

# Recombinant Education:

Regenerating the  
Learning Ecosystem

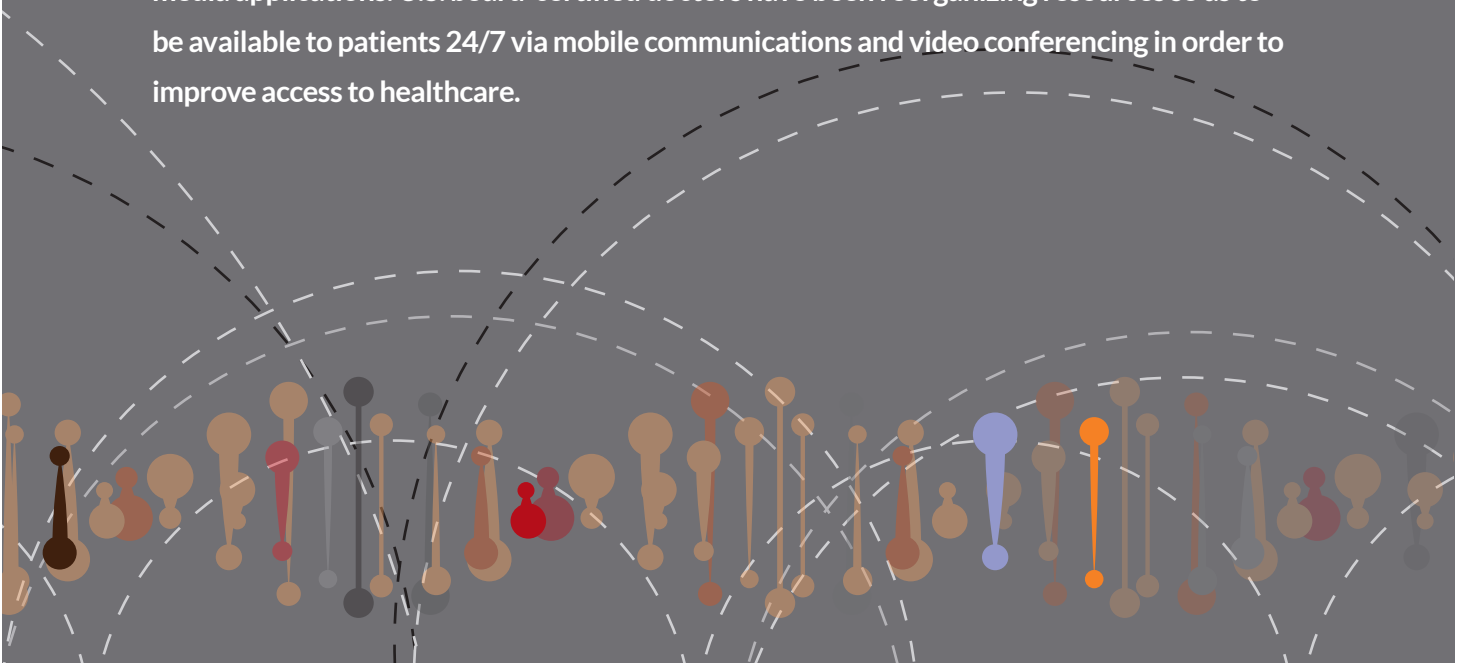


## The future is not a fixed point. It is ours to create.

This forecast previews five disruptions that will reshape learning over the next decade. Responding to them with creativity rather than fear will be critical to preparing all learners for an uncertain future.

An explosion of innovation has been transforming how we think about learning and how we organize talent and resources for learning experiences and has effectively unbundled “school” as we knew it. The tightly bound relationships and resource flows that used to deliver instruction, develop curriculum, perform assessment, grant credentials, and provide professional development are dissolving. Teaching and learning have become uncoupled from traditional educational institutions and are now available through and enhanced by a vibrant learning ecosystem.

Across industries and institutions, the digital explosion has caused a similar breakdown of traditional assumptions, models, and relationships. It has also created unexpected possibilities for those willing to experiment with the novel recombination of resources, talent, and technology. For example, cities struggling to do more with less have been reorganizing to systematically take advantage of citizen contributions. Publishers faced with declining revenue models have been restructuring to leverage tablet computing and social media applications. U.S. board-certified doctors have been reorganizing resources so as to be available to patients 24/7 via mobile communications and video conferencing in order to improve access to healthcare.

