options.* Technology causing problems with f2f communication will launch new markets for “disconnecting” from technology and connecting more deeply with people.<sup>550</sup>

### Unfulfilled plans

- HB2180, the “Eraser bill,” would allow Internet users to delete website postings, and legislate that website posting policies are public. The bill, aimed primarily at social

networking companies, did not come up for a vote in the House Technology and Economic Development Committee in 2014, but it could surface again in the future.

- Bills relating to so-called “revenge porn” both died in committee. The move to penalize individuals who post “intimate images” with the intent to cause “emotional distress” would have made this offense a class C felony and a sex offense.<sup>551</sup>
- A start-up intended to digitize “snail mail” has folded after disappointing customer uptake. Despite the popularity of email, paper correspondence does not seem to have reached extinction yet.<sup>552</sup>

## Events

- A potential wildcard event is “Fort U” in which university admission might require complete surrender of privacy for all students in order to protect them and their information “from themselves.” In fact, this might be a niche market that some students, and their helicopter parents, would desire because of the security it provides. At its most extreme, enrollment in Fort U would mean signing up for complete monitoring, digital and physical, including personal geo tracking devices. The challenge to Fort U becomes protecting students from unauthorized use of real time data and digital trails.

## Issues

- How do students and institutions balance openness and access to information with security needs?
- What if intense privacy concerns drive a move to alter-personae and encrypted personal communication for students that do not want their identities known?
- What if connecting technologies actually lead to more isolation, and perhaps spur a “consciousness” movement that revolutionizes spirituality?
- What if technologically sophisticated students are more difficult to “control?”
  - For instance members of the “Homelander” generation (born approximately between 2000-2020) are now being taught how to code right along with their ABC’s which facilitates ad hoc networks and makes them difficult to manage or control.
- How will institutions deal with pressure on students to use performance enhancing drugs?
  - Demands on college students are escalating, requiring superhuman effort. Students are taking drugs for performance enhancement and endurance – designer drugs that are nearly undetectable are common. University health centers could be in an arms race with drug synthesizers targeting overachiever students with addictive personalities.
- How will sexual standards of conduct adapt to emerging technological capabilities?

## Ideas

- Social work through creative thinking and spirituality is evolving into going beyond ego, ethno, and even human-centric views that divide.<sup>553</sup>
- Futurist Ray Kurzweil says Samantha (a human-like AI software program) of movie “Her” could happen by 2029.<sup>554</sup>
- A new type of autonomous online bot uses the information people voluntarily share online to construct virtual personalities, which could allow poaching of personal information online from an ex, or a celebrity crush to model the perfect robot partner.<sup>555</sup>
- “Individual empowerment will accelerate owing to poverty reduction, growth of the global middle class, greater educational attainment, widespread use of new communications and manufacturing technologies, and health-care advances.”<sup>556</sup>
- Students form connections with pets that are more exotic and strain the new pet-friendly posture of the institutions.
- The hologram telephone call – which will allow callers to see a live 3D image of the other person on the line – is set to become reality.<sup>557</sup>

## Key uncertainties

- Will the benefits of online information sharing be seen as outweighing the costs?
- Will the integration of the virtual and real become practically indistinguishable
- How does the balance between f2f and virtual sort itself out?

### **Connecting Alternative Future Summary: “From Connection to Immersion”**

Distinctions between virtual and f2f are disappearing as the integration of two is well underway.

#### **Abstract**

The rapid spread of technology for connecting and enhancing human relationships takes the next step as it is totally integrated into daily life and people are immersing themselves in it.

The immersion of technology with connecting is transforming relationships with colleagues, friends and family -- human or otherwise. This is happening through the mechanisms of devices, augmented reality, and everyday invisible interactions with everything one comes into contact with. This immersion is changing thinking and behavior around the concepts of privacy, geography, households, spirituality and communities among others.

#### **Key differences from baseline**

- Technology has become a tool not only for increasing the quantity of connections, but also for increasing their quality.
- Technology for connecting is totally integrated into daily life such that few question whether it “should.”
- The relationship between people and technology evolves in a balanced fashion – it’s not

“either-or,” but “both-and.”

- Privacy and security issues are largely resolved, in favor of greater transparency. Very little information is kept private.

### **Connecting Alternative Future Narrative: “From Connection to Immersion”**

*In this alternative future, the integration of new connecting technologies gets “figured out.” Not without a struggle, of course, but ultimately new connecting technologies are a routine part of student life. The seemingly limitless technological capabilities for connecting have become almost taken-for-granted. The interesting questions of the last decade (2010-2020) centered on how deeply students and people in general would integrate technology into their lives. If the early part of the century was about using technologies to connect more — quantity — the last decade has been about connecting more effectively -- quality.*

Ask anyone in 2025 and you will be told that the increasing technological capabilities for connecting have never been the issue. There were typically performance issues in the early phases of new technology introduction. VR (virtual reality) was introduced with great fanfare, but its disappointing performance led it to virtually disappear until next-generation capabilities arrived. Students are used to early versions of new technologies, such as today’s holographic communications, being a bit clunky and simply expect that any bugs or performance issues will soon be taken care of.

At the same time, a perhaps inevitable backlash against mechanisms such as social media spurred a rethink of the role of communicating and connecting in one’s life. While many experts forecast the backlash would lead to something of a neo-Luddite revolution, it hasn’t gone that far. When it was found out that some universities were geotracking students by tapping into their body implants, the uproar wasn’t about the tracking, but that it was done without their knowledge. Similarly, studies came out “proving” that technology was causing problems with actual face-to-face human interactions, only to be overwhelmed by dozens “proving” the opposite. And there are some issues, for sure, just ask the psychotherapists and counselors specializing in VR addiction. In general, though, younger students simply laughed at this debate among the dinosaurs.

Some would say that the integration is so deep that it has become simply impossible to disentangle the technology from daily life and connecting. For instance, sponsored (as in company and otherwise) Internet is extremely cheap and nearly ubiquitous. Advertising has reached a level of lifestyle presence similar to product placement in movies, except the students are animated in the movie. Just like those that remember the movie “Star Wars” where Princess Leia leaves the 3D hologram message in R2D2 to be played at the right time, devices routinely connect friends and family via holograms and other pervasive additions of augmentation (Glass, etc.) in real life.

Any analysis of leading-edge changes with technology starts with friends. Students experiment with their friends, and then the rest of the world finds out. And they often abandon approaches once the “masses” catch up. The cool factor is compelling. Younger students in particular want to be first with whatever technology – from Google Glass and its many successor augmented reality tech’s or Oculus Rift and its VR successors or Tron-like holographic games and communications. Some students only “know” their classmates only by their augmented reality personae that attend classes with them. Even as communication overload seemed about ready to make students and people in general “crack,” they figured out ways to “humanize” their lives.

One interesting development is that good, old-fashioned marriage is on the upswing, having surfaced as a strategy for strength and stability in contemporary times. Families have undergone a great deal of change over the last several decades. It’s not uncommon to see multiple generations, complete with pets (“real” and robotic), applying to live in university dorms. New traditions emerged alongside of some pretty radical changes. The increase of marriage and cohabitation, alongside the rise of non-human “partners” means sexuality is now much trickier to define and navigate. New family forms (some might say the reemergence of old) of communal living have emerged.

Perhaps the biggest social issues center on privacy and security, basically how would all the information and communication being generated and carried by new technological mechanism be used? Few issues generated such heated debate. The “winning” approach was a move toward much greater transparency for everyone. In other words, much less information is kept private, yet there are greater legal protections against abusing that information. A prominent illustration from modern history is that the mainstream marvels at the idea of “pre-existing conditions” in the health insurance industry. People today cannot believe that it was once possible to deny health insurance to individuals because they were sick, or that people were legally compelled to disclose that they were sick. No one would dare try such a trick today. It was, of course, very awkward to get used to having one’s information “out there.” For some, it’s still awkward today. Most experts call it “transition anxiety” and feel that most people are okay with it, and the rest are just in the process of adapting.

With technology quantifying everything about everyone and reporting it to all networked devices, fear of unauthorized access to that information generated genuine anxiety. Some early adopters have even integrated information technology capabilities with their biology. Biohackers who tweak their own biological “codes” and use implants can essentially program their physical selves with their devices. This development creates great concern about being hacked!

Perhaps no greater example comes from the realm of spirituality. Surely, technology would not be involved with one’s connection to higher power? Most would say that technology is alive and well even here. Sure, there is still spirituality without technology, but it has also been integrated with it. One can connect with something larger than oneself through devices, virtual rooms and worlds, and helmets.

## A Day in the Life

### Tweets

- Big data picked my classes and classmates for the next 4 years – I need an edge to make sure that I get a good grade as we all start out about equal.
- I have a snap family. When I applied to college my mom put me up for ‘adoption’ and I’ll be staying with the TG couple who run the maker space near the school. #free #mommysboy
- My dorm mate is a 60 year old guy that speaks Croatian but wears a Google prosthetic to translate. He smells like garlic all of the time. #lifeoffail
- I checked into my high security, isolation dorm last week – my food is delivered weekly and I go to classes via tunnels – or I can VR into the classes. #anonymous
- My parents caught me cybering (VR sex activities) with my friends in the wave pool in FaceWorld. I thought my password was encrypted. #pantsdown
- In a virtch class for 3 years before I found out my crush was a test student completely fabricated by my Sociology department, not a quiet girl from Idaho. #virtualfail
- It’s not paranoia if they really are watching you #tooboring #badday #voyeurtales

### Overheard in the cafeteria

- My social *credi* score was average to mediocre until I got into one of the maker labs for a combined course from the Art college in Canada and the Industrial engineering class in Brownsville; through the roof!
- I hacked my contacts and permanently burned my retina in one spot. The x-ray vision app did not really show me what he looked like in his underwear anyway.
- I always buy the product with one star if it’s cheaper – product laws make it all work out anyway – and if it’s good I say I hate it to keep its cost down.

### Tag lines from the 2025 “The Experience Project” site

- I hacked my location tag and it turns off whenever I get into public transportation. I run with the Ghosts on the subway when I am not studying Bio-Industrial Finance.
- I like to go to archived services in VR. Helps me rest and go to sleep; especially the sermons.
- I change out all of my friends every 3 years, max. Some only last a month, especially if they are married.
- I divorced my family when I was 12 and became a foster child by choice.
- I know more about my classmates than they do because I bought the upgrade privacy penetrator app.

### Newsclip

- Two hipsters approach each other and greet with a right foot to right foot to tap and a back wave...The latest flu EP34 (Encephlapod\_ver\_34) has made the toe touch popular instead of the germ laden handshaking. Friend still hug, but antiseptic sprays are considered as normal as hand sanitizers of the early 21st century.

### Ad

- Try the new Glade scented viral masks, healthy, attractive, and uplifting! Now with custom tribal markings for Greeks, and Geeks.



## ***Participating Alternative Future “Inputs”***

The baseline future suggests that declining faith and participation in governance is offset by a rise in activism “outside” the system. The incredible availability of data -- and tools for “hacking” it -- enable those on the outside to shine bright light on what’s going on “inside.” A key question is whether this hacking will be used for “good” or “nefarious” purposes. In the alternative future, the team hedges a bit. The primary scenario is one in which the establishment sees the writing on the wall and decides to embrace the good hackers and become more transparent and open to participation. We felt, however, that there was also a strong possibility of a “circle the wagons” response that creates a more confrontational future. These negative possibilities are highlighted in a series of mini-vignettes.

### **Trend breaks**

- *Hacking becomes socially acceptable.* Organized events of civic hacking promoted by big companies and the government, and attended by thousands, with more happening each year.<sup>559 560</sup>
- *Hacktivism moves from fringe to the mainstream.* A shift in the movement to away from destructive toward the constructive elements; constructive mainstreams while destructive remains on the fringe.
- *Multiple platforms developed by activists.* Platforms proliferate not only for decoding legislation, but for writing and proposing it as well, including the development of online tools to encourage more widespread use.<sup>561 562 563</sup>
- *Government 3.0.* Greater collaboration, transparency, and participation between citizens and the government.<sup>564 565</sup> Many governments are adopting government 3.0 technology to cut back bureaucracy, improve services, and produce innovative, crowd-sourced solutions to tricky problems.<sup>566</sup>
- *Efficiency helps.* Efficiencies in government service delivery relieve constant pressure to cut.
- *Smart cities mainstream.* People more interconnected to each other, their environment, and their government than ever before.<sup>567 568</sup>
- *From talk to action.* Action moves from just interacting to even producing. An early indicator is Iceland used social media to help produced a constitution.<sup>569</sup>
- *Total transparency.* The momentum for greater privacy and protection gives way to a “reveal everything” approach, particularly among youth.
- *We are all activists.* Activism spreads beyond youth throughout age groups.

### **Unfulfilled plans**

- Hacktivists and other opposition groups plan to oppose the current governance structure erode as governance “opens up,” which could be viewed as a “victory” or fulfillment but hard-core hacktivists are surprised by the responsiveness and feel that movement has been co-opted.
- “Destructive” hacktivists become social pariahs and lose ability to aid government.

- The various Vision 2020 activities really don't lead anywhere and become seen as trite, feel-good exercises that do not go far enough.
- Plans to maintain the current system by accommodating greater input give way to much greater and deeper involvement in the governance process.
- Formal civic participation falls off as activism flourishes.
- Government plans to keep pace with technological challenges come up short.

## Events

- Breakthroughs in sustainable technology make living off the grid an affordable endeavor. The ability to disconnect from public services grows to the point of putting pressure on government to do something.
- Net neutrality, cited by some as "the free speech issue of our time" is preserved in law.

## Issues

- Will hacktivists be able to gain social acceptability and be trusted?
- Will greater local control and autonomy lead to a breakdown in larger-scale cooperative efforts?
- Will governance efforts to provide a real voice or be viewed skeptically?
- How will government be able to keep up with hackers and their greater capabilities?
- How will the government tendency to keep secrets be balanced with public desire for transparency?

## Ideas

- Multiple citizen groups plan to make government transparent and codes understandable to all, so citizens can participate in writing bills and laws.<sup>570 571</sup>
- Increase in transparency in government leads to more accountability and more distinction between local, state, and federal government roles. People will engage more with government since they will be able to better identify which part of the government they need to interact with to get things done.<sup>572</sup>
- FAST government: Governments will become flatter, agile, stream-line, and tech-enabled (FAST) to meet the fast changing needs of the populace. They will build slim and streamlined organizations that will be adaptive, and they'll share labor, services and resources through networks (Gov. 3.0). They'll use the Internet and social media to empower citizens and rebuild the social contract between political leaders and citizens.<sup>573</sup>
- States and local communities begin to create their own systems of health care, infrastructure, and governance.
- "Civic startups," as a way of creating jobs as well as building support for transforming civic hacks into functional and legitimate programs. There is also the potential for the development of new businesses in the private sector to emerge from civic startups.

- Is it time to take government 3.0 out of the hands of elected or appointed high-profile officials"? Apps and big data as tools of the government employee, rather than the official, might generate new respect for bureaucracy or at least a more effective role for government pencil-pushers.
- Proliferation of new concepts in online civic engagement platforms, such as:
  - "Voterheads" with email alerts when city, county or school board is discussing domains of interest to the user.
  - Open Town Hall which promises to "[move] the public meeting process online," requires participants have a geocoded address in order to share input; location will be taken into account in analysis and weighing the comments.
  - A "platform to watch" is Placehood.org: a "virtual place to discuss real places that you want to see transformed."

### Key uncertainties

- Can hacktivist-inspired citizens and government put aside their mistrust and work together?
- Can small and isolated successes with more open citizen participation "scale up?"

### **Participating Alternative Future Summary: "NationCraft: Rebuilding Governance"**

Hacktivism triggers a movement that uses big data to provide more effective direct citizen participation in governance.

#### **Abstract**

Hacktivism, which began largely as a fringe movement to out-manuever or get around the system, is repurposed to more of a mainstream "gamification" approach. The challenge is not to beat the system, but to improve and re-craft it. Participation in governance reverses its long-term decline, as people see a way to make a difference and have a positive impact in how their lives and communities are run. Governance opens up and big data is used to improve the efficiency and delivery of government services.

#### **Key differences from baseline**

- *Technological capability and connections:* The needs of government and action will be greatly augmented by a data-rich and information heavy world
- *Increased flexibility and adaptability:* Governments and communities being able to move quickly or continue at a slowed pace to enact change
- *Economic reach:* Budgetary strains have both spurred private action to better government and organizational capacity but also slows government's own action or ability to pay private investors or entrepreneurs
- *Open worlds:* The opening up of all things information makes some truths hard to bear and other truths eye-opening to public intrigue or scorn
- *Gamification* for community and nation-building

## ***Participating Alternative Future Narrative: “NationCraft: Rebuilding Governance”***

*The 2025 alternative future of government interaction lies in the space of not only speaking about change but acting on it in a way that has not happened before. The protests and calls for government action of yesteryear have transformed to civilian action through technology-aided social movements, data-driven app building, and a push both virtually and face-to-face to see change happen quickly on local, national, and global scales.*

The long-term decline in formal participation in governance, such as party membership and voting, masked a rise in informal participation, largely through single-issue activism. The Hacktivist movement provided an outlet and in effect a movement to rally around to “do something” about the system. In essence the desire to participate was there, but the system had long been operating in an “us vs. them” mode. The change in that ethos, some say, was critical.

The pressure came from the obvious possibilities that big data provided for more efficient and effective services. The Hacktivists pointed out these possibilities, and created a public relations nightmare for bureaucracies still caught in trying to control information and employing “spin doctors” in an attempt to manage public opinion. It became increasingly apparent to even the most die-hard old-schoolers that the gap between the potential for improved services and the delivery was so big that something had to be done.

A key difficulty in this transition was that some of the Hacktivist movement was viewed more along the lines of terrorists. Ironically, this split within the movement was what enabled it to go mainstream – much to the horror of hard-liners. Another way to think of the rapprochement is a new division of labor. Or, some might say, activities taken on by government over time went back....to churches, communities, to the local levels where they once belonged.

While the culture of government reinvention has many intriguing possibilities, there is a dark side to an environment where every action step, citizen voice, or data point can potentially usher in swift government action. The wrong influence or information could create changes that affect the public in negative ways. Similarly, the security of information (both public and government) remains a question going forward. Fortunately, budgetary concerns do not only spur innovation but keep it in check.

One thing for sure is that the world of Participation included lots of action in building, from tools to connections to organizational swells. It’s a block by block NationCraft. The gaming metaphor, thought it dates back to the early 2010’s, is appropriate in that much of civic participation is framed in terms of using big data capabilities to “rate and rank” citizen participation and performance in a game-like fashion. The scores are used as a basis for incentives and disincentives to encourage or discourage certain behaviors. Whether it is energy or water usage, recycling, or one’s level of volunteering, there are hundreds of different types

of civic engagement being tracked and monitored that give people a way to participate – in way they also helped create the activities and measures in the first place.

Some would say that what has really happened is the end of an era of government -- large, impenetrable, and labor-intensive. It is being replaced by an approach moving toward governing each individual separately by use of data and communication technology. Of course this is an exaggeration; it is more an ideal or vision (“everyone gets their own government”) but it has dramatically altered the perception of government and practice of governance. It has certainly created an expectation that individuals, including students, expect a direct voice on how their affairs are managed.

This alternative admittedly might be seen as a bit optimistic. There are several ways that it could turn out not-so-good. Below are three mini-alternatives in which key drivers do not play out favorably.

**Potential “negative” alternative: Big Brother lives**

An increase in terrorist attacks across America has spurred enhanced national security. The public, afraid and inflamed by fear-mongers in government and media are willing to trade for privacy for security. Government investment in security technology goes way up, particularly in the realm of cyber-security, surveillance, and drone technology.

Government crackdown on criminal activity escalates. Some areas of the Constitution have been suspended in the name of national security, and law-enforcement agencies are constantly being accused of human rights violations. Hackers and activists who try and expose government injustices are seen as threats to the government and civil obedience and are routinely arrested. Many of these trials are not made public, those accused are not tried by a jury of their peers, and after they are sentenced the chances of appeal are minimal to non-existent. Civic participation falls off because government is so tightly controlled and there is no room for activism.

Privacy is a forgotten concept from a forgotten age. The government routinely tracks and monitors all communication from its citizenry. Large government installations are built with the sole purpose of filtering all the data from every communication network in operation inside the U.S. and abroad. The NSA is granted power over all medical records for citizens. There are some protests, with many protesters being injured, arrested, or killed. Whistleblowers began disappearing with many believing them to be incarcerated or assassinated by the government. Those brave enough to expose government corruption quickly go into hiding.

**Potential “negative” alternative: Bureaucracy nightmare**

The government has overextended itself; it has become a bloated beast barely able to sustain all its departments and agencies. An artificially deflated unemployment rate rests solely on the number of employees hired by the federal and state governments. Federal spending has ground to a halt. The government doesn't have the money or resources to invest in infrastructure or many basic services and the incredibly high tax-rates prevent many companies from doing the same.

Many communities have taken it upon themselves to provide the services that they require. Civic activists and community leaders organize social services for numerous volunteer projects. While these activists try and get support from the government, the amount of red tape to cut through is often too much for most organizations to want to deal with. Government turnaround in replying to requests can take years, so more often than not, many community groups find themselves doing all the work alone. Many of these social activists find it hard to fill the gap left by an absentee government. This is true especially in the rural areas, as opposed to the cities, because of the limited number of people and resources in the less populated areas of the country. This lack of government support and the need for innovative results has led to the rise of the Maker community. People and communities are collaborating more often and sharing ideas, equipment, and expertise in order to get projects underway.

**Potential “negative” alternative: Corporate cities**

Corporations have either taken over the government or have enough political power that they can create or circumvent the law with no consequence or repercussion. Most functions of government have been privatized including health care, law enforcement, media, education, military, etc., and most social programs fall under the purview of employee benefits for those fortunate enough to find employment.

A cycle that perpetuates the immense gap between the “haves” and the “have-nots” is in effect. The only way to gain upward mobility is to either find employment with a corporation or find ways to make money through illegal means. Many freedoms have been taken away and people have formed underground rebellions to combat the power of mega-corporations. These rebels, deemed terrorists in the eyes of the ruling class represent the best hope for social reform.

Technological advancements have allowed for the creation of slave castes, either from clones or androids with sophisticated AI. In this world, students who come from wealthy families can afford the expensive costs of private universities. Students who can't afford tuition can gain sponsorship from corporations in return for an agreed upon term of service. This arrangement causes many students to become indentured servants to their corporate sponsors after graduation. Technology is quite advanced, and ubiquitous in society, yet it is often used by the corporations to keep the population in check.

## Chapter 6. Synthesis

This chapter looks across the six domains to develop key cross-cutting themes as a vital input to the principal focus of this project, the emerging needs identification in the next chapter.

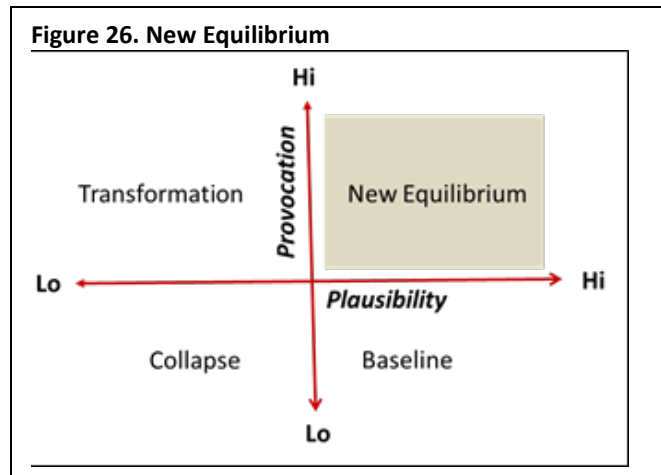
### Transitioning from baselines to alternatives

The scenario archetype approach was introduced in Chapter 2 to explain our viewpoint on possible economic futures. The baseline future largely extrapolates current trends in the various domains. There are, of course, other potential alternative futures. In all six of the baselines, the teams identified a strong trend of growing use and integration of technology, particularly information technologies, AI, robotics, and the like. If that trend were to collapse, the domains would in large part return to previous approaches. This is not very

plausible – but possible – and in terms of serving this project’s goal of stimulating provocative thinking about new potential student needs, it would not help much. We considered the possibility also of transformative futures, in which entirely new systems and rules of the game emerge in the domains. There are indeed hints of transformation in the scanning and forecasts, but we judged that transformation was probably too much of a stretch by 2025.

The model forecast archetype noted in the shaded region of Figure 26 that was judged to best serve the project goals followed a “new equilibrium” pattern of change: there is a challenge to the baseline direction and the systems supporting it by a combination of significant events and developments. This leads to accelerating changes that branch off the baseline. The alternative outcomes are substantially different futures, but not unrecognizable. The “systems” underlying the domains are challenged and changed and one might even say compromised, but the basic structures are still there. As we tested various approaches the alternatives – before committing to any single type – we found that this new equilibrium approach best met the dual tests of “plausibility” and “provocation.” Put simply, we found that a new equilibrium pattern of change is both quite plausible and produces a future that will indeed present significant challenges in terms of meeting student needs.

Table 4 lists the baselines and alternative forecasts for each domain, and highlights the “accelerators” or triggers for each. The baseline extrapolates present trends into future and the accelerators suggest how the baselines could be disrupted and shift towards the alternative futures.





The accelerators in Table 4 are offered as plausible explanations for the significant changes in the alternatives from the baseline. The specific details might be different, i.e., the specific technologies that trigger change might be different. They are offered as thematic descriptions with examples to help illustrate what they might look like.

<b>Table 4. From baselines to alternatives</b>				
<b>Baseline Title</b>	<b>Abstract</b>	<b>Accelerators</b>	<b>Alternative Title</b>	<b>Abstract</b>
<b>Living:</b> Easy Is Good	Lifestyle decisions are made to minimize effort, time, and commitment through convenience, smart technology, and immediate solutions where available.	A) Student debt bubble pops; stalled universal health care; double-dip recession B) Big Data, AI, analytics, sensors, wearables, etc. C) peer-to-peer collaboration	<b>Living:</b> The “Ours” Economy: The Rise of Collaborative Consumption	People use technology to enhance the quality of their lives, in particular to enable greater sharing and collaboration, such as forming communities to address their needs, sharing living spaces, finding group investment opportunities, and sharing consumer products.
<b>Learning:</b> Institutions under Pressure	Non-traditional approaches to satisfying learning needs are becoming increasingly difficult to ignore.	A) Edtech bubble pops and along with recession decreases enrollment in higher education B) New players make inroads, such as by meeting support-type needs. C) Social networks spread “success stories;” institutions respond	<b>Learning:</b> Student- Centric	A balance-of power transition away from traditional models of one-size-fits-all classroom instruction optimized for institutional goals gives ways to a student-centric approach to learning.
<b>Working:</b> The Super-Skilled, Messy Middle, and Warm Bodies	The hollowing out of middle class occupations, and growth only at the top and bottom of the wage scale.	A) “Slow” pace of automation masks transformation nature of coming tech-based changes B) Automation and pervasive artificial intelligence make deep inroads into the economy.	<b>Working:</b> Welcome to the Jungle	Students must be well-prepared, as they face an ultra-competitive job market influenced by the spread of AI and automation.
<b>Playing:</b> Scheduled Play	Play is increasingly purpose-driven, fulfilling some overt or implicit agenda.	A) “Psychological” barriers to gaming production lowered by hacker culture B) Physical barriers lowered by “democratizing” tools such as visualization, simulations, 3D printing, AR and VR C) Gaming spreads beyond play to work, education, etc.	<b>Playing:</b> It’s All Play	Gamification infiltrates so deeply into routine activities that it raises questions about the meaning of play when “everything” is a game.

<b>Connecting:</b> More Ways to Connect:	Technology is enabling a wider range of options for connecting and integrating into all aspect of human connections and relationships.	A) Continued progress in connecting technologies B) Virtual passes social tests of being “good for relationships” & transparency proves stronger than privacy C) Technologies for connecting are ubiquitous and “melded” into the background	<b>Connecting:</b> From Connection to Immersion	Distinctions between virtual and f2f are disappearing as the integration of two is well underway.
<b>Participating</b> Hacker Nation	An influential “hactivist” movement that promotes greater transparency of government emerges in opposition to “the system.”	A) Increased availability of data and tools for “hacking” B) “Constructive hackers outflank “destructive hedges C) Governments stop fighting and embrace the “constructive” and becomes more transparent and open	<b>Participating:</b> “NationCraft: Rebuilding Governance”	Hactivism triggers a movement that uses Big Data to provide more effective direct citizen participation in governance.

**Key themes**

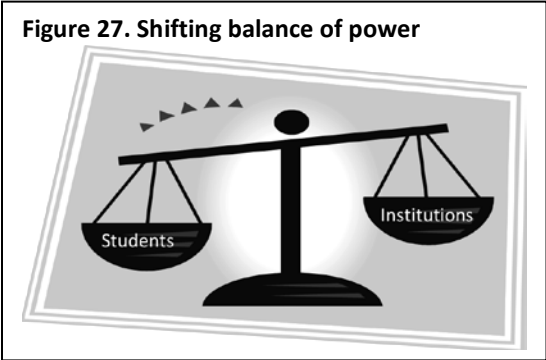
After the six alternative futures were crafted, they were analyzed for cross-cutting themes. We searched for patterns that were present across the set. The four identified themes are:

1. A shift in balance of power from institutions toward students.
2. A “blurring” among the six domains that makes them difficult to distinguish and thus difficult to address in isolation.
3. IT/AI technologies are both part of the “problem” – that is they drive change – and the “solution” – that is, they offer great potential for addressing student needs.
4. “Social” or non-technological issues are present, and must be “dealt with” for the alternatives to occur as described.

1. Shift from institutions toward students

The balance of power shifting toward students means that they will increasingly be dictating what needs to be “produced” rather than the institutions.

One might argue that this is indeed a transformative shift, and if fully bloomed, would probably be characterized as such. By 2025, however, it is still “in progress.” Indeed the pace of this shift could be suggested as the single most important development to monitor in the years ahead.



The shift toward student power is part of a larger social trend of the decentralizing of power in general. Society continues to shift from hierarchies to networks, enabled in large part by technologies that provide greater power to small groups and individuals vis-à-vis larger organizations. For example, in health care, patients are becoming more knowledgeable and powerful in their relationship to doctors. Hospitals are seeking to shorten stays, and home health care is growing. Wellness and prevention in the hands of individuals grows as a means to avoid institutional approaches. Individuals will have an increasingly powerful set of tools to better manage their own care. This pattern is repeating itself in many industries. Manufacturing, for instance, is shifting to more agile, flexible, and local approaches that will be further fueled by improvements in 3D printing and other “maker” technologies. In the workplace in general, core workforces are shrinking, as temporaries, contractors, allies, network partners and free agents form a new decentralized model of working.

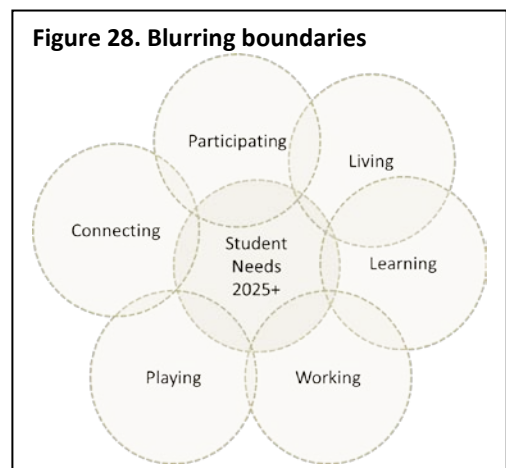
In these cases -- higher education included -- it is not suggested that large institutions will disappear, but simply that there will be fewer of them, and a general shift towards smaller and networked, which in turn re-distributes power to the individual. Sectors dominated by powerful institutions will be disrupted and decentralized as smaller-scale approaches improve their efficiency and build their capabilities, again fueled by technologies that place greater power in the hands of individuals. Of course, institutions with claim to leading roles in a sector are not likely to “go quietly,” and many will seek to maintain their existing position, and resist change. Others, most likely a minority, will see the changes coming and do their best to accommodate this shift.

This change will not likely take place at a consistent rate: some of the six domains will be disrupted faster than others. But the analysis finds a consistent pattern in which powerful tools in the hands of the individuals begin to pull the institutions toward them.

## 2. “Blurring” between domains

Perhaps the most striking or surprising theme to emerge was the blurring between the domains. Teams worked on their individual domains and were periodically brought together as a whole to share their results and questions. It was interesting to observe how often the teams had a difficult time in sorting out the boundaries of the domains. Again and again, one team would note that developments in their domains were mirrored by those in another.

The theme clearly emerged when it was noted that it would be increasingly difficult to tell if one was working, or playing, or learning, or connecting, or participating, or simply living. This development can be seen in the present, particularly in discussions around work-life balance, where for many,



people it is already difficult to separate when one is working from when they are not. Our findings suggest that this difficulty is going to be multiplied, as more and more activities involve all six domains. For example, a student living at home is playing a MOOG as part of a university class and connecting with friends who've been invited to play along with a domain of how to improve civic participation with the results going into their portfolio for the job they are planning to apply to. If you ask them what they are doing, they might be hard-pressed to give a simple response!

This development suggests it will be increasingly difficult to separate the domains. The blurring is occurring within and among the domains. For instance:

- in Living, the “death of the schedule” and just-in-time lifestyles break down traditional structures.
- In Learning, it becomes increasingly difficult to know what “counts” as learning.
- In Working, people will increasingly wonder “am I working now?”
- In Playing, gamification makes more and more activities seem like games.
- In Connecting, the digital and the real are increasingly integrated.
- In Participating, greater activism and engagement make it less clear who is governing and who is the governed.

A university, for instance, might assert that its mission is learning, but will be hard-pressed to focus solely on that. Learning, as an activity, has been constructed as a “separate” activity for which students are supposed to take time out of their “regular” life and go do. The ability to pluck students out and focus them just on learning will become increasingly challenging, much as it will be difficult for employers to keep workers focused just on work.

The blurring of student life will also challenge traditional notions of how to deliver “higher education.” The growing focus on providing skills for future jobs may actually be counter-productive to student needs. They need skills in a wide range of areas, and work may not necessarily be the dominant consideration -- the skills for work are similar to the skills for the other five domains.

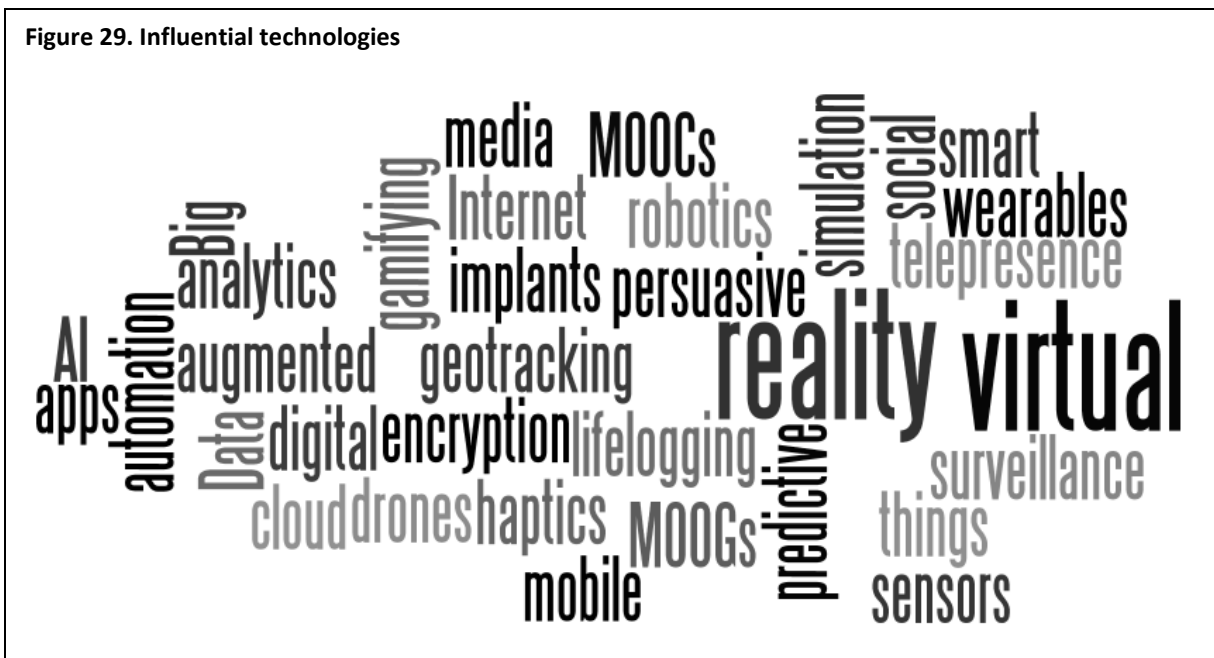
### 3. IT/AI technologies: “problem” and solution

The growing capabilities of a vast array of information and communication technologies are the single biggest driver of change across the six domains. Put simply, in looking at how student life is changing, there is no bigger driver than the growing influence of information technologies. In the forecasts mention an alphabet soup of influential technologies, shown in Figure 29.

A key point is that the teams questioned their assumptions and looked for ways that the increasingly influence of information technologies might not happen, and found little to stop it beyond economic collapse. There are social issues related to technologies that could slow it – these are covered in #4 below. A common theme across the domains was an incremental pace of their influence in the baseline forecast (even incremental is fairly rapid growth) followed by a

trigger point or reaching of a critical mass that accelerated that influence in the alternative forecasts.

It should be noted that this tech-heavy future will not be so foreign, in that the growth is continuous, students (and others) have time to adjust, and that the technology itself, as it becomes more ubiquitous, increasingly blends into the fabric of daily life. Over time, it becomes increasingly taken-for-granted and in the background rather than the forefront. All of the technologies noted in the alphabet soup in Figure 29, for example, are already here in the present to some extent. As they mature, they will become more effective and less apparent or noticeable. As people expressed wonder with their smart phones as they first emerged, they are now largely taken for granted today.



#### 4. “Social” or non-technological issues

The story is not simply a technological one, or put differently, technology does not emerge in isolation, but rather in a context of people and society that decide whether to use it or not. There could be some reasonable debates about whether people really have a choice, but the marketplace can be cruel to technologies that do not address some personal or social need. Many of the technologies forecast in this report have been around for years – even decades – but have been unable to offer a compelling enough value proposition to be adopted. That said, the forecasts do take the position that the values propositions will be largely resolved in favor of technology adoption, based on the assumption that their growing capabilities will indeed be seen as providing value.

An acceleration of the globalization of higher education is more likely to accelerate the changes suggested in the forecasts, although we did envision the possibility that institutions could respond to a potential loss of domestic students by moving more aggressively into global markets instead of addressing the domestic issues.

There are also technology-related issues that will have to be addressed along the way. Certainly the biggest issue that emerges from the forecast is the issue of how to balance openness and transparency with privacy. The forecasts assume the issue will arise, and be resolved more or less “successfully” to the degree that any slowdowns in technology adoption will be temporary. Other issues likely to emerge and play a significant role include:

- Automation and job loss
- Legal or IP issues
- Backlash issues, e.g., How will decision-making evolve? Will there be increasingly reliance on group decisions or AI entities?

### **Differences within the six domains**

The six domains, while inter-related, will not change in lock-step. Some will change faster or slower than others. As noted above the key driver across all six was the increasing spread of information technologies.

Two domains stood out as the most likely to be different. Playing had perhaps the widest range of potentially transformative possibilities. To capture these possibilities, the Playing alternative future includes six scenario vignettes of transformative possibilities. We used this mechanism to highlight the possibility that change may go “even faster” in this domain. At the other end of the spectrum, the Participating alternative future was judged to be the most likely of the six to veer toward collapse. Three scenario vignettes are included in the Participating alternative future to capture how this could play out.

To be clear, our position is that all six domains will proceed along a “new equilibrium” path, with the caveats that Playing was most likely to accelerate the fastest, and Participating most likely to be slowest, or even regress or collapse.

### **Issues or obstacles to monitor**

Individual issues or obstacles to the progress of the alternatives are noted within their individual descriptions. Below are some developments that do not necessarily sit within an individual domain, but could have a widespread influence on all of them.

- The “Singularity” as popularized by futurist Ray Kurzweil and now the subject of significant study (see “the Singularity Institute) suggests a transformative potential of developments in AI, robotics, nanotech, and biotech such that life “on the other side” of these changes is essentially un-knowable. Even though our forecasts were fairly optimistic on technology progress, that viewpoint pales in comparison to the disruptive

impacts foreseen by advocates of the Singularity. Most do not see this happening by 2025, but they also do not see it that far away from 2025 either. The progress of developments toward the Singularity thus bears monitoring.