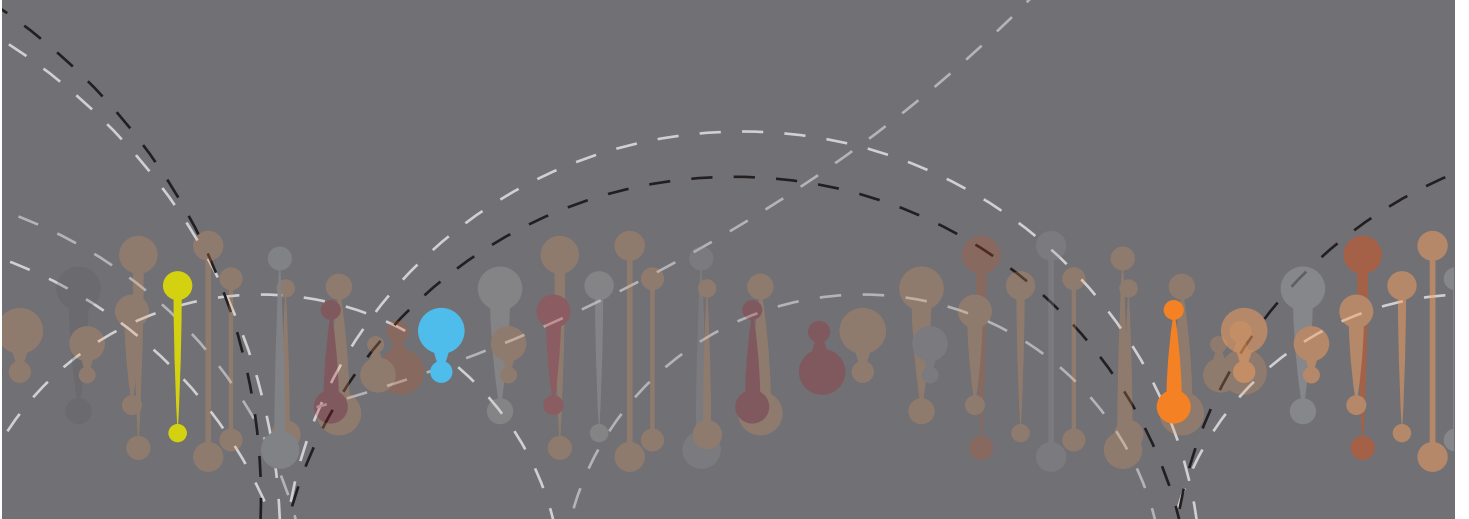


Knowledge-based industries such as education continue to confront the most significant disruptions and also to find the greatest opportunities for recombination. In keeping with that trend, the next decade promises to bring extensive recombination to education. As new education innovations, organizations, resources and relationships proliferate, we have the opportunity to put the pieces — some long-established and some new — together in new sequences to create a diverse and evolving learning ecosystem. Just as genetic recombination increases diversity by producing new forms of DNA, so too education recombination promises to bolster the learning ecosystem's resilience, helping it withstand threats and make use of possibilities.

At its best, recombinant education will discover diverse organizational forms and learning formats that find many ways to integrate talent, community assets, and global resources in support of student-centered learning. New ways of reassembling what seem like disparate pieces — and of incorporating new kinds of inputs — have the potential to usher in a world of learning that provides rich personalization for every learner throughout a lifetime.

Of course, less promising alternatives are also possible. If we do not effectively engage in ongoing education recombination, we risk letting the disruptions of the coming decade perpetuate inequities for learners, undermine the learning ecosystem's capacity to adapt, and narrow the impact of education innovations by keeping them largely uncoordinated, opportunistic, and fragmented.

The choice is ours to make, and the future ours to shape. What will be the future of learning in your organization, community, or region?



## DEMOCRATIZED STARTUP

Transformational investment strategies and open access to startup knowledge, expertise, and networks will seed an explosion of disruptive social innovations.

Entrepreneurship will no longer be reserved for the few with the resources to buffer risk and the social capital to access expertise and guidance. Instead, a new open social and financial infrastructure will disseminate practical know-how about entrepreneurship and startups, creating transformational networks that match investment with collective economic and social impact. This democratization of disruptive social innovation through bottom-up, networked entrepreneurship and access to tools will attract entrepreneurs of all ages and provide them with the resources and support to turn their ideas into practical, marketable solutions that transform communities and industries. In education, democratized access to investment capital and startup know-how has the potential to turn any teacher, parent, or student into an edu-preneur. Along with a diversification of today's professional pathways into new learning agent roles, this access will accelerate the diffusion of disruptive tools, models, and applications for organizing teaching and learning. Venture funding for education has already surged, having grown from \$59 million in 2001 to \$334 million in 2011. These new venture-supported approaches will likely garner increasing traction as the field attracts more diverse professionals through alternative pathways. As the shift toward entrepreneurial investment continues, more learners and learning agents will likely adopt an entrepreneurial mindset — an outlook demonstrating experimentation, risk-taking, learning from failure, creative problem solving, and market awareness. By modifying, building upon, and connecting one another's innovations, edu-preneurs will stimulate continuous learner-centered recombination across the learning ecosystem.

## HIGH-FIDELITY LIVING

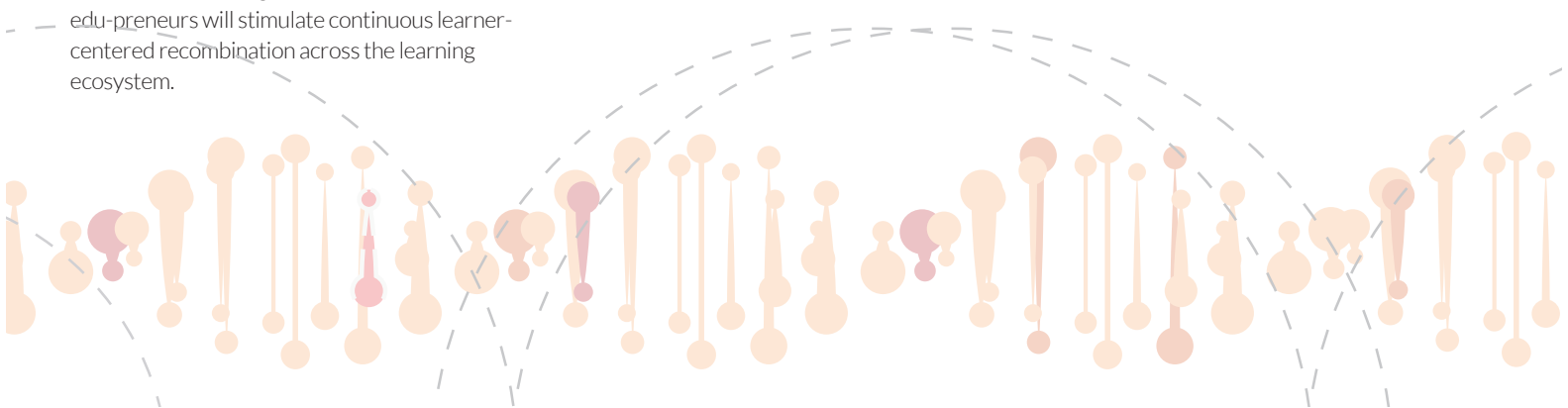
As big data floods human sensemaking capacities, cognitive assistants and contextual feedback systems will help people target precisely their interactions with the world.

We are entering the era of big data. As the cost of digital devices and technologies continues to decrease, trillions of gigabytes of data will be generated from sensor networks, mobile and context-aware devices, and online interactions. The increased volume, velocity, and variety of data will be so vast that basic information-filtering tools and practices will no longer suffice. The expanding infosphere will drive the adoption of cognitive enhancements and assistive technologies that will help us discern meaning from the world while avoiding overload. It will also raise new possibilities for surveillance, opening deep debates about privacy and trust in data. Despite such concerns, we will increasingly make use of cognitive prosthesis — a shoring up of our minds with software assistants and feedback systems that help us discern information flows and improve our decision-making and outcomes through data integration, alerts, and automation. Deeper insights into brain processes and into cognition and motivation under varying conditions will inform both the design of cognitive assistants and our understanding of how to structure learning and work environments to maximize focus, intrinsic motivation, and creativity. Data analytics, dashboards, and visualizations will be critical for extracting insights and meaning from continuous data flows. Such sophisticated analytics will help learning agents provide preemptive and continuous whole-person support based on factors such as learners' health, environments, and social contexts, as well as their academic performance. Using such tools in education recombination will help regenerate learning at the level of the individual.

## DE-INSTITUTIONALIZED PRODUCTION

Activity of all sorts will be increasingly independent of institutions as contributions become more ad-hoc, dynamic, and networked.