- Another technological theme, related to the Singularity, but worth calling out separately, is the potential for significant advancement in human performance enhancement. This could take the form of directly altering the human body and mind, such as smart prosthetics, implants, or genetic engineering. It could also be more indirect through pharmaceuticals, diet, or even the ingestion of nanobots. As with the Singularity, it does not appear likely by 2025, but not that far outside of it either.
- Privacy and security issues are mentioned within the forecasts, but it is worth calling out here that a massive breakdown on these issues could have quite a dampening effect on the pace of change suggested by the forecasts. These are critical concerns that bear serious attention.
- A second significant social issue is the potential for “divides” and disparities – across so many aspects of life. While social and technological developments have the potential to create more access and opportunity, they also could be applied for more nefarious purposes to benefit some groups at the expense of others. This is captured to a degree in Participating, but the potential could spread across any of the domains.
- Finally, the Working alternative, “Welcome to the Jungle,” forecasts that jobs are more difficult to come by. Our team has explored a wide range of possibilities for the future of work and the economy, and we feel it is useful to note that it may also be possible that jobs are viewed as “less necessary” as 2025 approaches and beyond then. The context suggested in Chapter Two is relatively conservative, but it is possible that growing economic security may make “jobs” less necessary as society finds other mechanisms to distribute wealth.



## Chapter 7. Implications: Emerging Student Needs

### The process

We generated more than 300 raw needs (including duplication) within and across the four student types. The needs were generated in three ways:

- World Café Discussion forum session at the March 1 Student Needs 2025 Meeting
- Team Implications Workshop, April 4<sup>th</sup>
- Needs generated by individual team brainstorming

These raw needs went through several rounds of combining, modifying and clustering, to arrive at the final set of nine emerging needs. It was challenging to settle on a relatively small number, but our experience is that long lists are eminently forgettable.

We also tried hard to separate out historical and current needs and focus on emerging future needs. For instance, students clearly need financial support – always have and always will. Our “test” for whether to include it in our list of emerging needs was whether there was some sort of new development relating to that need in the future. Our sense in the case of financial need was that it would continue to be an important issue and that there wasn’t much terribly new to say about it. Given also our focus on stretching thinking beyond conventional views of higher education led us outside that box. It clearly does not mean it’s not important – it is vitally important – but it doesn’t pass our novelty test.

The line between present, emerging, and future is a blurry one that is difficult to draw.

### The emerging needs

The nine emerging needs (in no particular order):

1. *Re-skilling*: students need to know what skills they will need and how to master them
2. *Mentoring*: students need personalized guidance on what to do next and on other life lessons
3. *Continuous and real-time feedback*: students need to know how they are doing so they can

#### **World Café Meeting Format**

*Small Group Rounds*: The process begins with the first of three or more twenty minute rounds of conversation for the small group seated around a table. At the end of the twenty minutes, each member of the group moves to a different new table. They may or may not choose to leave one person as the “table host” for the next round, who welcomes the next group and briefly fills them in on what happened in the previous round.

*Questions*: each round is prefaced with a **question** designed for the specific context and desired purpose of the session. The same questions can be used for more than one round, or they can be built upon each other to focus the conversation or guide its direction.

*Harvest*: After the small groups (and/or in between rounds, as desired) individuals are invited to share insights or other results from their conversations with the rest of the large group. These results are reflected visually in a variety of ways, most often using graphic recorders in the front of the room.

For more info:

<http://www.theworldcafe.com/method.html>

#### **Needs vs. Services**

In identifying needs, the identification of the need itself and the meeting of it can be tricky. The project team was careful to focus on the identification of the need and distinguish it from the “service” for meeting that need.

continuously improve in order to “keep up” and move forward

4. *Frameworks (for navigating new uncertainties)*: students need to know what to do in various situations, particularly novel ones
5. *Credentials*: student need to document knowledge, skills and experiences acquired
6. *Experiences*: students need contact with people and the world that teach by doing
7. *Personalized instruction*: students need the means to acquire relevant knowledge and skills customized to their individual style
8. *Spaces, tools, and templates*: Students need physical and virtual supportive environments and tools for pursuing and acquiring knowledge and skills
9. *Differentiation*. Students need to find and communicate their personal value proposition that distinguishes “who they are.”

### The emerging needs explained

1. *Re-skilling: students need to know what skills they will need and how to master them*

We generated a list of emerging or increasingly important skills based on the forecasts. We realized, however, that these lists are produced rather frequently, as the skill requirements indeed change rather frequently. We decided the core need was not necessarily preparing for this or that proposed set of skills, but rather it was being capable of re-skilling on a regular basis. And related to that is having a sense of what those skills are.

There is an important point to be made about the changing nature of skill requirements for students: they go beyond a narrow description of learning and fit more closely with life skills. For instance, we identified bartering, citizenship, hacking, making, and personal branding among the twenty-six future skills we identified.

- |   |   |
|---|---|
| 1. Bartering  | 14. Hacking   |
| 2. Big data analysis                                | 15. Job (working)   |
| 3. Citizenship                                      | 16. Learning  |
| 4. Coalition-building                               | 17. Life logging  |
| 5. Collaborating (w/people and AI)                  | 18. Life skills, e.g., contracts, writing checks, doing taxes, running household, home and consumer economics |
| 6. Continuous re-skilling                           | 19. Making  |
| 7. Creativity and innovation skills                 | 20. Negotiating   |
| 8. Critical thinking skills: assumption challenging | 21. Personal branding   |
| 9. Cultural literacy                                | 22. Problem solving skills: real world problems(macro/micro)  |
| 10. Curating  | 23. Querying  |
| 11. Decision-making                                 | 24. Sharing   |
| 12. Discerning (evaluating)                         | 25. Social networking   |
| 13. Gaming/game-playing                             | 26. Technological literacy  |

## *2. Mentoring: students need personalized guidance on what to do next and on other life lessons*

In general, the need for mentorship regards the "skills" identified in #1 above, such as the need to know how to talk to AI, how to learn at the university level, help with personal strategic planning, or perhaps needing guidance on managing their privacy. The needs will also vary by student types. For instance, traditional straight-from-high school students need help in how to deal with their new-found "freedom," or adult students might need a refresher on "how to do school." Given that we suggest that the skills are continuously updating, the same would hold true for mentoring.

In terms of service ideas, or forms the mentoring might take, we considered the possibility of students (or their parents or significant others) hiring agents or life coaches. One more "outlier" idea was an updated form of "godparents" assigned at birth that were geared more to an education role – or something akin to a Big Brother or Big Sister. Another possible approach was that instead of one mentor or coach was the possibility of several of a narrower nature ("meal share" buddies, "car share" buddies, "Daycare Co-op partners)."

People could fill all of these roles, or it might be that AI-based avatars that could fill some of them.

## *3. Continuous and real-time feedback: students need to know how they are doing so they can continuously improve in order to "keep up" and move forward*

Students will need to know how they are doing on a wide range of tasks or activities. They will range well beyond just education-related to include the spectrum of one's activities and life. How is one's "reputation" score on social networks or citizenship index score? How is one doing on extra-curricular activities? How is their work-life-study balance? A key need is to know where one stands as a guide to direct ways to improve.

The future context suggested by the forecasts is one where ubiquitous technology – sensors, Big Data, AI, and the cloud – mean that everything can be measured and increasingly will be. Students will face the same performance scrutiny, perhaps even more. While the top students are likely to be okay, the majority may feel intense pressure to perform, particularly if the job market is as tight as forecast here. They will be searching for an edge in an ultra-competitive battlefield, thus even when "monitoring" is not required per se, they may opt to do it for themselves.

Services are likely to include some form of lifelog to capture feedback, activities, accomplishments, etc. The feedback will come from multiple sources -- AI, mentors/coaches, peers, personal trainers, teachers, etc. Some will be standard metrics while others may be highly personalized. Some may be concerned about their knowledge in particular subjects of interest, or health measures, or game-playing performance. Some may customize their own compilations or indexes of metrics. Trends toward postmodern and integral values might

suggest, for instance, a “making a difference” metric that measures one’s overall contribution to planetary or local well-being.

4. *Frameworks (for navigating new uncertainties): student need to know what to do in various situations, particularly novel ones*

The use of frameworks here is in the sense of guidelines and structures for students to follow, particularly in novel areas where it is not clear what to do. For instance, the spread of mobile phone technology to the mainstream led, eventually, to an etiquette for when and how it was okay to answer. The intent here is to be more proactive in the sense of developing frameworks “earlier” in the emergence of novelty with an understanding that they be flexible and adaptable.

The forecasts indeed suggest a wide range of novel situations emerging in the future, thus we anticipate the need for a variety of frameworks. For instance, they might be needed around:

- |   |                                    |
|---|------------------------------------|
| 1) social interaction                           | 7) rites of passage                |
| 2) acquiring credentials                        | 8) physical and virtual protection |
| 3) expressing one's personal style and identity | 9) citizenship                     |
| 4) performance enhancements                     | 10) costs                          |
| 5) educational opportunities                    | 11) living with others             |
| 6) blending virtual and physical worlds         |                                    |

The idea is that there will be a great deal of uncertainty for students within these broad areas, and students will be looking for help in how to navigate them. For instance, the forecasts suggest the possibility of a much greater development and availability of performance-enhancing drugs. Today’s students are often dabbling in illicit substances to help them study longer or focus better, but because this is unsanctioned and in some cases even illegal, there are safety risks to the students and the potential for unfair advantage. In a future of heightened competition among students and with greater available options, one could easily envision a serious situation or even epidemic. This presents the question of what is to be allowed or how to handle the potential for further “underground” use.

The services in this case are not necessarily in the form of offerings in a transaction sense, but are likely to emerge from governing bodies or institutions, with the participation of those affected.

5. *Credentials: students need to document knowledge, skills and experiences acquired*

This need is a historic one, and is getting increased attention today as more options are opening up for credentials, with the emergence of myriad certificate/certification offerings, MOOCs, open courseware and so on. Students need to know what counts, for how much, and who recognizes it.

The forecasts suggest this need for credentials will not only intensify in the educational space, but expand across the spectrum of activities in student life. The ability to measure and monitor practically any activity could lead to a future in which few actions are not accounted for in some fashion. For instance, the anticipated expansion of gamification and gaming-related skills could mean that “fun” activities may actually be ranked and rated and part of one’s portfolio. One’s level of civic engagement could likewise be captured in a credential, raising the potential for a massive need to compare credentials.

In terms of services, there will likely be tremendous potential for conflict between the need for agreed-upon standards on the one hand and the desire for institutions to have a differentiated offering on the other. Yet one could argue that perhaps no need is of greater importance to student success. The “control” of necessary credentials is a tremendously powerful lever. Of course, the same pressure exists at the student level to differentiate themselves from their fellow student competitors.

For the student, it suggests a need for a lifetime personal record or portfolio of credentials that captures the full range of what they bring to the table. The control, management and vetting of this record/portfolio will be an important consideration to sort out. Another potential issue could be the potential for overload and/or increased stress when everything is measured. It is likely, therefore, that much of this measuring and monitoring will proceed in the background, and accessed when necessary.

#### *6. Experiences: students need contact with people and the world that teach by doing*

Students will increasingly follow the long-term social trend of a greater desire for positive experiences. In practical terms, they will increasingly opt for an interesting experience over accumulating materials goods or possessions. They will put a higher value on the quality of their contacts and relationships as a measure of their well-being. For some, the ability to connect and network comes natural, but for many it does not -- thus assistance is needed. Experiences will be viewed as increasingly important supplements to required credentials in the education space and indeed may become subject to measuring and credentialing themselves, i.e., what is your social or professional network score, with the credential being a required minimum score.

The forecasts suggest that student success will go beyond simple measures like grade point average to capture a fuller range of who the student is and what they offer. It may be that having a wide range of experiences is a key differentiator for student success.

Services may include the ability to offer, or at a minimum acknowledge, a wide range of experiences as a part of student evaluation. It could be, for instance, that academic course offerings could converge, and it is the experience offerings that provide differentiation among institutions. For instance, an increasingly global educational marketplace may make it more practical for partner universities and a great expansion of exchange programs. Students in the future might wonder why their predecessors were “stuck” at the same university for four years,

since they routinely spend semesters at other universities both within the US and abroad. Employers concerned about having students “ready to work” might regularly sponsor programs at a university designed to provide real-work experience. Our own university, for example, has a hotel on campus run by the students of that academic program. Such programs could be dramatically expanded in the future.

*7. Personalized instruction: students need the means to acquire relevant knowledge and skills customized to their individual style*

One could say that students have always needed personalized instruction. What’s different in the future is that the means to provide such personalized instruction are likely to be far more available and capable. Mass approaches arose out of necessity, as individualized instruction is relatively expensive. It has tended to encourage standard curricula and outcomes – although arguments over these have often been fierce.

The forecasts suggest a world with greater tools for individualized instruction. This assumes that the student would need to know the desired outcomes and then be capable of choosing or following a path best suited to their unique needs. Thus, a more student-centric approach to learning requires greater student responsibility for their education. The difficulty of achieving this will vary by student types. For independent learners, this will be a relatively straightforward development. For first generation, it could be challenging, and thus our identification of related needs around frameworks and mentoring.

The availability of ubiquitous measuring and monitoring systems should enable students to discern their own style and what works for them. For this to work, however, the credentialing system will need to be revamped to accept “outcomes” that are judged to be of sufficient quality, however they are achieved.

For services, the solution will involve providing more effective individualized learning models using learning approaches and assessment that suit the learner's preferences, styles, strengths and weaknesses. Institutions would become less about providing content and skill-delivery, and more like open labs and incubators with professors to guide and support.

Perhaps the biggest challenge is the stretch of personalization beyond just learning but to all aspects of student life. In the workplace, for instance, it may be that to get the best out talent, employers encourage customized approaches to getting the job done, which raises issues around “fairness.” Personalized approaches to health could require menus that can provide twenty different meals for twenty different students. The coordination and logistics of meeting these needs again assume a high degree of information technology capabilities.

*8. Spaces, tools, and templates: Students need physical and virtual supportive environments and tools for pursuing and acquiring knowledge and skills*

The shift to a more student-centric learning approach will shift student needs and relationships to both virtual and physical spaces. The forecasts, in particular the move toward gamification and “It’s All Play,” suggests that student learning approaches will be much more about students seeking, or being provided with, challenges (or learning objectives) and then figuring out how to meet them. In order to meet these learning challenges, students will need the appropriate support in terms of places, tools, and templates – both in the physical and virtual worlds.

The relationship between physical and virtual space will likely be an ongoing balancing act, as students and institutions experiment with various approaches and combinations. A “division-of-labor” will likely evolve to sort out where activities best fit. For instance, in terms of learning, traditional physical classrooms were set up for lectures to groups of students, but it may be that this activity is best suited to online and perhaps asynchronous.

Tools need to be available to support and capture the learning, experience, play, credentials, etc. wherever it happens, with templates providing the guidelines or structure for the activity. The responsibility for learning shifts to the student – they have the objective and the means and thus can “learn” in the way that best fits them. Multi-player online games today provide a glimpse of the development in the virtual space as they coordinate huge number of individuals in a virtual space, provide a game template, and various tools for playing the game.

As the variety of learning experiences expands, the classroom in turn expands to practically anywhere. A service offering might take the form of the various “maker” hubs springing up today. They foreshadow this development in the sense of participants paying a monthly fee to access various equipment, such as 3D printers, for making objects, after they have acquired the necessary training. The space is flexible and configurable and can be integrated with the online world, or use augmented or virtual reality.

*9. Differentiation. Students need to find and communicate their personal value proposition that distinguishes “who they are.”*

An informal objective of the college experience has been to help students “find themselves” and find out what they want to do with their life. But little help is provided. Students are largely on their own and it’s hit-or-miss.

The proliferation of technologies and systems for assessing and measuring individual contributions across student life will create pressure on students to focus – since everything is being measured. At the same time, these tools will help students find their focus. This does not suggest students must “lock in” at a young age (though some will, and will have been advised to do so), but rather have a clearer sense of the “value” they are providing at any particular moment in time. They may consciously shift that value proposition over time, and by being conscious of this process, can more effectively communicate about it.



A world of greater transparency in which everything is watched, known, and publicly available, puts greater pressure on individuals to distinguish themselves from others. First, one must develop the insight and understanding of one’s self. Then, it is about communicating that self, not in a way that one would sell consumer products, but rather in a way that authentically communicates the story of “you.”

Probing deeper on needs

Table 5 identifies some exemplary services offerings for meeting the emerging student needs as well as issues that are going to influence whether or how effectively they are likely to be addressed. With reskilling, for example, the types of services offerings that could help address these needs would include the development of competency models, greater use of learning outcomes in higher education, and more useful projections of futures skills. An issue would be whether these projections would be accurate enough to be useful. Each emerging need is thus illustrated with examples of services for meeting the along with the issue or issues.

<b>Table 5: Needs, services, and issues</b>		
<b>Emerging need</b>	<b>Example “service”</b>	<b>Issues</b>
<u>Re-skilling</u> : students need to know what skills they will need and how to master them	Competency models Learning outcomes Projections	Is there foresight available to project future skills dependable enough?
<u>Mentoring</u> : students need personalized guidance on what to do next and on other life lessons	Mentors or life coaches AI personal assistants	Are there enough mentors to go around?
<u>Continuous and real-time feedback</u> : students need to know how they are doing so they can continuously improve in order to “keep up” and move forward	Personal, e.g., real-time “grading”; AI/big data quantification devices	How real-time does it need to be? Is there a point of too much feedback?
<u>Frameworks (for navigating new uncertainties)</u> : students need to know what to do in various situations, particularly novel ones	Schemas, codes, rules, roadmaps	If institutions provide these, will anyone believe or use them?
<u>Credentials</u> : students need to document knowledge, skills and experiences acquired	Diplomas, certificates, badges	Whose credentials have credibility?
<u>Experiences</u> : students need contact with people and the world that teach by doing	Internships, travel, experiments	How does this tie to improving student life? Do they get credentials for this?
<u>Personalized instruction</u> : students need the means to acquire relevant knowledge and skills customized to their individual style	Learning needs assessments; personal or AI tutors	Is this approach affordable? How do group approaches fit?
<u>Spaces, tools, and templates</u> : Students need physical and virtual supportive environments and tools for pursuing and acquiring knowledge and skills	Tech hub; Second life for learning; degree plans	How to provide appropriate “generic” support to “customized” learners?
<u>Differentiation</u> : Students need to find and communicate their personal value proposition that distinguishes “who they are.”	Personal brand	Is there too much competitive pressure? Will this cause too much specialization?

Table 6 looks at how the intensity of the nine emerging needs differ – or not – across the four student types. The emerging needs affect all four student types as that was a key criteria in their selection. The “++” score indicates a particularly strong or intense need of that student types compared to the others.

In a few cases, there was a single type more impacted than the others, re-skilling for adults, continuous and real-time feedback for first gen, and credentials and spaces, tools, and templates for independents. With mentor, first gen and independent were both judged to have a greater need than traditional and adults.

There were also a few cases where an emerging need was particularly strong among three of the types and less so for one. For instance adult learners were judged to have a less acute need for experiences and for differentiation (as they are more likely to have done so). Independents were judged to have less of a need for personalized instruction, since that is already their predominant mode.

The one emerging need determined to be equally acute across the types was for frameworks for navigating the new uncertainties. In this case, novel situations in the future would present equally challenging situations with little precedent to draw upon.