In the next decade, work and other meaningful activities will increasingly be brokered and leveraged across social production networks that coordinate the activities of large numbers of people via distributed leadership. A shift from a work force to a talent cloud will occur, with organizations relying on global networks of independent talent to match specialized skills with interaction-based tasks. At the same time, our ability to automate more and more tasks will displace more human workers in favor of robots, giving rise to "steel-collared" workers. As greater longevity and economic need extend individual working life and as individuals have many careers over a lifetime, refreshing and sustaining powerful personal brands will become a critical practice. Career pathways will become less tied to the requirements of a single institution or industry. Instead, they will more closely resemble personal mosaics of skills and experiences that will be documented through a multitude of alternate credentials, certificates, and reputation markers. These less linear career pathways will include new roles for educators, who will be able to find and create opportunities to contribute to learning in multiple and sometimes micro ways. As extreme career mobility becomes the norm, college and career-readiness will no longer be a static benchmark. Instead, career readiness will be a continuous and dynamic need over a lifetime, requiring self-directed learning that is closely aligned to the needs of social production networks. Individuals will assemble the right combinations of learning experiences and credentials to meet their lifelong learning needs and to communicate their performance and mastery.



## CUSTOMIZABLE VALUE WEBS

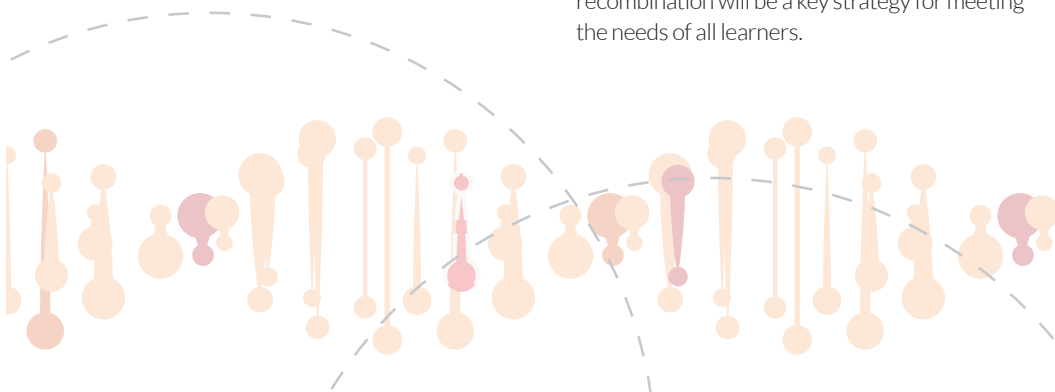
Innovative, open business models will leverage complex networks of assets and relationships to create ultra-customer-centric experiences across industries.

While the digital explosion has long been creating an expanding ecosystem of new services, applications, and tools, innovative business models will find new ways of harnessing these opportunities into flexible value webs that deliver highly customer-centric experiences. Across industries, new intermediaries, novel customer value propositions, and creative ways of facilitating open digital platforms and networks are already transforming customer experiences. For example, new intermediaries in the music industry have integrated platforms such as iTunes, Google+, and Facebook with artist information, concert databases, and mobile apps to transform passive listeners into active music participants who share, create, remix, and produce music. In education, new intermediaries will facilitate a similar integration of networks and systems that bring learners, resources, services, data, and learning agents together in novel value webs. Schools will no longer be singular, enclosed organizations. Instead, they will serve students by harnessing and brokering resources and talent across the global community. Customer-centric value propositions will guide the creation of learning experiences that leverage rich value webs to serve distinct populations. What began as a “bring-your-own-device” (BYOD) movement may very well turn into a “create-your-own-school” movement as new intermediaries, learning agents, parents, and learners collaborate to weave vibrant value webs. This increasing customization of learning will involve recombining learning experiences, assets, and tools to help each learner find the specific value proposition(s) that best meet her or his needs.

## SHAREABLE CITIES

Next gen cities will drive social innovation, with urban infrastructure shaped by patterns of human connection and contribution.