<b>Table 6: The nine emerging needs and the four student types</b>				
<b>Emerging need</b>	<b>Traditional</b>	<b>First Gen</b>	<b>Adult</b>	<b>Independent</b>
<u>Re-skilling</u> : students need to know what skills they will need and how to master them	+	+	++	+
<u>Mentoring</u> : students need personalized guidance on what to do next and on other life lessons	+	++	+	++
<u>Continuous and real-time feedback</u> : students need to continuously improve to “keep up” and move forward, and need to know how they are doing	+	++	+	+
<u>Frameworks (for navigating new uncertainties)</u> : students need to know what to do in various situations, particularly novel ones	++	++	++	++
<u>Credentials</u> : students need to document knowledge, skills and experiences acquired	+	+	+	++
<u>Experiences</u> : students need contact with people and the world that teach by doing	++	++	+	++
<u>Personalized instruction</u> : students need the means to acquire relevant knowledge and skills customized to their individual style	++	++	++	+
<u>Spaces, tools, and templates</u> : Students need physical and virtual supportive environments and tools for pursuing and acquiring knowledge and skills	+	+	+	++
<u>Differentiation</u> : Students need to find and communicate their personal value proposition that distinguishes “who they are.”	++	++	+	++

## Appendices

### A1. Some Recent Sources on Future of Higher Education (2013 to present)

*A Case for Student-Centered Learning*, Bob Lenz, Envision Education  
February 13, 2014  
<http://www.edutopia.org/blog/a-case-for-student-centered-learning-bob-lenz>

*A Stronger Nation through Higher Education*, Lumina Foundation, April 2014  
[http://www.luminafoundation.org/publications/A\\_stronger\\_nation\\_through\\_higher\\_education-2014.pdf](http://www.luminafoundation.org/publications/A_stronger_nation_through_higher_education-2014.pdf)

*Confronting the Myth of the 'Digital Native,' The Digital Campus 2014: Why Online Identity Matters*, Megan O'Neil, April 21, 2014  
<http://chronicle.com/article/Confronting-the-Myth-of-the/145949/>

*Creating Coders: Building Computer Science Skills in K-12 and Beyond*, Kevin Hardy, April 21, 2014  
<http://www.ewa.org/blog-educated-reporter/creating-coders-building-computer-science-skills-k-12-and-beyond>

*Do-It-Yourself Education Is the Ideal*, Anya Kamenetz, September 30, 2013  
<http://chronicle.com/article/Do-It-Yourself-Education-Is/141885/>

*Failure to Launch: Structural Shift and the New Lost Generation*, Anthony Carnavale, Andrew Hanson, and Artem Gulish, Center on Education and the Workforce, September 2013  
<http://cew.georgetown.edu/failuretolaunch>

*5 Bold Predictions for the Future of Higher Education: What, Where, and How Will We Learn?* Fast Company, Brad Lukanic, April 23, 2014  
<http://www.fastcoexist.com/3029109/futurist-forum/5-bold-predictions-for-the-future-of-higher-education>

*Future of Higher Education*, Educause Library, 2013  
<http://www.educause.edu/library/future-higher-education>

*KnowledgeWorks Forecast 3.0*, 2013  
<http://knowledgeworks.org/learning-in-2025>

*LAPTOP U: Has the Future of College Moved Online?* New Yorker, Nathan Heller  
May 20, 2013  
[http://www.newyorker.com/reporting/2013/05/20/130520fa\\_fact\\_heller?currentPage=all](http://www.newyorker.com/reporting/2013/05/20/130520fa_fact_heller?currentPage=all)

*Learning and Living at Stanford: An Exploration of Undergraduate Experiences in the Future*, Stanford d.school  
<http://www.stanford2025.com/>

*MOOCs Move Beyond the Perfect Media Narrative*, Jeff Selingo, November 24, 2013  
<http://chronicle.com/blogs/next/2013/11/24/moocs-move-beyond-the-perfect-media-narrative>

*National Academies Release: The Mathematical Sciences in 2025*, Mark L. Green & Scott T. Weidman, September 1, 2013  
<http://www.siam.org/news/news.php?id=2095>

*New Study Reveals Most Important Skills for Students*, October 15, 2013  
<http://www.microsoft.com/en-us/news/press/2013/oct13/10-15skillspr.aspx>

*NEXT: The Future of Higher Education*, Special Report, The Chronicle of Higher Education, May 9, 2014  
<http://chronicle.com/section/NEXT-The-Future-of-Higher/751/>

*Powerful Learning: Studies Show Deep Understanding Derives from Collaborative Methods*, Brigid Barron & Linda Darling-Hammond, April 26, 2014  
<http://www.edutopia.org/inquiry-project-learning-research>

*Prospective Adult Students Miss Key Data on College Options, Report Says*, Katherine Mangan, November 4, 2013  
<http://chronicle.com/article/Prospective-Adult-Students/142815/>

*The Future of Higher Education? Five Experts Give their Predictions*, Chris Parr, March 5, 2014  
<http://www.timeshighereducation.co.uk/the-future-of-higher-education-five-experts-give-their-predictions/2011867.article>



*The New, Nonlinear Path through College*, Jeff Selingo, September 30, 2013  
<http://chronicle.com/article/The-New-Lifelong-Nonlinear/141867/>

*The Promises of Higher Education: Access, Campaign for the Future of Higher Education*, October 23, 2013  
<http://futureofhighered.org/workingpapers/>

*Westport 2025: Initiative Brings Parents Back to Classroom*, Paul Schott, March 12, 2013  
<http://www.westport-news.com/news/article/Westport-2025-Initiative-brings-parents-back-to-4348053.php#page-2>

*What the Open-Data Movement Means for the Future of Colleges*, Jeff Selingo, October 17, 2013  
<http://chronicle.com/blogs/next/2013/10/17/what-the-open-data-movement-means-for-the-future-of-colleges/>

## A2. Team Bios

Role	Name and Bio	Photo
Principal Investigator	<p><b>Dr. ANDY HINES</b></p> <p>Dr. Andy Hines is Program Coordinator of the University of Houston’s Graduate Program in Foresight, bringing together the experience he earned as an organizational, consulting, and academic futurist. He is also speaking, workshopping, and consulting through his firm Hinesight. Before that, he was Managing Director of Social Technologies/Innovaro, and served as an Adjunct Professor with the university since 2004. Hines enjoyed earlier careers as a consulting and organizational futurist. He was a partner with Coates &amp; Jarratt, Inc., a think tank and consulting firm that specialized in the study of the future. He was also Futurist &amp; Senior Ideation Leader at Dow Chemical with a mission of using futures tools and knowledge to turn ideas into new business opportunities. Before that, Hines established and ran the Global Trends Program for the Kellogg Company. Among his five books are Teaching about the Future: The Basics of Foresight Education (Palgrave Macmillan, 2012) and Thinking About the Future: Guidelines for Strategic Foresight (Social Technologies, 2007). He has also authored dozens of articles, speeches, and workshops and ha appeared on several radio and television programs. He also co-founded and is former Chair of the Association of Professional Futurists.</p>	
Content Review	<p><b>Dr. PETER BISHOP</b></p> <p>In 2013, Dr. Bishop retired as an Associate Professor of Strategic Foresight and Director of the graduate program in Foresight at the University of Houston. He has published two books on the subject: Thinking about the Future: Guidelines for Strategic Foresight (2007) and Teaching about the Future: The Basics of Foresight Education (2012), both with co-author Andy Hines. He delivers keynote addresses and conducts seminars on the future for business, government and not-for-profit organizations. He also facilitates groups in developing scenarios, visions and strategic plans for the future. Dr. Bishop is a founding Board member of the Association of Professional Futurists and President of his own firm, Strategic Foresight and Development, that offers training and facilitation to businesses and government agencies. He received his doctoral degree in sociology from Michigan State University in 1974.</p>	

Project Manager

**ALEXANDRA WHITTINGTON**

Alexandra has taught undergraduate foresight courses as an adjunct lecturer at the University of Houston since 2009. She has authored and coauthored articles for publications including *The Futurist* magazine and the journal *Futures*. Alexandra was a recurrent guest on KPFT Pacifica's (90.1 FM, Houston) *Growing Up In America*, and has appeared on Radio Saigon Houston (900 AM) and Houston Community College TV's (HCCTV) *Dialogue Houston*. Ms. Whittington has a B.A. in Anthropology and M.S. in Studies of the Future.



LIVING Lead & Personas Team

**TERRY GRIM**

Terry has a background in foresight, strategy development, customer engagements, and large-scale and mission-critical software projects for government and Fortune 500 companies. Terry's experience includes senior positions at IBM as a member of the space program software development team, an international management assignment, and a headquarters position in Corporate Strategy. After IBM, Terry became a consultant in foresight and strategy and is a partner with Foresight Alliance. She is also an adjunct professor for the master's program in Foresight at the University of Houston. Terry is the author of the Foresight Maturity Model (FMM), a results-oriented approach to evaluating an organization's foresight capacities based on best practices in the field. Terry has a BS in Computer Science from University of Florida with High Honors and an MS in Studies of the Future from the University of Houston, and will soon complete an MA in Industrial-Organizational Psychology, from the University of Houston – Clear Lake. Terry is a member of the Association of Professional Futurists and the World Future Society.



LIVING Analyst & Personas Team

**KATE BURGESS-MACINTOSH**

Kate Burgess-Mac Intosh brings experience fueled by enthusiasm and creativity, and the eye and problem solving skills of an artist to her work. Kate is an emerging futurist, completing graduate level coursework in Foresight. She has a Master's Degree in Museum Studies from Harvard University Extension School, and a B.A. in Fine Arts and Art History from Montserrat College of Art. Kate's present work includes facilitating creative mash-ups through her company, Revitalizing Historic Sites; she consults for institutions considering revitalization through new initiatives, social media, unique partnerships, and working with artists, and works with artists, museum professionals, and students on career positioning, personal marketing, and self-branding.





LIVING Research  
& PLAYING  
Research

**MIKE IVICAK**

Mike Ivicak joined the University of Houston Foresight Program in 2009 and is slowly inching his way towards completion of the Masters in Foresight degree. Currently, Mike works as an IT Consultant implementing Business Process Management (BPM) software in the Kansas City area, where he lives with his wife, Angie and twin sons, Luka and Declan. He has over 20 years of IT experience in the health care, investment and insurance industries, but secretly aspires to be a technology strategist. Until then, Mike enjoys watching the speed of technological change around us, listening to garage rock and lounge music and chasing around Luka and Declan.



LEARNING Lead

**ROSS SHOTT**

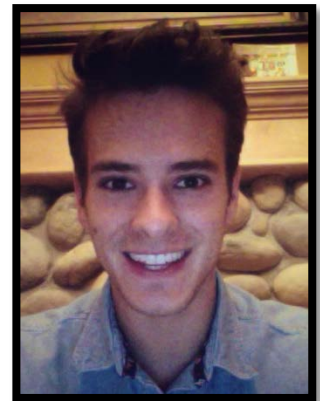
Over 25 years Ross Shott has led military units, manufacturing plants, service operations, retail establishments, construction projects, distribution chains, and educational institutions. He has worked with for-profit/non-profit entities ranging from entrepreneurial start-ups of 3 members to established corporations with over 25,000 employees. He uses his unique blend of strategic foresight education and practical management experience to coach executives one-on-one for leadership enhancement and to mentor management teams for enterprise transformation. Ross acquired his Bachelor of Science in Business Administration from Thomas Edison State College, his Master of Technology in Strategic Foresight from the University of Houston, and is just finishing his Doctorate of Psychology in Human Performance. Mr. Shott is currently the CEO of Psyphers Group, adjunct faculty in the UH Foresight Program, and Graduate Studies Program Director at Singularity University.



LEARNING Analyst

**MACKENZIE DICKSON**

Mackenzie Dickson is a graduate student of the MSc in Foresight program at the University of Houston and is currently an intern in the Foresight Unit in the Social and Human Science Sector of the United Nations Education, Scientific and Cultural Organization (UNESCO). He has focused his foresight research on the future of values, learning and education. Mackenzie's background is in psychology and he leads programs for youth on personal and social development, communication, and leadership. Mackenzie has facilitated programs at the Haven Institute and lead workshops in Canada, Kenya and Israel.





LEARNING Research  
& Social Media Lead

**KATIE KING**

Katie King is in her first year in the Master's in Foresight program. She is a middle school English teacher in Northern California and previously worked for a health foundation in Los Angeles. She has a bachelor's degree in journalism from the University of Southern California and was born and raised in Houston.



CONNECTING Lead

**TERRY COLLINS**

Terry Collins is a Foresight consultant and a lecturer and researcher at the University of Houston in the College of Technology. Terry has given five presentations at the World Futures Society and two at the regional Project Management conference. She has appeared on "Great Day Houston" and moderated a Futures Panel at the Mensa regional conference. Terry has peer-reviewed publications in *Foresight*, *Futures Quarterly Review*, and *On the Horizon*. Terry has a B.A. in Philosophy and a Masters in Foresight from the University of Houston.



CONNECTING  
Analyst

**JIM BREAU**

Jim Breau is a dynamic speaker, accomplished facilitator, futurist and foresight professional with experience in Infrastructure and engineering management. He has earned a BSIE, Cullen College of Engineering, and MSF, College of Technology, from the University of Houston. His professional affiliations include Association of Professional Futurists- Gatherings Team, World Futures Society, World Futures Studies Federation, and Institute of Industrial Engineers.



CONNECTING  
Research  
&  
Graphic Design Lead

**OMAR SAHI**

Omar is a second semester graduate student studying Foresight at The University of Houston. He has conducted research on the future of personal photography and the future of news media thus far in the program. A background in the Fine Arts largely informs Omar's research interests: he has a BFA from the Studio for Interrelated Media at the Massachusetts College of Art and Design. Still recovering from a nomadic childhood spent between Pakistan, Saudi Arabia, Italy, The Netherlands, Canada and The United States, Omar spends most of his time speculating about the future, identity, art, and sapience.



PARTICIPATING  
Lead &  
Personas Team

**CHRISTOPHER MANFREDI**

Christopher Manfredi is a technology consultant based out of Houston, Texas. He is a graduate of the University of Houston's Foresight program and the University of Houston's Bauer College of Business with a Master's of Business Administration with emphasis in Data Analytics. A lifelong learner, Christopher has worked as an electrical engineer, a military paralegal, a logistical manager, and a licensed massage therapist all while finding the time to visit over 80 countries. Interested in sustainable societies and an interconnected universe, Christopher can be found blogging, surfing, or skateboarding at a city near you with his dog, Tank.



PARTICIPATING  
Analyst

**APRIL KOURY**

April Koury grew up in Texas and attended UT business school (BBA). She joined Peace Corps right after graduation and was sent to a small Moroccan village for two years. While there, she and other women and April built a small shop for selling handcrafts to tourists. She came back to the states, worked for a bit and joined the UH Foresight Graduate program, where she was summoned to her current posting as a Graduate Assistant by Dr. Peter Bishop. April has traveled throughout Europe, parts of the Middle East/North Africa, and most recently South East Asia. Her favorite city thus far has been Berlin, although Ourazazate, Morocco holds a special place in her heart since it was the only city in the region that had a supermarket with good cheese. She lives in Katy, TX and plans to complete a degree in Foresight by the end of summer 2014. She is a member of both the WFS and the APF.



PARTICIPATING  
Research Assistant  
& Research "At  
Large"

**WILL BROWN**

Will Brown is a graduate (B.A.) of the University of Arizona. He has worked as a college English and math tutor, and was a Congressional Intern in the office of U.S. Representative Gabrielle Giffords, where his duties included greeting visitors, logging constituent requests, and performing research utilizing various Congressional resources. Will enjoys writing, blogging, and exploring the different interactions available through social media.



PLAYING Lead

**CODY CLARK**

Cody has degrees in Mathematics and Studies of the Future. As an unabashed generalist, he’s not only a futurist, but also a systems analyst, a software engineer, a business process expert, a Six Sigma Black Belt, and a marriage educator. He’s tracked trends for baby food makers and envisioned technologies with Taiwanese research scientists. He’s taught optometrists and priests how to do strategic planning and hundreds of married couples how to argue more effectively.

Cody likes to mix his professional and personal life in creative ways. He has applied system dynamics to marriage, supply chain management to his household laundry, and statistical process control to parenting. Cody is grateful for the people in his life that tolerate his "ideas," primarily his wife Heidi of 26 years and his four children, one by birth and three adopted. Along with collecting children, Cody loves duct tape, cardboard, poetry, sitting and thinking, and art.



PLAYING Analyst

**LAURA SCHLEHUBER**

Laura is a Consultant in Ernst & Young’s Human Capital practice, and is based in the Houston office. Her areas of expertise include actuarial audit support, actuarial valuations, payroll service delivery design and transformation, benchmarking, human resource and payroll audit reviews and process assessments. Laura received a Bachelor of Science in Applied Mathematics and in Statistical Science from Southern Methodist University. She is currently pursuing a Master’s degree in Foresight from the University of Houston.



WORKING Lead

**MORGAN KAUFFMAN**

Morgan Kauffman received a BS in geology and a MS in strategic foresight from the University of Houston, with work focusing on energy and environmental issues and research on climate change policy. Since earning his degrees, he has had experience in international relations, technology forecasting, and public policy analysis. He is currently the director of the Interlock Project, a research project focused on cataloguing and analyzing the interconnections of twelve major policy problems facing the United States.



WORKING Analyst

**JASON SWANSON**

Jason Swanson is a Futurist and graduate student in the University of Houston’s Foresight program. Much of Jason’s foresight work centers on the Future of Education and Learning Technologies. He is a research associate of the European Future Observatory, and Futurist at the PA Leadership Charter School, and his work has been featured as part of “The Best of University of Houston” panel, the World Future Review, and the Futurist. Jason lives in Pittsburgh, Pennsylvania, is a member of both the World Future Society (WFS) and the Association of Professional Futurists (APF).



WORKING Research  
& Scanning Link  
Curator

**JOYCE REDLON**

Joyce completed a B.S. in Consumer Science & Retailing at University of Houston in May 2013. She is currently working on a master's degree in Foresight from University of Houston. She says: “My exceptional instructors and colleagues are my inspiration.” Joyce is also an ESL (English as a Second Language) tutor for Volunteer Houston, the largest of all Literacy Advance programs.



## References

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- <sup>1</sup> A. Hines & P. Bishop, "Framework foresight: Exploring futures the Houston way," *Futures*, 51, July 2013, 31–49.
- <sup>2</sup> [http://nces.ed.gov/programs/digest/d11/tables/dt11\\_200.asp](http://nces.ed.gov/programs/digest/d11/tables/dt11_200.asp)
- <sup>3</sup> A. Hines, *ConsumerShift: How Changing Values Are Reshaping the Consumer Landscape*, Tucson, AZ: No Limit Publishing, 2011.
- <sup>4</sup> A. Hines, *ConsumerShift: How Changing Values Are Reshaping the Consumer Landscape*, Tucson, AZ: No Limit Publishing, 2011.
- <sup>5</sup> N. Howe & W. Strauss, *Generations: The History of America's Future, 1584 to 2069*, Quill, [reprint] 1992.
- <sup>6</sup> American Generations: Seniors, Innovaro Global Lifestyles #2009-39.
- <sup>7</sup> American Generations: Baby Boomers, Innovaro Global Lifestyles #2009-14.
- <sup>8</sup> American Generations: Gen X, Innovaro Global Lifestyles #2009-29.
- <sup>9</sup> American Generations: Millennials, Innovaro Global Lifestyles #2009-34.
- <sup>10</sup> Generation Z, Innovaro Global Lifestyles, Spring 2010, GL-2010-8.
- <sup>11</sup> <http://www.csmonitor.com/The-Culture/Family/2012/1213/America-s-4-parenting-cultures-Which-one-is-yours/The-Faithful>
- <sup>12</sup> <http://quickfacts.census.gov/qfd/states/00000.html>
- <sup>13</sup> <http://www.census.gov/hhes/families/>
- <sup>14</sup> <http://www.census.gov/hhes/families/>
- <sup>15</sup> <http://www.census.gov/hhes/families/data/cps2013H.html>
- <sup>16</sup> <https://econsultancy.com/reports/digital-tribes>
- <sup>17</sup> <http://www.amazon.com/ConsumerShift-Changing-Reshaping-Consumer-Landscape/dp/1614660034>
- <sup>18</sup> <http://www.andyhinesight.com/values/five-key-changes-in-the-future-consumer-landscape-5-enoughness/>
- <sup>19</sup> [http://darmano.typepad.com/logic\\_emotion/2011/05/play2.html](http://darmano.typepad.com/logic_emotion/2011/05/play2.html);
- <sup>20</sup> Innovaro Trend Inventory; GL-2012-49: Technology Trajectories--Shopping
- <sup>21</sup> [http://en.wikipedia.org/wiki/Social\\_currency](http://en.wikipedia.org/wiki/Social_currency)
- <sup>22</sup> Innovaro GL-2007-22: Making the Virtual Real; TF-2011-11 3D Printing
- <sup>23</sup> Innovaro Trend Inventory; GL-2011-13: Artificial Intelligence and Work; GL-2012-48: Technology Trajectories--Knowledge Work
- <sup>24</sup> Innovaro TF-2011-43: Big Data
- <sup>25</sup> General--"What Is Captology?" Stanford Persuasive Technology Lab, 2010, <http://captology.stanford.edu>.
- <sup>26</sup> Innovaro Tf-2012-23, Persuasive Technologies: Influencing Attitudes and Behaviors.
- <sup>27</sup> Innovaro GL-2010-12: Consumer Augmented Reality
- <sup>28</sup> Innovaro TF-2010-31: The Internet of Things
- <sup>29</sup> Innovaro GL-2009-30: Cloud Computing and Consumers
- <sup>30</sup> <http://www.digitaltrends.com/home/samsung-smart-home-connects-household-devices-one-app/>
- <sup>31</sup> <http://www.ibisworld.com/industry/global/global-biotechnology.html>
- <sup>32</sup> <http://www.ers.usda.gov/data-products/adoption-of-genetically-engineered-crops-in-the-us/recent-trends-in-ge-adoption.aspx#.Uv2yofldVn8>
- <sup>33</sup> [http://www.usatoday.com/tech/wireless/2008-10-19-family-texting\\_N.htm](http://www.usatoday.com/tech/wireless/2008-10-19-family-texting_N.htm)
- <sup>34</sup> <http://www.biocentury.com/promotions/buysiders/commercial-risk-table-top-biotech-products-01.htm>
- <sup>35</sup> Innovaro Technology Foresight, The Future of Biotechnology, TF-2004-70
- <sup>36</sup> <http://www.peakoilawareness.info/>
- <sup>37</sup> <http://www.globalresearch.ca/the-fracked-up-usa-shale-gas-bubble/5326504>
- <sup>38</sup> [http://www.instituteforenergyresearch.org/energy-overview/renewable-energy/#\\_edn1](http://www.instituteforenergyresearch.org/energy-overview/renewable-energy/#_edn1)
- <sup>39</sup> <http://www.powermat.com/>
- <sup>40</sup>
- <sup>41</sup> "3D Printers Could Create Customized Drugs on Demand," BBC News: Technology, April 18, 2012, <http://www.bbc.co.uk/news/technology-17760085>; Innovaro Trend Inventory; TF-2011-44: Technology Trajectories--Overview

---

<sup>42</sup> <http://bccresearch.blogspot.com/2012/05/smart-materials-and-their-applications.html>  
<sup>43</sup> <http://www.nanotechproject.org/>  
<sup>44</sup> [http://www.rand.org/content/dam/rand/pubs/monograph\\_reports/2005/MR1307.pdf](http://www.rand.org/content/dam/rand/pubs/monograph_reports/2005/MR1307.pdf)  
<sup>45</sup> <http://data.worldbank.org/country/united-states>  
<sup>46</sup> <http://www.usnews.com/opinion/blogs/economic-intelligence/2013/12/20/market-forces-mainstream-sustainability>  
<sup>47</sup> <http://www.lohas.com/about>  
<sup>48</sup> [http://www.ey.com/Publication/vwLUAssets/Six\\_growing\\_trends\\_in\\_corporate\\_sustainability\\_2013/](http://www.ey.com/Publication/vwLUAssets/Six_growing_trends_in_corporate_sustainability_2013/)  
<sup>49</sup> <http://www.pewresearch.org/key-data-points/climate-change-key-data-points-from-pew-research/>  
<sup>50</sup> <http://www.peakoilawareness.info/>  
<sup>51</sup> <http://footprintnetwork.org/en/index.php/GFN/page/calculators/>  
<sup>52</sup> <http://www.deseretnews.com/article/865598645/Lawmakers-pass-political-transparency-bills.html>  
<sup>53</sup> <http://www.grossnationalhappiness.com/>  
<sup>54</sup> <http://www.fairvote.org/research-and-analysis/voter-turnout/>  
<sup>55</sup> <http://www.pewresearch.org/fact-tank/2013/07/17/partisan-polarization-in-congress-and-among-public-is-greater-than-ever/>  
<sup>56</sup> <http://www.amazon.com/Nudge-Improving-Decisions-Health-Happiness/dp/014311526X>  
<sup>57</sup> [http://en.wikipedia.org/wiki/Emissions\\_trading](http://en.wikipedia.org/wiki/Emissions_trading)  
<sup>58</sup> <http://www.economist.com/news/finance-and-economics/21576388-failure-reform-europes-carbon-market-will-reverberate-round-world-ets>  
<sup>59</sup> <http://www.walkersands.com/futureofretail>  
<sup>60</sup> <http://marketingland.com/survey-customers-more-frustrated-by-how-long-it-takes-to-resolve-a-customer-service-issue-than-the-resolution-38756>  
<sup>61</sup> <http://www.theatlantic.com/business/archive/2013/03/cheap-eats-how-america-spends-money-on-food/273811/>  
<sup>62</sup> <http://ucsdnutritionlink.org/articles/archives/fastfood.pdf>  
<sup>63</sup> [http://www.huffingtonpost.com/2013/08/06/fast-food-poll\\_n\\_3714988.html](http://www.huffingtonpost.com/2013/08/06/fast-food-poll_n_3714988.html)  
<sup>64</sup> <http://www.rwjf.org/en/research-publications/find-rwjf-research/2013/11/fast-food-facts-2013.html>  
<sup>65</sup> <http://www.cbsnews.com/news/despite-more-options-1-of-fast-food-kids-meals-healthy-study/>  
<sup>66</sup> [http://www.fastfoodmarketing.org/media/fastFoodFACTS\\_TargetedMarketing.pdf](http://www.fastfoodmarketing.org/media/fastFoodFACTS_TargetedMarketing.pdf)  
<sup>67</sup> <http://www.rwjf.org/en/research-publications/find-rwjf-research/2011/10/better-for-you-foods.html>  
<sup>68</sup> <http://www.collegequarterly.ca/2013-vol16-num01-winter/huang-capps.html>  
<sup>69</sup> <http://researchresults.wordpress.com/category/students-2/>  
<sup>70</sup> <http://online.wsj.com/news/articles/SB10001424127887323293704578334401534217878>  
<sup>71</sup> <http://uwire.com/2013/10/22/campusmd-debuts-video-doctor-visits-for-college-students-via-american-well/>  
<sup>72</sup> <http://www.uhs.uga.edu/sleep/>  
<sup>73</sup> <http://www.cbsnews.com/news/study-shows-70-percent-of-americans-take-prescription-drugs/>  
<sup>74</sup> <http://www.gallup.com/poll/165671/obesity-rate-climbing-2013.aspx>  
<sup>75</sup> <http://www.bradleycorp.com/handwashing>  
<sup>76</sup> <http://consumer.healthday.com/public-health-information-30/demographics-news-173/t-preventive-dental-care-fph-release-batch-1060-683054.html>  
<sup>77</sup> [http://www.huffingtonpost.com/2013/04/10/work-stress-jobs-americans\\_n\\_3053428.html](http://www.huffingtonpost.com/2013/04/10/work-stress-jobs-americans_n_3053428.html)  
<sup>78</sup> <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3702233/>  
<sup>79</sup> <http://www.bankrate.com/finance/college-finance/going-to-college-single-parent.aspx>  
<sup>80</sup> [http://www.humanesociety.org/issues/pet\\_overpopulation/facts/pet\\_ownership\\_statistics.html](http://www.humanesociety.org/issues/pet_overpopulation/facts/pet_ownership_statistics.html)  
<sup>81</sup> [http://www.cities21.org/HH\\_NRG\\_consumption.htm](http://www.cities21.org/HH_NRG_consumption.htm)  
<sup>82</sup> <http://money.cnn.com/2013/12/10/pf/college/homeless-college-students/>  
<sup>83</sup> <http://www.nytimes.com/roomfordebate/2013/08/29/should-students-live-on-campus-or-off/off-campus-housing-can-be-a-bargain>  
<sup>84</sup> <http://www.usatoday.com/story/news/nation/2013/09/03/how-higher-education-pays/2755345/>  
<sup>85</sup> <http://www.usatoday.com/story/news/nation/2013/09/03/how-higher-education-pays/2755345/>



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<sup>86</sup> <http://www.usatoday.com/story/news/nation/2013/09/03/how-higher-education-pays/2755345/>

<sup>87</sup> <http://chronicle.com/article/The-Employment-Mismatch/137625/#id=overview>

<sup>88</sup> <http://chronicle.com/article/The-Employment-Mismatch/137625/#id=overview>

<sup>89</sup> <http://www.theatlantic.com/education/archive/2013/11/white-people-are-skeptical-Cabout-the-value-of-a-college-degree/281238/>

<sup>90</sup> <http://www.heri.ucla.edu/PDFs/pubs/briefs/brief-pr030508-08faculty.pdf>

<sup>91</sup> <http://www.heri.ucla.edu/PDFs/pubs/briefs/brief-pr030508-08faculty.pdf>

<sup>92</sup> <http://pewInternet.org/Reports/2011/College-presidents/Summary.aspx>

<sup>93</sup> <http://campustechnology.com/articles/2013/06/24/report-students-taking-online-courses-jumps-96-percent-over-5-years.aspx?CTCC>

<sup>94</sup> <https://www.edsurge.com/n/2013-12-22-moocs-in-2013-breaking-down-the-numbers>

<sup>95</sup> <http://www.forbes.com/sites/georgeanders/2014/01/21/coursera-flirts-with-diplomas-online-specialization-is-250/>

<sup>96</sup> <http://www.gallup.com/poll/165425/online-education-rated-best-value-options.aspx>

<sup>97</sup> <http://chronicle.com/blogs/wiredcampus/employers-and-community-college-students-are-not-sold-on-online-degrees-survey-finds/46765>

<sup>98</sup> <http://www.nytimes.com/2013/02/19/opinion/the-trouble-with-online-college.html>

<sup>99</sup> [http://sloanconsortium.org/news\\_press/january2013\\_new-study-over-67-million-students-learning-online](http://sloanconsortium.org/news_press/january2013_new-study-over-67-million-students-learning-online)

<sup>100</sup> <http://www2.ed.gov/rschstat/eval/tech/evidence-based-practices/finalreport.pdf>

<sup>101</sup> <http://blog.viacom.com/2013/10/mtvs-the-new-millennials-will-keep-calm-and-carry-on/#sthash.uXbBD43f.dpuf>

<sup>102</sup> <http://www.heri.ucla.edu/PDFs/pubs/briefs/brief-pr030508-08faculty.pdf>

<sup>103</sup> <http://www.heri.ucla.edu/PDFs/pubs/briefs/brief-pr030508-08faculty.pdf>

<sup>104</sup> <http://www.ascd.org/publications/educational-leadership/sept09/vol67/num01/21st-Century-Skills@-The-Challenges-Ahead.aspx>

<sup>105</sup> <http://nces.ed.gov/fastfacts/display.asp?id=372>

<sup>106</sup> <http://www.usnews.com/news/articles/2013/10/24/the-rise-in-tuition-is-slowing-but-college-still-costs-more>

<sup>107</sup> <http://www.statisticbrain.com/high-school-dropout-statistics/>

<sup>108</sup> <http://www.theatlantic.com/national/archive/2013/06/high-school-graduation-rate-hits-40-year-peak-in-the-us/276604/>

<sup>109</sup> <http://www.bls.gov/news.release/hsgsec.nr0.htm>

<sup>110</sup> <http://nces.ed.gov/fastfacts/display.asp?id=98>

<sup>111</sup> <http://nces.ed.gov/fastfacts/display.asp?id=372>

<sup>112</sup> <http://www.npr.org/blogs/thetwo-way/2013/11/11/244601986/record-number-of-international-students-attend-u-s-colleges>

<sup>113</sup> <http://nces.ed.gov/fastfacts/display.asp?id=40>

<sup>114</sup> <http://chronicle.com/article/Why-Are-So-Many-Students-Still/127584/>

<sup>115</sup> <http://www.collegeclasses.com/comparing-the-graduation-rates-between-online-and-traditional-colleges/>

<sup>116</sup> <http://www.washingtonpost.com/wp-dyn/content/article/2010/08/15/AR2010081502765.html>

<sup>117</sup> <http://www.washingtonpost.com/wp-dyn/content/article/2010/08/15/AR2010081502765.html>

<sup>118</sup> [http://www.livecareer.com/career-news/multiple-internships-trend#.Uuh\\_BGTTm5w](http://www.livecareer.com/career-news/multiple-internships-trend#.Uuh_BGTTm5w)

<sup>119</sup> <http://careercenter.umich.edu/article/internships-survey-and-2013-internship-trends>

<sup>120</sup> <http://chronicle.com/article/A-Universitys-Offer-of-Credit/140131>

<sup>121</sup> <http://www.soapboxmedia.com/features/012814-an-alternative-path-through-the-gateway-to-higher-education.aspx>

<sup>122</sup> <http://stats.oecd.org/Index.aspx?DataSetCode=ANHRS>

<sup>123</sup> <http://thinkprogress.org/economy/2013/08/07/2428351/nearly-80-of-students-are-working-while-in-school/>

<sup>124</sup> <http://www.huffingtonpost.com/news/average-student-debt/>

<sup>125</sup> <https://cew.georgetown.edu/failuretolaunch>

<sup>126</sup> <http://www.bls.gov/nls/nlsfaqs.htm#anch41>

<sup>127</sup> <http://www.census.gov/prod/2013pubs/p70-134.pdf>



---

<sup>128</sup> [http://en.wikipedia.org/wiki/Household\\_income\\_in\\_the\\_United\\_States](http://en.wikipedia.org/wiki/Household_income_in_the_United_States)  
<http://www.dropoutprevention.org/statistics>,  
[http://www.census.gov/newsroom/cspan/educ/educ\\_attain\\_slides.pdf](http://www.census.gov/newsroom/cspan/educ/educ_attain_slides.pdf),  
<sup>129</sup> <http://www.bls.gov/news.release/union2.nr0.htm>  
<sup>130</sup> <http://www.theatlantic.com/business/archive/2013/02/heres-exactly-how-many-college-graduates-live-back-at-home/273529/>  
<sup>131</sup> <http://www.moneynews.com/Personal-Finance/Harvard-Flexible-work-Gender/2014/01/05/id/545306>  
<sup>132</sup> <http://www.dlt.ri.gov/lmi/laus/us/usadj.htm>  
<sup>133</sup> <http://www.nytimes.com/2013/07/26/education/in-a-recovering-economy-a-decline-in-college-enrollment.html?pagewanted=2&r=0>  
<sup>134</sup> <http://www.gallup.com/poll/162560/average-retirement-age.aspx>  
<sup>135</sup> <http://www.stats.bls.gov/news.release/ecopro.t01.htm>  
<sup>136</sup> <http://www.cnn.com/2013/09/24/us/undocumented-immigrants-population/>  
[http://www.cbo.gov/sites/default/files/cbofiles/attachments/44134\\_Description\\_of\\_Immigrant\\_Population.pdf](http://www.cbo.gov/sites/default/files/cbofiles/attachments/44134_Description_of_Immigrant_Population.pdf)  
<sup>137</sup> <http://www.cbo.gov/publication/44134>  
[http://www.cbo.gov/sites/default/files/cbofiles/attachments/44134\\_Description\\_of\\_Immigrant\\_Population.pdf](http://www.cbo.gov/sites/default/files/cbofiles/attachments/44134_Description_of_Immigrant_Population.pdf)  
<sup>138</sup> <http://eldis.org/go/home&id=65902&type=Document#.Uuvi4mRdW5L>  
<sup>139</sup> <http://business.time.com/2012/07/09/how-recruiters-use-social-networks-to-make-hiring-decisions-now/>  
<sup>140</sup> <http://seekingalpha.com/article/1940291-u-s-unemployment-rate-falls-to-5-year-low-of-6-7-percent-in-december-but-job-growth-lags>  
<sup>141</sup> <http://www.bls.gov/news.release/empsit.t04.htm>  
<sup>142</sup> <http://data.bls.gov/timeseries/LNS11300000> [http://www.bls.gov/emp/ep\\_table\\_303.htm](http://www.bls.gov/emp/ep_table_303.htm) (with age-based variation in participation rate)  
<sup>143</sup> <http://www.businessweek.com/articles/2013-09-10/counting-america-s-freelance-ahem-self-employed-workers>  
<sup>144</sup> <http://www.advisorperspectives.com/dshort/commentaries/Full-Time-vs-Part-Time-Employment.php>  
<http://www.frbsf.org/economic-research/publications/economic-letter/2013/august/part-time-work-employment-increase-recession/>  
<sup>145</sup> <http://news.yahoo.com/temporary-jobs-becoming-permanent-fixture-140133833.html>  
<sup>146</sup> <http://online.wsj.com/news/articles/SB10001424127887324539404578342503214110478>  
<sup>147</sup> <http://www.usatoday.com/story/news/nation/2013/09/09/internship-limits-colleges/2775411/>  
<sup>148</sup> <http://www.stats.bls.gov/news.release/ecopro.t03.htm>  
<sup>149</sup> <http://www.challengergray.com/press/press-releases/2013-labor-day-trends-leave-resume-take-your-own-device>  
<sup>150</sup> <http://www.forbes.com/sites/elainepofeldt/2013/05/27/u-s-entrepreneurship-hits-record-high/>  
<sup>151</sup> <http://online.wsj.com/news/articles/SB10001424052970204422404576596630897409182>  
<sup>152</sup> <http://www.instituteofplay.org/>  
<sup>153</sup> <http://www.righttoplay.com/International/Pages/Home.aspx>  
<sup>154</sup> <http://www.playworks.org/splash.php?r=%2F>  
<sup>155</sup> <http://www.theesa.com/games-improving-what-matters/schools.asp>  
<sup>156</sup> [http://www.theesa.com/facts/pdfs/esa\\_ef\\_2013.pdf](http://www.theesa.com/facts/pdfs/esa_ef_2013.pdf)  
<sup>157</sup> <http://www.harrisinteractive.com/NewsRoom/HarrisPolls/tabid/447/ctl/ReadCustom%20Default/mid/1508/ArticleId/814/Default.aspx>  
<sup>158</sup> <http://www.imdb.com/title/tt1798709/>  
<sup>159</sup> [http://www.askmen.com/entertainment/special\\_feature\\_150/184\\_special\\_feature.html](http://www.askmen.com/entertainment/special_feature_150/184_special_feature.html)  
<sup>160</sup> [www.dhs.gov/.../files/publications/Connecting%20Generations\\_0.pdf](http://www.dhs.gov/.../files/publications/Connecting%20Generations_0.pdf)  
<sup>161</sup> [www.dhs.gov/.../files/publications/Connecting%20Generations\\_0.pdf](http://www.dhs.gov/.../files/publications/Connecting%20Generations_0.pdf)  
<sup>162</sup> <http://www.pewInternet.org/Reports/2012/Teens-and-smartphones/Summary-of-findings.aspx>  
<sup>163</sup> <http://www.pewInternet.org/Reports/2013/Teens-Social-Media-And-Privacy/Summary-of-Findings.aspx>

---

<sup>164</sup> <http://www.pewInternet.org/2011/06/16/part-3-social-networking-site-users-have-more-friends-and-more-close-friends/>

<sup>165</sup> <http://www.sciencedaily.com/releases/2013/10/131009100225.htm>

<sup>166</sup> <http://getlifeboat.com/goodies/report2013/#info>

<sup>167</sup> <http://www.sciencedaily.com/releases/2014/01/140103205135.htm>

<sup>168</sup> <http://www.sciencedaily.com/releases/2009/05/090527111907.htm>

<sup>169</sup> <http://www.pewInternet.org/2011/06/16/social-networking-sites-and-our-lives/>

<sup>170</sup> <http://www.statisticbrain.com/dating-relationship-stats/>

<sup>171</sup> <http://marriage.about.com/cs/sexualstatistics/a/sexstatistics.htm>

<sup>172</sup> <http://www.psychologytoday.com/blog/the-empathic-misanthrope/201108/the-importance-staying-connected-friends-and-family>

<sup>173</sup> <http://www.sciencedaily.com/releases/2014/02/140220094957.htm>

<sup>174</sup> <http://religions.pewforum.org/pdf/report-religious-landscape-study-full.pdf>

<sup>175</sup> <http://networked.pewInternet.org/2012/05/24/networked-individualism-what-in-the-world-is-that-2/>

<sup>176</sup> <http://www.activenetwork.com/blog/top-10-social-media-stats-to-watch-2013/#sthash.ymVurfvh.dpuf>

<sup>177</sup> <http://www.umkc.edu/getinvolved/fsa-national-statistics.asp>

<sup>178</sup> <http://www.umkc.edu/getinvolved/fsa-national-statistics.asp>

<sup>179</sup> [http://en.wikipedia.org/wiki/Maker\\_culture](http://en.wikipedia.org/wiki/Maker_culture)

<sup>180</sup> <http://makerfaire.com/makerfairehistory/>

<sup>181</sup> [http://www.wired.com/opinion/2013/12/ap\\_thompson-2/](http://www.wired.com/opinion/2013/12/ap_thompson-2/)

<sup>182</sup> <http://www.telegraph.co.uk/technology/news/10529785/How-technology-is-changing-childhood.html>

<sup>183</sup> <http://www.ctia.org/your-wireless-life/how-wireless-works/wireless-quick-facts>

<sup>184</sup> <http://www.fcc.gov/document/fcc-releases-new-data-Internet-access-services-6>

<sup>185</sup> [http://transition.fcc.gov/Daily\\_Releases/Daily\\_Business/2013/db0520/DOC-321076A1.pdf](http://transition.fcc.gov/Daily_Releases/Daily_Business/2013/db0520/DOC-321076A1.pdf)

<sup>186</sup> <http://www.pewInternet.org/Reports/2013/Teens-and-Tech.aspx>

<sup>187</sup> <http://www.marketingcharts.com/wp/wp-content/uploads/2014/01/Gallup-Generational-Skew-in-Tech-Use-Jan2014.png>

<sup>188</sup> <http://www.onlinedatingmagazine.com/faq/howmanyonlinedatingsitesarethere.html>

<sup>189</sup> <http://www.forbes.com/sites/martinzwilling/2013/03/01/how-many-more-online-dating-sites-do-we-need/>

<sup>190</sup> <http://www.aarp.org/technology/social-media/info-11-2011/connect-online-ma.html#.Us1xhfNmMbQ.email>

<sup>191</sup> <http://www.pewInternet.org/fact-sheets/social-networking-fact-sheet/>

<sup>192</sup> <http://www.pewInternet.org/2011/06/16/social-networking-sites-and-our-lives/>

<sup>193</sup> <http://readwrite.com/2013/03/07/10-compelling-ways-people-plan-to-use-google-glass>

<sup>194</sup> <http://www.edelman.com/post/five-hot-trends-in-wearable-technology/>

<sup>195</sup> <http://www.rallyengine.com/blog/bid/319372/Geo-location-apps-and-9-other-big-trends-in-mobile-today>

<sup>196</sup> [http://www.nbcnews.com/id/49701718/ns/technology\\_and\\_science-science/t/why-percent-americans-wont-vote/](http://www.nbcnews.com/id/49701718/ns/technology_and_science-science/t/why-percent-americans-wont-vote/)

<sup>197</sup> <http://www.census.gov/hhes/www/socdemo/voting/publications/index.html>

<sup>198</sup> E. Engstrom, "The Rise and Decline of Turnout in Congressional Elections: Electoral Institutions, Competition, and Strategic Mobilization," *American Journal of Political Science*, 56(2) April 2012, 373–386; [http://elections.gmu.edu/Turnout\\_2012G.html](http://elections.gmu.edu/Turnout_2012G.html)

<sup>199</sup> <http://bipartisanpolicy.org/sites/default/files/2012%20Voter%20Turnout%20Full%20Report.pdf>

<sup>200</sup> <http://www.sarasotagov.com/InsideCityGovernment/Content/CAC/PDF/UofCalifornia.pdf>

<sup>201</sup> <http://www.dailykos.com/story/2013/10/21/1249442/-Power-Shift-Youth-Activism-and-Hope-for-the-Future%23>

<sup>202</sup> <http://citiesspeak.org/2012/12/20/engaging-youth-in-local-government/>

<sup>203</sup> <http://www.civicyouth.org/ResearchDomains/research-domains/political-participation-and-voting/>

<sup>204</sup> <http://www8.georgetown.edu/centers/cdacs/cid/DaltonOccasionalPaper.pdf>

<sup>205</sup> D. Koller & D. Schugurensky, "Examining the Developmental Impact of Youth Participation in Education Governance: The Case of Student Trustees," *Journal of Research on Adolescence*, 21(2), 350 – 360.

- 
- <sup>206</sup> J. Simmons & B. Lilly, "The University and Student Political Engagement," *Political Science and Politics*, 43(2) April 2010, 347-349.
- <sup>207</sup> <http://ejournal.missouristate.edu/2014/04/social-media-social-capital-and-the-civic-participation-of-college-students/>
- <sup>208</sup> E. Crocetti, P. Jahromi, & W. Meeus, "Identity and civic engagement in adolescence," *Journal of Adolescence*, 35 (2012) 521–532.
- <sup>209</sup> <http://www.oracle.com/us/industries/public-sector/national-local-government/solutions/index.html>
- <sup>210</sup> C. Reddick & D. Norris, "E-participation in local governments: An examination of political-managerial support and impacts," *Transforming Government: People, Process and Policy*, 7(4), 2013, 453-476.
- <sup>211</sup> I. McKinnon & C. Fitzpatrick, "There's an App for That!" Institute of Transportation Engineers, *ITE Journal*, 83(10) Oct. 2013, 42.
- <sup>212</sup> D. Norris & C. Reddick, "Local E-Government in the United States: Transformation or Incremental Change?" *Public Administration Review*, 73(1) 2012, 165–175.
- <sup>213</sup> [http://www.nytimes.com/2012/01/22/education/edlife/the-new-student-activism.html?pagewanted=all&\\_r=1&](http://www.nytimes.com/2012/01/22/education/edlife/the-new-student-activism.html?pagewanted=all&_r=1&)
- <sup>214</sup> B. Perlman, "Social Media Sites at the State and Local Levels: Operational Success and Governance Failure," *State and Local Government Review*, 44(1) 2012, 67-75.
- <sup>215</sup> D. Norris & C. Reddick, "Local E-Government in the United States: Transformation or Incremental Change?" *Public Administration Review*, 73(1) 2012, 165–175.
- <sup>216</sup> J. Allen & D. Geller, "Open source deployment in local government: Rapid innovation as an occasion for revitalizing organizational IT," *Information Technology & People*, 25(2), 2012, 136-155.
- <sup>217</sup> <http://www.census.gov/hhes/www/socdemo/voting/publications/p20/2012/tables.html>
- <sup>218</sup> <http://www.civicyouth.org/quick-facts/youth-voting/>
- <sup>219</sup> <http://www.civicyouth.org/support-for-president-obama-varied-greatly-by-gender-and-race/>
- <sup>220</sup> [http://www.aacu.org/peerreview/pr-spsu08/pr-spsu08\\_index.cfm](http://www.aacu.org/peerreview/pr-spsu08/pr-spsu08_index.cfm)
- <sup>221</sup> <http://www.civicyouth.org/wp-content/uploads/2012/11/2012-Exit-Poll-by-Education-Attainment-Final.pdf>
- <sup>222</sup> <http://secure.assets.bostatic.com/frontend/projects/legacy/legacy-report.pdf>
- <sup>223</sup> <http://voices.suntimes.com/early-and-often/sweet/youths-turned-off-on-obamacare-new-harvard-institute-of-politics-poll/>
- <sup>224</sup> <http://www.washingtonpost.com/wp-srv/special/politics/campaign-finance/>
- <sup>225</sup> <http://www.gallup.com/poll/165371/americans-satisfaction-gov-drops-new-low.aspx>
- <sup>226</sup> <http://www.gallup.com/poll/5392/trust-government.aspx>
- <sup>227</sup> <http://www.gallup.com/poll/167375/congressional-job-approval-february.aspx>
- <sup>228</sup> <http://www.panettainstitute.org/programs/national-surveys/>
- <sup>229</sup> <http://www.volunteeringinamerica.gov/infographic.cfm>
- <sup>230</sup> <http://www.volunteeringinamerica.gov/assets/resources/FactSheetFinal.pdf>
- <sup>231</sup> <http://theweek.com/article/index/220100/occupy-wall-street-a-protest-timeline>
- <sup>232</sup> [http://www.huffingtonpost.com/2012/03/01/occupy-wall-street\\_n\\_1314948.html#s746896title=Sara\\_Shaw](http://www.huffingtonpost.com/2012/03/01/occupy-wall-street_n_1314948.html#s746896title=Sara_Shaw)
- <sup>233</sup> [http://www.nytimes.com/2012/01/22/education/edlife/the-new-student-activism.html?pagewanted=all&\\_r=1&](http://www.nytimes.com/2012/01/22/education/edlife/the-new-student-activism.html?pagewanted=all&_r=1&)
- <sup>234</sup> E. Swank, "Predictors of Political Activism Among Social Work Students," *Journal of Social Work Education*, 48(2) Spring/Summer 2012, 136-153.
- <sup>235</sup> A. Marri & E. Walker, "Our Leaders Are Us: Youth Activism in Social Movements Project," *Urban Rev*, 40, 2008, 5–20.
- <sup>236</sup> K. LaRiviere, J. Snider, A. Stromberg, & K. O'Meara, "Protest: Critical Lessons of Using Digital Media for Social Change," *About Campus*, July–August 2012, 10-17.
- <sup>237</sup> <http://www.crcn.org/about/>
- <sup>238</sup> <http://collegedems.com/footer-links/listing/>
- <sup>239</sup> <http://www.thedrum.com/news/2011/12/07/Internet-shopping-boom-coming-end-it-reaches-full-maturity>; <http://hbr.org/2011/12/the-future-of-shopping/ar/1>; <http://hbr.org/web/slideshows/how-retailers-are-reinventing-shopping/1-slide>; <http://www.psfk.com/2013/01/target-online-brands.html#!v5d8u>

---

<sup>240</sup> <http://www.psfk.com/2013/04/supermarket-dietitian-sales.html#!v47XC>;  
[http://www.nytimes.com/2013/02/24/magazine/the-extraordinary-science-of-junk-food.html?hp&\\_r=1&](http://www.nytimes.com/2013/02/24/magazine/the-extraordinary-science-of-junk-food.html?hp&_r=1&)

<sup>241</sup> <http://www.euromonitor.com/fast-food-in-the-us/report>; <http://www.nutraingredients-usa.com/Suppliers2/Demand-for-nutraceutical-ingredients-to-reach-21.8bn-by-2013>;  
[http://domains.nytimes.com/top/reference/timesdomains/subjects/f/food\\_safety/](http://domains.nytimes.com/top/reference/timesdomains/subjects/f/food_safety/);  
<http://www.cnn.com/2013/11/19/health/upwave-bottled-water/>

<sup>242</sup> <http://socialmediatoday.com/marketingletter/1518801/10-digital-trends-2013-are-you-ready>  
<http://www.pammarketingnut.com/2011/07/social-network-group-dynamics-is-it-about-me-or-we/>

<sup>243</sup> <http://finance.yahoo.com/blogs/the-exchange/how-big-grocery-is-starting-to-bite-consumers-174111863.html>

<sup>244</sup> <http://www.forbes.com/sites/chancebarnett/2013/05/08/top-10-crowdfunding-sites-for-fundraising/>

<sup>245</sup> <http://www.worldhealth.net/news/incidence-diabetes-projected-rise-64-2025/>;  
<http://quantifiedself.com/2013/01/pew-Internet-research-the-state-of-self-tracking/>;  
<http://www.gallup.com/poll/165671/obesity-rate-climbing-2013.aspx>; <http://www.uhs.uga.edu/sleep/>;  
<http://www.usatoday.com/story/news/nation/2013/09/10/tobacco-free-campuses-resources-to-quit/2795053/>;  
<http://www.sciencedaily.com/releases/2013/06/130619132352.htm>

<sup>246</sup> <http://the-gadgeteer.com/2013/12/12/blue-goji-goji-play-review/>

<sup>247</sup> <http://m.deliciousliving.com/personal-care/beauty-and-personal-care-trends-expo-west>  
<http://www.marketline.com/blog/how-manufacturers-are-adapting-to-demands-for-greater-convenience-in-the-personal-care-sector/>

<sup>248</sup> <http://health.usnews.com/health-news/news/articles/2013/12/18/many-americans-dont-receive-preventive-dental-care-survey>; [http://www.huffingtonpost.com/2013/04/10/work-stress-jobs-americans\\_n\\_3053428.html](http://www.huffingtonpost.com/2013/04/10/work-stress-jobs-americans_n_3053428.html)

<sup>249</sup> [http://www.census.gov/newsroom/releases/archives/families\\_households/cb13-199.html](http://www.census.gov/newsroom/releases/archives/families_households/cb13-199.html);  
<http://web.hbr.org/email/archive/dailystat.php?date=081612>; <http://www.policymic.com/articles/58935/a-record-number-of-millennials-are-living-at-home-but-it-s-not-what-it-looks-like>;  
<http://www.ericgarland.co/2011/07/04/future-american-family/>

<sup>250</sup> <http://www.cato.org/blog/long-run-decline-actual-homeownership>;  
<http://www.forbes.com/sites/zillow/2013/05/10/5-things-home-buyers-want-in-2013/>;  
<http://www.gallup.com/poll/154124/u.s.-homeownership-hits-decade-low.aspx>;  
[http://www.nytimes.com/2013/09/15/sunday-review/is-suburban-sprawl-on-its-way-back.html?\\_r=0](http://www.nytimes.com/2013/09/15/sunday-review/is-suburban-sprawl-on-its-way-back.html?_r=0)

<sup>251</sup> [http://www.mckinsey.com/insights/urbanization/urban\\_world](http://www.mckinsey.com/insights/urbanization/urban_world)

<sup>252</sup> <http://www.dvice.com/2014-1-9/sonys-life-space-ux-uses-laser-projectors-digitize-your-room>

<sup>253</sup> <http://www.cargillfoods.com/emea/en/market-categories/convenience-foods/index.htm>

<sup>254</sup> <http://www.epa.gov/cleanenergy/documents/suca/vision.pdf>

<sup>255</sup> <http://www.navigantresearch.com/wp-assets/uploads/2013/07/LB-SCITS-13-Executive-Summary.pdf>

<sup>256</sup> <http://mashable.com/2013/03/12/forrester-u-s-ecommerce-forecast-2017/>

<sup>257</sup> <http://www.euromonitor.com/fast-food-in-the-us/report>

<sup>258</sup> <http://www.worldhealth.net/news/incidence-diabetes-projected-rise-64-2025/>

<sup>259</sup> <http://www.marketresearch.com/RNCOS-v3175/Convenience-Stores-Forecast-6882975/>

<sup>260</sup> <https://solohealth.com/>

<sup>261</sup> <http://www.fda.gov/medicaldevices/productsandmedicalprocedures/connectedhealth/mobilemedicalapplications/default.htm>

<sup>262</sup> [http://www.jchs.harvard.edu/sites/jchs.harvard.edu/files/w09-5\\_masnick\\_and\\_belsky.pdf](http://www.jchs.harvard.edu/sites/jchs.harvard.edu/files/w09-5_masnick_and_belsky.pdf)

<sup>263</sup> <http://pewsocialtrends.org/files/2011/03/millennials-marriage.pdf>

---

<sup>264</sup> <http://www.machinetomachinemagazine.com/2012/05/18/90-million-homes-to-employ-home-automation-by-2017/>

<sup>265</sup> [http://www.mckinsey.com/insights/urbanization/urban\\_world](http://www.mckinsey.com/insights/urbanization/urban_world)

<sup>266</sup> <http://smh.domain.com.au/real-estate-news/traditional-rooms-are-changing-20121201-2anhx.html>

<sup>267</sup> <http://www.treehugger.com/green-architecture/otis-optimal-travel-independent-space-green-mountain-college.html>

<sup>268</sup> [http://www.luminafoundation.org/advantage/document/goal\\_2025/2013-Lumina\\_Strategic\\_Plan.pdf](http://www.luminafoundation.org/advantage/document/goal_2025/2013-Lumina_Strategic_Plan.pdf)

<sup>269</sup> [http://www.luminafoundation.org/advantage/document/goal\\_2025/2013-Lumina\\_Strategic\\_Plan.pdf](http://www.luminafoundation.org/advantage/document/goal_2025/2013-Lumina_Strategic_Plan.pdf)

<sup>270</sup> <http://www.corestandards.org/standards-in-your-state/>

<sup>271</sup> <http://www.usatoday.com/story/opinion/2014/01/07/students-college-university-higher-education-competency-column/4165323/>

<sup>272</sup> <http://national.deseretnews.com/article/854/More-education-trends-for-2014.html>

<sup>273</sup> <http://elearningindustry.com/mobile-devices-wearable-technology-and-augmented-reality-will-support-students-learning-and-performance-needs>

<sup>274</sup> <http://www.ratemyprofessors.com/About.jsp>

<sup>275</sup> <http://tech.fortune.cnn.com/2014/02/19/is-there-an-ed-tech-investment-bubble/>

<sup>276</sup> [http://www.huffingtonpost.com/vala-afshar/infographic-adoption-of-m\\_b\\_3303789.html](http://www.huffingtonpost.com/vala-afshar/infographic-adoption-of-m_b_3303789.html)

<sup>277</sup> [http://www.huffingtonpost.com/vala-afshar/infographic-adoption-of-m\\_b\\_3303789.html](http://www.huffingtonpost.com/vala-afshar/infographic-adoption-of-m_b_3303789.html)

<sup>278</sup> <https://www.udacity.com/georgia-tech>

<sup>279</sup> [http://www.nytimes.com/2014/06/18/business/economy/udacity-att-nanodegree-offers-an-entry-level-approach-to-college.html?\\_r=0](http://www.nytimes.com/2014/06/18/business/economy/udacity-att-nanodegree-offers-an-entry-level-approach-to-college.html?_r=0)

<sup>280</sup> <http://www.knowledgeworks.org/sites/default/files/2020-Forecast.pdf>

<sup>281</sup> <http://www.knowledgeworks.org/knowledgeworks-forecast-30-looks-trends-changes-learning-ecosystem-over-next-decade-0>

<sup>282</sup> <http://www.oecd.org/edu/school/36702582.pdf>

<sup>283</sup> <http://www.newgeography.com/content/003761-toward-a-self-employed-nation>

<sup>284</sup> <https://www.americanexpress.com/us/small-business/openforum/articles/tracking-the-work-from-home-trend/>

<sup>285</sup> <http://www.forbes.com/sites/karstenstrauss/2013/05/28/why-coworking-spaces-are-here-to-stay/>

<sup>286</sup> <http://www.forbes.com/sites/elainepofeldt/2013/05/27/u-s-entrepreneurship-hits-record-high/>

<sup>287</sup> [https://www.census.gov/newsroom/releases/pdf/home\\_based\\_workers\\_us\\_infographic.pdf](https://www.census.gov/newsroom/releases/pdf/home_based_workers_us_infographic.pdf)

<sup>288</sup> [http://www.nytimes.com/2013/03/31/opinion/sunday/friedman-need-a-job-invent-it.html?\\_r=2&](http://www.nytimes.com/2013/03/31/opinion/sunday/friedman-need-a-job-invent-it.html?_r=2&)

<sup>289</sup> <http://www.usatoday.com/story/money/business/2014/01/21/millennials-workplace-pushback/4664465/>

<sup>290</sup> <http://money.usnews.com/money/careers/articles/2012/09/10/where-the-jobs-will-be-in-2020>

<sup>291</sup> <http://www.forbes.com/sites/meghancasserly/2013/02/06/how-startups-drive-freelance-salaries-elande-billions/>

<sup>292</sup> [http://www.timesdispatch.com/business/economy/hiring-explodes-in-part-time-and-contract-work/article\\_f653f2bb-291b-524b-84bc-dd94d20d2c61.html](http://www.timesdispatch.com/business/economy/hiring-explodes-in-part-time-and-contract-work/article_f653f2bb-291b-524b-84bc-dd94d20d2c61.html)

<sup>293</sup> <http://online.wsj.com/news/articles/SB10001424052702303743604579355030694293884>

<sup>294</sup> <http://degrecouncil.org/careers-of-the-future-2025/>

<sup>295</sup> <http://www.forbes.com/sites/jeannemeister/2012/12/04/personal-branding-in-the-future-workplace-a-crucial-skill-for-employees-and-recruiters-alike/>

<sup>296</sup> <http://www.usatoday.com/story/money/business/2013/02/15/twitterinterviews-resumes/1919305/>

<sup>297</sup> <http://www.npr.org/blogs/money/2013/07/11/201075339/where-the-jobs-are-and-where-they-arent-in-1-graph>

<sup>298</sup> <http://money.usnews.com/money/careers/articles/2012/09/10/where-the-jobs-will-be-in-2020>

<sup>299</sup> <http://www.newworldofwork.co.uk/2013/07/16/will-you-still-have-a-job-in-2025-the-alarming-rate-at-which-jobs-are-being-disrupted/>

<sup>300</sup> [www.usatoday.com/story/news/nation/2013/09/09/internship-limits-colleges/2775411/](http://www.usatoday.com/story/news/nation/2013/09/09/internship-limits-colleges/2775411/)

<sup>301</sup> <http://www.babson.edu/executive-education/thought-leadership/education/pages/entrepreneurship-trends.aspx>

---

<sup>302</sup> D. Woodgate, "The Age of Upheaval," Presentation to University of Houston Foresight Program, March 2012.  
<sup>303</sup> <http://business.time.com/2013/03/21/with-baby-boomers-retiring-why-do-we-need-so-many-new-jobs/>  
<sup>304</sup> <http://money.usnews.com/money/careers/articles/2012/09/10/the-pink-collar-job-boom>  
<sup>305</sup> <http://money.uk.msn.com/news/number-of-women-in-work-increases>  
<sup>306</sup> <http://www.bls.gov/news.release/ecopro.t02.htm>  
<sup>307</sup> <http://www.bls.gov/news.release/ecopro.t01.htm>  
<sup>308</sup> <http://www.economist.com/node/21558250>  
<sup>309</sup> <http://www.economist.com/blogs/freeexchange/2012/07/labour-mobility>  
<sup>310</sup> <http://content.time.com/time/magazine/article/0,9171,2154995,00.html>  
<sup>311</sup> <http://economix.blogs.nytimes.com/2013/10/18/game-changing-investments-for-the-u-s/>  
<sup>312</sup> <http://business.time.com/2013/12/09/why-robots-are-essential-to-googles-future/>  
<sup>313</sup> <http://www.economist.com/news/briefing/21594264-previous-technological-innovation-has-always-delivered-more-long-run-employment-not-less>  
<sup>314</sup>  
[http://www.futuretech.ox.ac.uk/sites/futuretech.ox.ac.uk/files/The\\_Future\\_of\\_Employment\\_OMS\\_Working\\_Paper\\_1.pdf](http://www.futuretech.ox.ac.uk/sites/futuretech.ox.ac.uk/files/The_Future_of_Employment_OMS_Working_Paper_1.pdf)  
<sup>315</sup> <http://www.newworldofwork.co.uk/2013/07/16/will-you-still-have-a-job-in-2025-the-alarming-rate-at-which-jobs-are-being-disrupted/>  
<sup>316</sup> <http://www.theatlantic.com/business/archive/2014/01/what-jobs-will-the-robots-take/283239/>  
<sup>317</sup> <http://www.forbes.com/sites/netapp/2013/05/29/recruitment-big-data/>  
<sup>318</sup> <http://money.usnews.com/money/careers/slideshows/10-smart-ways-to-use-social-media-in-your-job-search>  
<sup>319</sup> <http://incitemc.com/fortune-500-social-media-adoptions-rates-grow-slowly/>  
<sup>320</sup> <http://www.forbes.com/sites/meghancassery/2013/02/06/how-startups-drive-freelance-salaries-eland-billions/>  
<sup>321</sup> <http://www.usatoday.com/story/money/columnist/bruzzo/2013/10/20/on-the-job-generation-z/2999689/>  
<sup>322</sup> [http://www.mckinsey.com/insights/manufacturing/next-shoring\\_a\\_ceos\\_guide](http://www.mckinsey.com/insights/manufacturing/next-shoring_a_ceos_guide)  
<sup>323</sup> <http://talentmgmt.com/articles/view/study-l-d-spending-soars-in-2013>  
<sup>324</sup> <http://www.amatrol.com/program/green-energy-technology/solar-technology/>  
<sup>325</sup> <http://www.economist.com/news/international/21594350-how-cut-youth-unemployment-fast-changing-jobs-market-all-hands-deck>  
<sup>326</sup> <http://androidgogy.com/2012/12/11/tech-people-and-systems/>  
<sup>327</sup> <http://tincanapi.com/overview/>  
<sup>328</sup> <http://www.theverge.com/2014/1/29/5356756/obama-calls-for-high-tech-manufacturing-hubs-state-of-the-union>  
<sup>329</sup> <http://www.bcg.com/media/pressreleasedetails.aspx?id=tcm:12-144944>  
<sup>330</sup> <http://online.wsj.com/news/articles/SB10001424052702303612804577533232044873766>  
<sup>331</sup> <http://www.whitehouse.gov/issues/immigration>  
<sup>332</sup> [http://www.mckinsey.com/insights/manufacturing/next-shoring\\_a\\_ceos\\_guide](http://www.mckinsey.com/insights/manufacturing/next-shoring_a_ceos_guide)  
<sup>333</sup> <http://business.time.com/2013/12/09/why-robots-are-essential-to-googles-future/>  
<sup>334</sup>  
[www.futuretech.ox.ac.uk/sites/futuretech.ox.ac.uk/files/The\\_Future\\_of\\_Employment\\_OMS\\_Working\\_Paper\\_1.pdf](http://www.futuretech.ox.ac.uk/sites/futuretech.ox.ac.uk/files/The_Future_of_Employment_OMS_Working_Paper_1.pdf)  
<sup>335</sup> <http://www.theatlantic.com/business/archive/2014/01/what-jobs-will-the-robots-take/283239/>  
<sup>336</sup> <https://medium.com/science-and-technology/c9702574a525>  
<sup>337</sup>  
[http://www.futuretech.ox.ac.uk/sites/futuretech.ox.ac.uk/files/The\\_Future\\_of\\_Employment\\_OMS\\_Working\\_Paper\\_1.pdf](http://www.futuretech.ox.ac.uk/sites/futuretech.ox.ac.uk/files/The_Future_of_Employment_OMS_Working_Paper_1.pdf)  
<sup>338</sup> [http://www.timesdispatch.com/business/economy/hiring-explodes-in-part-time-and-contract-work/article\\_f653f2bb-291b-524b-84bc-dd94d20d2c61.html](http://www.timesdispatch.com/business/economy/hiring-explodes-in-part-time-and-contract-work/article_f653f2bb-291b-524b-84bc-dd94d20d2c61.html)  
<sup>339</sup> <http://www.theatlantic.com/magazine/archive/2013/12/theyre-watching-you-at-work/354681/>  
<sup>340</sup> <http://www.thefutureorganization.com/future-work-customized-work/>



---

<sup>341</sup> <http://www.andyhinesight.com/?s=knowledge+work>

<sup>342</sup> <http://bschool.pepperdine.edu/studentblog/index.php/five-predictions-for-the-future-of-personal-branding/>

<sup>343</sup> [http://cdn.theatlantic.com/static/front/docs/sponsored/phoenix/future\\_work\\_skills\\_2020.pdf](http://cdn.theatlantic.com/static/front/docs/sponsored/phoenix/future_work_skills_2020.pdf)

<sup>344</sup> <http://www.fastcoexist.com/3015652/futurist-forum/8-new-jobs-people-will-have-in-2025>

<sup>345</sup> <http://money.usnews.com/money/careers/articles/2012/09/10/10-businesses-that-will-boom-in-2020?page=2>

<sup>346</sup> <http://www.economist.com/blogs/schumpeter/2014/01/women-business>

<sup>347</sup> [http://homes.chass.utoronto.ca/~aerosa/research/aguiar\\_hurst\\_9\\_06.pdf](http://homes.chass.utoronto.ca/~aerosa/research/aguiar_hurst_9_06.pdf)

<sup>348</sup> <http://www.businessinsider.com/average-annual-hours-worked-for-americans-vs-the-rest-of-the-world-2013-8#ixzz2cGQN5500>

<sup>349</sup> <http://nypost.com/2013/07/19/rich-parents-hire-play-date-consultants-to-help-kids-play-better-for-private-school-admissions/>

<sup>350</sup> <http://www.census.gov/compendia/statab/2012/tables/12s1233.pdf>

<sup>351</sup> <http://abcnews.go.com/Lifestyle/popular-gifts-1913-2013/story?id=21148651>

<sup>352</sup> <http://www.economist.com/blogs/schumpeter/2013/09/toy-industry>

<sup>353</sup> [http://www.theesa.com/facts/pdfs/esa\\_ef\\_2013.pdf](http://www.theesa.com/facts/pdfs/esa_ef_2013.pdf)

<sup>354</sup> <https://www.npd.com/wps/portal/npd/us/news/press-releases/over-half-of-children-now-using-smart-devices/>

<sup>355</sup> [http://www.toy-icti.org/resources/wtf\\_1999/03.htm](http://www.toy-icti.org/resources/wtf_1999/03.htm) and <http://www.toy-icti.org/PDFs/ToyMarkets12.pdf>

<sup>356</sup> <http://mashable.com/2014/01/15/this-app-lets-you-control-a-game-using-face-tracking>

<sup>357</sup> <http://www.thinkwithgoogle.com/articles/the-future-of-play.html>

<sup>358</sup> <http://www.bbc.com/future/story/20131107-could-video-games-replace-exams>

<sup>359</sup> <http://mashable.com/2013/07/23/hasbro-games-ipad/>

<sup>360</sup> <http://mashable.com/2014/01/27/bomb-defusing-game-oculus/>

<sup>361</sup> <http://www.npr.org/blogs/alltechconsidered/2014/01/07/255247261/in-gaming-a-shift-from-enemies-to-emotions>

<sup>362</sup> <http://purposefulgames.info/post/17529386426/points-of-entry-an-immigration-challenge>

<sup>363</sup> <http://www.thinkwithgoogle.com/articles/the-future-of-play.html>

<sup>364</sup> <http://tiltonfitness.wordpress.com/2013/01/09/the-messiest-fitness-trend-of-2013-mud-runs-fun-runs-zombies-and-more/>

<sup>365</sup> <http://mashable.com/2014/01/29/google-glass-games/>

<sup>366</sup> <http://designmind.frogdesign.com/articles/and-now-the-good-news/shaping-the-future-of-play.html#/images/dm/issues/and-now-the-good-news/articles/FutureOfPlay/Gleeve5.jpg>

<sup>367</sup> <http://www.tri-cityherald.com/2014/01/23/2789806/state-senate-bill-encourages-learning.html>

<sup>368</sup> <http://mashable.com/2013/09/04/rehab-for-Internet-addiction/>

<sup>369</sup> [http://www.spencerhighga.org/Magnet/Docs/PDF/Georgia\\_Videogaming.pdf](http://www.spencerhighga.org/Magnet/Docs/PDF/Georgia_Videogaming.pdf)

<sup>370</sup> <http://kotaku.com/5590907/30-things-we-will-know-about-video-games-in-30-years>

<sup>371</sup> <http://mashable.com/2013/12/20/x-gaming-trends-to-watch-in-2014/#>

<sup>372</sup> <http://www.mtv.com/thinkmtv/research/>

<sup>373</sup> <http://www.forbes.com/sites/katherynhayer/2014/01/14/mobile-technology-makes-online-dating-the-new-normal/>

<sup>374</sup> [http://www.safegov.org/media/43502/brunswick\\_edu\\_data\\_privacy\\_report\\_jan\\_2013.pdf](http://www.safegov.org/media/43502/brunswick_edu_data_privacy_report_jan_2013.pdf)

<sup>375</sup> <http://www.pewInternet.org/2013/05/21/teens-social-media-and-privacy/>

<sup>376</sup> <http://www.sciencedaily.com/releases/2011/07/110725190040.htm>

<sup>377</sup> <https://vine.co/v/hivqUA5MOvm>

<sup>378</sup> <http://www.fastcoexist.com/3022037/futurist-forum/the-future-of-relationships-10-ways-well-be-dating-having-sex-and-breaking-up>

<sup>379</sup> <http://www.sciencedaily.com/releases/2011/07/110725190040.htm>

<sup>380</sup> <http://munews.missouri.edu/news-releases/2011/0725-trend-in-young-adults%E2%80%99-dating-habits-committed-relationships-may-not-lead-to-marriage-mu-researcher-finds/>

<sup>381</sup> <http://gradworks.umi.com/15/20/1520602.html>

<sup>382</sup> <http://www.csmonitor.com/2005/1003/p13s01-wmgn.html>



---

<sup>383</sup> <http://cloudtimes.org/2013/11/30/predictive-analytics-is-the-next-growing-sector-in-big-data-market/>  
<sup>384</sup> <http://www.businessinsider.com/the-global-20-2012-5?op=1#ixzz2rFeu1z6P>  
<sup>385</sup> <http://transition.fcc.gov/.../DOC-321076A1.pdf>  
<sup>386</sup> <http://www.fastcompany.com/3021749/work-smart/10-surprising-social-media-statistics-that-will-make-you-rethink-your-social-strategy>  
<sup>387</sup> <http://www.fastcompany.com/3021749/work-smart/10-surprising-social-media-statistics-that-will-make-you-rethink-your-social-strategy>  
<sup>388</sup> <http://www.fastcompany.com/3024607/dialed/5-of-the-best-and-worst-social-networking-trends-for-2014>  
<sup>389</sup> <http://www.fastcompany.com/3024607/dialed/5-of-the-best-and-worst-social-networking-trends-for-2014>  
<sup>390</sup> <http://www.business2community.com/social-media/14-social-media-marketing-trends-2014-0745445#ltGgcE>  
<sup>391</sup> <http://www.pbs.org/wgbh/pages/frontline/generation-like/>  
<sup>392</sup> [http://www.askmen.com/entertainment/special\\_feature\\_150/184b\\_special\\_feature.html](http://www.askmen.com/entertainment/special_feature_150/184b_special_feature.html)  
<sup>393</sup> <http://www.itbusinessedge.com/slideshows/show.aspx?c=95484&slide=11>  
<sup>394</sup> <http://www.itbusinessedge.com/slideshows/show.aspx?c=95484&slide=11>  
<sup>395</sup> <http://www.bbb.org/blog/2014/01/brand-loyalty-declines-for-third-year-straight/>  
<sup>396</sup> <http://www.itbusinessedge.com/slideshows/show.aspx?c=95484&slide=11>  
<sup>397</sup> <http://www.itbusinessedge.com/slideshows/show.aspx?c=95484&slide=11>  
<sup>398</sup> <http://www.itbusinessedge.com/slideshows/show.aspx?c=95484&slide=11>  
<sup>399</sup> <http://www.itbusinessedge.com/slideshows/show.aspx?c=95484&slide=11>  
<sup>400</sup> <http://www.youtube.com/yt/press/statistics.html>  
<sup>401</sup> <http://mashable.com/2010/08/16/trends-connect-social-media/>  
<sup>402</sup> [http://www.channelonline.tv/channelonline\\_guernseynews/DisplayArticle.asp?ID=509179](http://www.channelonline.tv/channelonline_guernseynews/DisplayArticle.asp?ID=509179)  
<sup>403</sup> [http://www.huffingtonpost.com/2012/01/25/flash-mob-proposal-trend-\\_n\\_1231447.html](http://www.huffingtonpost.com/2012/01/25/flash-mob-proposal-trend-_n_1231447.html)  
<sup>404</sup> <http://www.ecaworldfitness.com/food-for-thought/slow-slow-food-2/>  
<sup>405</sup> <http://www.catholic.org/ae/celebrity/story.php?id=53991>  
<sup>406</sup> <http://blogs.wsj.com/digits/2013/12/30/which-car-sharing-app-to-use-on-new-years-eve>  
<sup>407</sup> <http://www.law360.com/articles/501657/palm-beach-sues-airbnb-couchsurfing-others-over-bed-tax>  
<sup>408</sup> <http://makezine.com/2013/12/24/12-maker-pro-trends-that-expanded-the-maker-movement-in-2013/>  
<sup>409</sup> <http://www.businessinsider.com/the-global-20-2012-5?op=1#ixzz2rFgKJHvo>  
<sup>410</sup> <http://readwrite.com/2013/03/07/10-compelling-ways-people-plan-to-use-google-glass#awesm=~oBKivKHp8eHWbY>  
<sup>411</sup> <http://www.ibtimes.co.uk/uk-students-shortlisted-2025-mars-one-mission-1431918>  
<sup>412</sup> <http://www.mars-one.com/>  
<sup>413</sup> <http://www.fastcoexist.com/3022037/futurist-forum/the-future-of-relationships-10-ways-well-be-dating-having-sex-and-breaking-up>  
<sup>414</sup> <http://www.futuristspeaker.com/2013/12/33-dramatic-predictions-for-2030/>  
<sup>415</sup> <http://www.fastcoexist.com/3022037/futurist-forum/the-future-of-relationships-10-ways-well-be-dating-having-sex-and-breaking-up>  
<sup>416</sup> <http://www.fastcoexist.com/3022037/futurist-forum/the-future-of-relationships-10-ways-well-be-dating-having-sex-and-breaking-up>  
<sup>417</sup> <http://www.entrepreneur.com/article/230975>  
<sup>418</sup> <http://www.fastcoexist.com/3022037/futurist-forum/the-future-of-relationships-10-ways-well-be-dating-having-sex-and-breaking-up>  
<sup>419</sup> <http://www.fastcoexist.com/3022037/futurist-forum/the-future-of-relationships-10-ways-well-be-dating-having-sex-and-breaking-up>  
<sup>420</sup> <http://www.csmonitor.com/2005/1003/p13s01-wmgn.html>  
<sup>421</sup> <http://www.blessedunrest.com/>  
<sup>422</sup> <http://www.volunteeringinamerica.gov/national>  
<sup>423</sup> C. Reddick & D. Norris, "E-participation in local governments: An examination of political-managerial support and impacts," *Transforming Government: People, Process and Policy*, 7(4), 2013, 453-476.  
<sup>424</sup> <http://www.dailykos.com/story/2013/10/21/1249442/-Power-Shift-Youth-Activism-and-Hope-for-the-Future>

---

<sup>425</sup> <http://pndblog.typepad.com/pndblog/2013/09/infographic-the-future-of-socialactivism.html>

<sup>426</sup> M. Gilster, "Putting Activism in its Place: The Neighborhood Context of Participation in Neighborhood-Focused Activism," *Journal of Urban Affairs*, Vol. 36, No. 1, 2014.

<sup>427</sup> [http://en.wikipedia.org/wiki/Occupy\\_movement](http://en.wikipedia.org/wiki/Occupy_movement)

<sup>428</sup> [http://www.govexec.com/media/gbc/docs/top5\\_open\\_gov\\_trends.pdf](http://www.govexec.com/media/gbc/docs/top5_open_gov_trends.pdf); <https://www.data.gov/>

<sup>429</sup> <http://eprints.qut.edu.au/62967/1/A05.pdf>

<sup>430</sup> <http://digital-activism.org/2013/07/the-future-isnt-digital-its-hybrid/>

<sup>431</sup> <http://www.statedecoded.com/about/>

<sup>432</sup> <http://opengovfoundation.org/blog/>

<sup>433</sup> <http://www.networkworld.com/community/node/84602>

<sup>434</sup> <http://www.npr.org/books/titles/200797816/smart-cities-big-data-civic-hackersand-the-quest-for-a-new-utopia?tab=excerpt#excerpt>

<sup>435</sup> [http://pewInternet.org/~media//Files/Reports/2013/PIP\\_CivicEngagementintheDigitalAge.pdf](http://pewInternet.org/~media//Files/Reports/2013/PIP_CivicEngagementintheDigitalAge.pdf)

<sup>436</sup> [http://www.academia.edu/1649090/Youth\\_Participation\\_in\\_Civic\\_Engagement\\_Through\\_Social\\_Media\\_a\\_case\\_study](http://www.academia.edu/1649090/Youth_Participation_in_Civic_Engagement_Through_Social_Media_a_case_study)

<sup>437</sup> [http://dspace.royalroads.ca/docs/bitstream/handle/10170/525/english\\_dayton.pdf?sequence=1](http://dspace.royalroads.ca/docs/bitstream/handle/10170/525/english_dayton.pdf?sequence=1)

<sup>438</sup> <http://www.forbes.com/sites/altruhelp/2012/10/17/new-civic-accelerator-galvanizessocial-entrepreneurship-impact-investing/>

<sup>439</sup> <http://pdc2012.org/RP1.html>

<sup>440</sup> <http://crx.sagepub.com/content/40/5/669>

<sup>441</sup> [http://www.huffingtonpost.com/brit-morin/what-is-the-maker-movemen\\_b\\_3201977.html](http://www.huffingtonpost.com/brit-morin/what-is-the-maker-movemen_b_3201977.html)

<sup>442</sup> <http://www.census.gov/hhes/www/socdemo/voting/publications/index.html>

<sup>443</sup> <http://www.accenture.com/SiteCollectionDocuments/PDF/Accenture-Digital-Citizen-FullSurvey.pdf>

<sup>444</sup> <http://www.innovations.harvard.edu/cache/documents/19773/1977353.pdf>

<sup>445</sup> [http://www.academia.edu/1510408/The\\_Use\\_of\\_the\\_Internet\\_and\\_Social\\_Media\\_in\\_U.S.\\_Presidential\\_Campaigns\\_1992-2012](http://www.academia.edu/1510408/The_Use_of_the_Internet_and_Social_Media_in_U.S._Presidential_Campaigns_1992-2012)

<sup>446</sup> <http://www.esri.com/library/brochures/pdfs/transparency-and-accountability.pdf>

<sup>447</sup> <http://www.networkworld.com/community/node/84602>

<sup>448</sup> <http://www.nlc.org/media-center/news-search/cities-continue-to-cut-jobs-and-infrastructure-in-face-of-recessions-impacts>

<sup>449</sup> <http://www.brookings.edu/research/articles/2012/12/state-local-budgets-gordon>

<sup>450</sup> <http://www.nlc.org/find-city-solutions/city-solutions-and-applied-research/finance/city-fiscal-conditions-in-2012>

<sup>451</sup> <http://datasmart.ash.harvard.edu/news/article/chicago-mayors-challenge-367>

<sup>452</sup> [http://www.slideshare.net/digiphile/big-data-a-city-of-things-and-civic-innovation?from\\_search=10](http://www.slideshare.net/digiphile/big-data-a-city-of-things-and-civic-innovation?from_search=10)

<sup>453</sup> [http://trends.ifla.org/files/trends/assets/ifla-trend-reportexpert\\_meeting\\_synthesis\\_2013-04-26.pdf](http://trends.ifla.org/files/trends/assets/ifla-trend-reportexpert_meeting_synthesis_2013-04-26.pdf)

<sup>454</sup> [http://www.gwlr.org/wp-content/uploads/2012/08/78\\_4\\_Citron.pdf](http://www.gwlr.org/wp-content/uploads/2012/08/78_4_Citron.pdf)

<sup>455</sup> [http://digitalcommons.law.umaryland.edu/cgi/viewcontent.cgi?article=1852&context=fac\\_pubs](http://digitalcommons.law.umaryland.edu/cgi/viewcontent.cgi?article=1852&context=fac_pubs)

<sup>456</sup> <http://www.people-press.org/2013/06/17/public-split-over-impact-of-nsa-leak-but-most-want-snowden-prosecuted/>

<sup>457</sup> <http://www.pcmag.com/article2/0,2817,2421204,00.asp>

<sup>458</sup> <http://www.tandfonline.com.ezproxy.lib.uh.edu/doi/pdf/10.1080/00330124.2012.658725>

<sup>459</sup> <http://detroitworkspj.com/wp-content/uploads/2013/01/05-Civic-Engagement.pdf>

<sup>460</sup> [http://www.lacountyarts.org/UserFiles/File/CivicArt/Civic%20Engagement%20Planning%20and%20Design%20Image\\_Define\\_Design1%20key%20.pdf](http://www.lacountyarts.org/UserFiles/File/CivicArt/Civic%20Engagement%20Planning%20and%20Design%20Image_Define_Design1%20key%20.pdf)

<sup>461</sup> <http://www.secondnature.org/>

<sup>462</sup> <http://www.nyc.gov/portal/site/nycgov/menuitem.c0935b9a57bb4ef3daf2f1c701c789a0/index.jsp?pageID=mayor>

---

\_press\_release&catID=1194&doc\_name=http%3A%2F%2Fwww.nyc.gov%2Fhtml%2Fom%2Fhtml%2F2009a%2Fpr173-09.html&cc=unused1978&rc=1194&ndi=1

<sup>463</sup> <http://www.knightfoundation.org/what-we-fund/engaging-communities>

<sup>464</sup> <http://neighbor.ly/discover>

<sup>465</sup> <http://www.technologyreview.com/news/514591/the-dictatorship-of-data/>

<sup>466</sup> [http://www.iftf.org/uploads/media/IFTF\\_Rockefeller\\_CivicLaboratoriesMap\\_01.pdf](http://www.iftf.org/uploads/media/IFTF_Rockefeller_CivicLaboratoriesMap_01.pdf)

<sup>467</sup> <http://www.iftf.org/our-work/global-landscape/governance/citizens-make-the-future/#sthash.WYWjpAb3.dpuf>

<sup>468</sup> <http://www.psfk.com/2013/11/shopping-trends-the-curve-report.html#!xw5Ah>

<sup>469</sup> [http://www.nytimes.com/2010/06/23/dining/23coop.html?pagewanted=all&\\_r=0](http://www.nytimes.com/2010/06/23/dining/23coop.html?pagewanted=all&_r=0)

<sup>470</sup> <http://www.chatelaine.com/health/fitness/want-to-lose-weight-why-exercise-beats-diet-pills-every-time/>

<sup>471</sup> <http://www.cnn.com/2014/02/25/health/lets-move-anniversary-progress/>

<sup>472</sup> [http://www.washingtonpost.com/national/health-science/hypercleanliness-may-be-making-us-sick/2013/03/25/9e6d4764-84e9-11e2-999e-5f8e0410cb9d\\_story.html?hpid=z5](http://www.washingtonpost.com/national/health-science/hypercleanliness-may-be-making-us-sick/2013/03/25/9e6d4764-84e9-11e2-999e-5f8e0410cb9d_story.html?hpid=z5)

<sup>473</sup> <http://thetinylife.com/what-is-the-tiny-house-movement/>; <http://www.sfgate.com/bayarea/article/Tech-entrepreneurs-revive-communal-living-4988388.php>

<sup>474</sup> <http://www.npr.org/blogs/alltechconsidered/2013/12/19/250548681/bay-areas-steep-housing-costs-spark-return-to-communal-living>

<sup>475</sup> [http://www.slate.com/articles/business/moneybox/2012/03/high\\_rents\\_america\\_s\\_ridiculous\\_shortage\\_of\\_apartment\\_buildings\\_is\\_pushing\\_rents\\_way\\_up\\_.html](http://www.slate.com/articles/business/moneybox/2012/03/high_rents_america_s_ridiculous_shortage_of_apartment_buildings_is_pushing_rents_way_up_.html)

<sup>476</sup> <http://www.technologyreview.com/news/520296/leading-economist-predicts-a-bitcoin-backlash/>

<sup>477</sup> <http://www.californiahealthline.org/articles/2013/3/11/states-push-back-against-health-insurers-fee-in-the-affordable-care-act>

<sup>478</sup> <http://www.psfk.com/2013/01/target-online-brands.html>

<sup>479</sup> <http://www.cnn.com/2012/06/28/health/fda-approves-first-new-weight-loss-drug-in-more-than-a-decade>

<sup>480</sup> <http://www.cnn.com/2012/06/28/155833070/fda-approves-first-new-weight-loss-drug-in-more-than-a-decade>

<sup>481</sup> [http://www.nytimes.com/2012/09/14/nyregion/health-board-approves-bloombergs-soda-ban.html?\\_r=0](http://www.nytimes.com/2012/09/14/nyregion/health-board-approves-bloombergs-soda-ban.html?_r=0)

<sup>482</sup> <http://www.reuters.com/article/2013/10/24/us-birdflu-epidemic-idUSBRE99N1HF20131024>

<sup>483</sup> <http://askabiologist.asu.edu/plosable/half-man-half-machine-becoming-robotic>

<sup>484</sup> <http://www.npr.org/blogs/health/2012/06/28/155833070/fda-approves-first-new-weight-loss-drug-in-more-than-a-decade>

<sup>485</sup> <http://www.wired.com/wiredscience/2013/11/end-abx/>

<sup>486</sup> <http://nation.time.com/2013/08/01/americans-sharply-split-on-privacy-issues/>

<sup>487</sup> [http://www.acponline.org/advocacy/advocacy\\_in\\_action/state\\_of\\_the\\_nations\\_healthcare/](http://www.acponline.org/advocacy/advocacy_in_action/state_of_the_nations_healthcare/)

<sup>488</sup> <http://www.aspenideas.org/session/young-vs-old-balancing-health-care-needs-nation>

<sup>489</sup> <http://sustainablepulse.com/2013/10/21/global-scientists-issue-gmo-safety-warning-breaking-news/>

<sup>490</sup> [http://www.annenbergclassroom.org/Files/Documents/LessonPlans/Korematsulesson\\_new.pdf](http://www.annenbergclassroom.org/Files/Documents/LessonPlans/Korematsulesson_new.pdf)

<sup>491</sup> <http://cen.acs.org/articles/91/i3/Global-Warming-Warnings.html>

<sup>492</sup> <http://sharingsolution.com/>

<sup>493</sup> <http://www.npr.org/2012/07/10/156463825/globals-generation-focuses-on-experience>

<sup>494</sup> <http://www.medicalnewstoday.com/articles/255918.php>

<sup>495</sup> <http://www.forbes.com/sites/williampentland/2013/12/12/solar-powered-apparel-may-be-coming-soon-to-a-store-near-you/?ss=business:energy>

<sup>496</sup> <http://www.forbes.com/sites/learnvest/2013/12/04/american-dream-2-0-are-we-better-off-than-our-parents/>

<sup>497</sup> [http://www.salon.com/2013/12/20/2013\\_the\\_year\\_we\\_stopped\\_trusting\\_technology/](http://www.salon.com/2013/12/20/2013_the_year_we_stopped_trusting_technology/)

<sup>498</sup> <http://www.pbs.org/wgbh/pages/frontline/generation-like/>

<sup>499</sup> <http://nces.ed.gov/fastfacts/display.asp?id=372>

<sup>500</sup> [http://blogs.edweek.org/edweek/state\\_edwatch/2013/12/nclb\\_waivers\\_may\\_have\\_provided\\_escape\\_hatch\\_for\\_many\\_low-performing\\_schools.html](http://blogs.edweek.org/edweek/state_edwatch/2013/12/nclb_waivers_may_have_provided_escape_hatch_for_many_low-performing_schools.html)

---

<sup>501</sup> <http://www.thedigitalshift.com/2013/06/k-12/meet-the-makers-can-a-diy-movement-revolutionize-how-we-learn/>

<sup>502</sup> <http://edupunksguide.org/>

<sup>503</sup> <http://www.forbes.com/sites/eliseackerman/2013/07/20/chromebooks-gain-ground-in-the-education-market-but-a-majority-of-educators-still-prefer-ipads/>

<sup>504</sup> <http://www.npr.org/2013/12/31/258420151/the-online-education-revolution-drifts-off-course?ft=1&f=1013>

<sup>505</sup> <http://foradian.com/post/49920105096/googleglass>

<sup>506</sup> <http://www.cnn.com/2012/07/10/tech/web/Internet-down-eagleman/>

<sup>507</sup> <http://thejournal.com/articles/2013/10/01/the-major-cloud-computing-problems-youre-not-paying-attention-to.aspx>

<sup>508</sup> [http://www.cisco.com/web/AP/docs/role\\_and\\_relevance\\_of\\_universities\\_in\\_digital\\_age\\_f1\\_17feb2014.pdf](http://www.cisco.com/web/AP/docs/role_and_relevance_of_universities_in_digital_age_f1_17feb2014.pdf)

<sup>509</sup> <http://www.demos.org/publication/great-cost-shift-continues-state-higher-education-funding-after-recession>

<sup>510</sup> <http://data.worldbank.org/indicator/SP.DYN.TFRT.IN>

<sup>511</sup> <http://data.worldbank.org/indicator/SE.SEC.ENRR/countries/US--XS?display=graph>

<sup>512</sup> <http://ipts.jrc.ec.europa.eu/publications/pub.cfm?id=1780>

<sup>513</sup> [http://www.sudval.com/01\\_abou\\_01.html](http://www.sudval.com/01_abou_01.html)

<sup>514</sup> <http://www.psychologytoday.com/blog/freedom-learn/200808/children-educate-themselves-iv-lessons-sudbury-valley>

<sup>515</sup> [http://www.p21.org/storage/documents/P21\\_Framework\\_Definitions.pdf](http://www.p21.org/storage/documents/P21_Framework_Definitions.pdf)

<sup>516</sup> <http://curriculumredesign.org/wp-content/uploads/CCR-Foundational-Whitepaper-Charles-Fadel2.pdf>

<sup>517</sup> [http://dx.doi.org/10.1787/trends\\_edu-2013-en](http://dx.doi.org/10.1787/trends_edu-2013-en)

<sup>518</sup> <http://www.seenmagazine.us/articles/article-detail/articleid/569/preparing-students-for-the-future.aspx>

<sup>519</sup> <http://www.datamation.com/applications/watson-plus-ibm-cloud-services-siri-or-cortana-on-steroids.html>

<sup>520</sup> <http://www.hcz.org/programs/early-childhood>

<sup>521</sup> <http://www.oecd.org/edu/school/centreforeducationalresearchandinnovationceri-theoecdsschoolingscenariosinbrief.htm>

<sup>522</sup> <http://www.businessspectator.com.au/article/2013/12/3/technology/turning-Internet-things-growth-engine>

<sup>523</sup> <http://business.time.com/2013/12/09/why-robots-are-essential-to-googles-future/>

<sup>524</sup> [http://www.futuretech.ox.ac.uk/sites/futuretech.ox.ac.uk/files/The\\_Future\\_of\\_Employment\\_OMS\\_Working\\_Paper\\_1.pdf](http://www.futuretech.ox.ac.uk/sites/futuretech.ox.ac.uk/files/The_Future_of_Employment_OMS_Working_Paper_1.pdf)

<sup>525</sup> <http://www.nytimes.com/2014/03/09/magazine/the-story-behind-the-sat-overhaul.html>

<sup>526</sup> <http://www.economist.com/news/international/21594350-how-cut-youth-unemployment-fast-changing-jobs-market-all-hands-deck>

<sup>527</sup> <http://www.pbs.org/newshour/making-sense/how-to-close-the-youth-skills/>

<sup>528</sup> <http://content.time.com/time/interactive/0,31813,2072670,00.html>

<sup>529</sup> [http://en.wikipedia.org/wiki/Autonomous\\_car#Official\\_predictions](http://en.wikipedia.org/wiki/Autonomous_car#Official_predictions)

<sup>530</sup> <http://www.robotshop.com/blog/en/trends-in-robotics-9806>

<sup>531</sup> [http://www.jetro.go.jp/en/reports/market/pdf/2006\\_10\\_c.pdf](http://www.jetro.go.jp/en/reports/market/pdf/2006_10_c.pdf); <http://www.gizmag.com/x-jetpacks-hydro-jetpack/30776/>

<sup>532</sup> <http://people.inf.ethz.ch/schmist/papers/SmartToysPoster.pdf>

<sup>533</sup> [http://books.google.com/books?hl=en&lr=&id=O06LoDbb48kC&oi=fnd&pg=PA331&dq=competitiveness+game+%26+gaming&ots=QBqyX2NhrW&sig=UB6VaBaFclRiK6h91sBEKeMK\\_g#v=onepage&q&f=false](http://books.google.com/books?hl=en&lr=&id=O06LoDbb48kC&oi=fnd&pg=PA331&dq=competitiveness+game+%26+gaming&ots=QBqyX2NhrW&sig=UB6VaBaFclRiK6h91sBEKeMK_g#v=onepage&q&f=false)

<sup>534</sup> <http://wunc.org/post/Internet-will-be-everywhere-2025-better-or-worse>

<sup>535</sup> <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3890262/>

<sup>536</sup> <http://mashable.com/2013/09/04/rehab-for-Internet-addiction/>

<sup>537</sup> <http://www.dvice.com/2014-2-11/darpa%E2%80%99s-futuristic-brain-implant-will-restore-lost-memories>

<sup>538</sup> <http://mashable.com/2014/01/15/this-app-lets-you-control-a-game-using-face-tracking/>

<sup>539</sup> <http://www.slashgear.com/whats-inside-motorolas-digital-tattoo-31284412/>

---

<sup>540</sup> <http://www.humankinetics.com/excerpts/excerpts/technology-can-have-positive-and-negative-impact-on-social-interactions>

<sup>541</sup> <http://nocamels.com/2013/11/correlor-unlocking-peoples-social-dna-to-make-advertisement-more-targeted/>;  
<http://techcrunch.com/2007/11/13/esnips-takes-page-from-online-dating-debuts-social-dna/>

<sup>542</sup> <http://www.fastcoexist.com/3020125/fund-this/adventures-in-teledildonics-sleek-new-toys-for-futuristic-computer-sex>

<sup>543</sup> <http://www.evolu.us/architecture/piezoelectric-playground-the-interactive-lumia-canopy-in-pioneers-park-belgrade/>

<sup>544</sup> [http://www.google.com/url?q=http%3A%2F%2Fdefensesystems.com%2Farticles%2F2014%2F01%2F22%2FArmy-nie-virtual-augmented-reality.aspx%3Fadmgarea%3DTC\\_NetSysManagement%2B&sa=D&sntz=1&usg=AFQjCNF\\_Ux8slOdmxzBubV7hPYybW99jCg](http://www.google.com/url?q=http%3A%2F%2Fdefensesystems.com%2Farticles%2F2014%2F01%2F22%2FArmy-nie-virtual-augmented-reality.aspx%3Fadmgarea%3DTC_NetSysManagement%2B&sa=D&sntz=1&usg=AFQjCNF_Ux8slOdmxzBubV7hPYybW99jCg)

<sup>545</sup> <http://readwrite.com/2013/03/07/10-compelling-ways-people-plan-to-use-google-glass#awesm=~ouirw7UKtMLNMQ>

<sup>546</sup> [http://www.google.com/url?q=http%3A%2F%2Fdefensesystems.com%2Farticles%2F2014%2F01%2F22%2FArmy-nie-virtual-augmented-reality.aspx%3Fadmgarea%3DTC\\_NetSysManagement%2B&sa=D&sntz=1&usg=AFQjCNF\\_Ux8slOdmxzBubV7hPYybW99jCg](http://www.google.com/url?q=http%3A%2F%2Fdefensesystems.com%2Farticles%2F2014%2F01%2F22%2FArmy-nie-virtual-augmented-reality.aspx%3Fadmgarea%3DTC_NetSysManagement%2B&sa=D&sntz=1&usg=AFQjCNF_Ux8slOdmxzBubV7hPYybW99jCg)

<sup>547</sup> <http://readwrite.com/2013/03/07/10-compelling-ways-people-plan-to-use-google-glass#awesm=~ouirw7UKtMLNMQ>

<sup>548</sup> <http://www.theverge.com/2013/8/26/4660008/pew-study-finds-30-percent-americans-have-no-home-broadband>

<sup>548</sup> <http://thenextweb.com/insider/2014/01/21/outbox-shutters-digitizing-snail-mail-service-says-working-new-product/#!zCiDH> <sup>550</sup> <http://www.forbes.com/sites/robashghar/2013/10/08/the-7-major-trends-shaping-your-business-or-career/>

<sup>551</sup> <http://www.geekwire.com/2014/crowdfunding-drones-open-data-washington-state-tech-legislation-update/>

<sup>552</sup> <http://thenextweb.com/insider/2014/01/21/outbox-shutters-digitizing-snail-mail-service-says-working-new-product/#!zCiDH> <sup>553</sup> <http://advancesinsocialwork.iupui.edu/index.php/advancesinsocialwork/article/viewArticle/83>

<sup>554</sup> <http://www.kurzweilai.net/a-review-of-her-by-ray-kurzweil>

<sup>555</sup> <http://www.newscientist.com/article/dn25057-cure-for-love-fall-for-a-robot-to-fend-off-heartache.html?cmpid=RSS%7CNSNS%7C2012-GLOBAL%7COnline-news#.UyJk5T97G89>

<sup>556</sup> <http://www.dni.gov/index.php/about/organization/national-intelligence-council-global-trends>

<sup>557</sup> <http://theviralpost.com/star-wars-phone-that-lets-you-talk-to-holograms>

<sup>558</sup> <http://www.livescience.com/6967-hang-25-year-wait-immortality.html>

<sup>559</sup> <http://www.hackforchange.org/>

<sup>560</sup> <http://www.shareable.net/blog/we-gathered-we-mapped-we-shared-a-mapjam-follow-up>

<sup>561</sup> <http://www.statedecoded.com/about/>

<sup>562</sup> <http://opengovfoundation.org/blog/>

<sup>563</sup> <http://www.networkworld.com/community/node/84602>

<sup>564</sup> <http://www.accenture.com/SiteCollectionDocuments/PDF/Accenture-Digital-Citizen-FullSurvey.pdf>

<sup>565</sup> <http://www.innovations.harvard.edu/cache/documents/19773/1977353.pdf>

<sup>566</sup> <http://www.manhattan-institute.org/government2.0/>

<sup>567</sup> <http://www.independent.co.uk/news/world/asia/new-songdo-city-atlantis-of-the-far-east-1712252.html>

<sup>568</sup> <http://www.slideshare.net/PSFK/the-future-of-cities-27145532>

<sup>569</sup> <http://singularityhub.com/2011/08/03/25-ordinary-citizens-write-icelands-new-constitution-with-help-from-social-media/>

<sup>570</sup> <http://www.statedecoded.com/about/>

<sup>571</sup> <http://opengovfoundation.org/the-madison-project/>

<sup>572</sup> [http://trends.ifla.org/files/trends/assets/ifla-trend-report-expert\\_meeting\\_synthesis\\_2013-04-26.pdf](http://trends.ifla.org/files/trends/assets/ifla-trend-report-expert_meeting_synthesis_2013-04-26.pdf)

<sup>573</sup> [http://www3.weforum.org/docs/EU11/WEF\\_EU11\\_FutureofGovernment\\_Report.pdf](http://www3.weforum.org/docs/EU11/WEF_EU11_FutureofGovernment_Report.pdf)