Over the next decade, the world’s population will continue to shift to cities. With cities struggling to meet the needs of more citizens as their budgets decline, necessity and constraint will drive creative solutions to large-scale problems such as transportation and power. Successful cities will be those that increasingly turn to open governance, with high levels of citizen engagement and leadership, to solve problems, support social welfare, and revitalize their economies. They will develop modular infrastructures, reorganizing and recombining approaches to regenerate themselves from the ground up. Abundant sensor data will provide greater feedback to residents while also shaping evidence-based urban policies. Successful cities will also embrace their interdependence, sharing data and models developed from ubiquitous urban informatics systems to create more flexible and responsive platforms for urban services. As DIY culture continues to spread and as fabrication tools such as 3D printers and digital lasers continue to become more affordable, a proliferation of small scale, local pop-up businesses will help revitalize communities and catalyze local economies. Urban education will transition from a disjointed state-run school system that is largely separate from other social and economic institutions to an urban service layer that will be networked across city spaces and organizations. Cities that emphasize enclosure and control of resources over sharing and openness will run greater risk of becoming feral, failing to provide core infrastructure. Creating a shared learning infrastructure in which people build on what others are doing through an ongoing process of recombination will be a key strategy for meeting the needs of all learners.



# DEMOCRATIZED STARTUP

Transformational investment strategies and open access to startup knowledge, expertise, and networks will seed an explosion of disruptive social innovations.

## Demystifying the Startup

The building blocks of entrepreneurship and the makings of viable startups are being decoded and shared broadly, increasing entrepreneurs' chances for success.

- **Startup Genome Compass** – Helps entrepreneurs manage early-stage decisions by providing a diagnostic tool informed by factors known to affect startup success. [startupcompass.co](http://startupcompass.co)
- **The Lean Startup Movement** – Launched a revolution in the startup world by codifying the lore of startup success into a manageable process. [theleanstartup.com](http://theleanstartup.com)
- **Ed Startup 101** – Introduces educators and educational researchers to entrepreneurship and intrapreneurship. [edstartup.net](http://edstartup.net)

## Matchmaking Networks

New social, financial, and networking platforms will create entrepreneurial communities that connect education entrepreneurs with funders and market opportunities.

- **FounderDating Education** – Jump starts edtech ventures by matching edtech startup talent with educators. [founderdating.com/founderdating-education](http://founderdating.com/founderdating-education)
- **Education Innovation Summit** – Brings together educators, technologists, funders, investors, and edtech startups. [edinnovation.asu.edu](http://edinnovation.asu.edu)
- **Imagine K12** – Leverages public-private partnerships to enable quick responses to the most promising technological, pedagogical, and market opportunities. [imaginek12.com](http://imaginek12.com)

## Transformational Capital

Innovative public, private, and institutional investment mechanisms will maximize social benefit and collective impact as well as economic return.

- **Social Impact Bonds** – Give investors a return when specified social good outcomes are achieved. [socialfinance.org.uk/sib](http://socialfinance.org.uk/sib)
- **HIP Investor** – Supports impact investing that combines human impact with profit, rating portfolio holdings by positive impact. [hipinvestor.com](http://hipinvestor.com)
- **Upstart** – Matches recent college grads with the right backers to provide them with the economic freedom to follow their true passions. [upstart.com](http://upstart.com)

## Key

Disruptions are major societal shifts that will have broad impact on the future of learning.

Trends are more narrowly focused changes that, when combined, give rise to disruptions.

Signals are examples, or early indicators, of how each trend is beginning to play out today.

## Opportunity

Watch for administrators to become district and regional innovation portfolio managers who break new ground to meet the needs of all learners by strategically allocating time, resources, and energy to local and global initiatives with different levels of risk and reward.

## Challenge

With an influx of new participants from other fields, leaders of the learning ecosystem will need to monitor potentially competing priorities to ensure that student learning remains the central focus and that innovations reflect the best current thinking about learning.

# HIGH-FIDELITY LIVING

As big data floods human sensemaking capacities, cognitive assistants and contextual feedback systems will help people target precisely their interactions with the world.

## Digitized Decisions

Highly sophisticated learning analytic tools will integrate multiple data streams about learners, including their social and emotional conditions, to predict performance and suggest personalized strategies for success.

- **Algorithmic Ecosystems** – Describes how machines will help humans scan streams of information that are too fast for us to read and process.

[youtube.com/watch?v=V43a-KxLFcg](https://www.youtube.com/watch?v=V43a-KxLFcg)

- **Knewton** – Combines a multitude of data points and sophisticated algorithms with user-selected content to recommend the ideal learning experience for each student.

[knewton.com](http://knewton.com)

- **Desire2Learn** – Uses a blend of socio-demographic data and activity-related indicators to predict learners' performance and to identify appropriate interventions and support.

[desire2learn.com](http://desire2learn.com)

## Extended Self

In augmenting human capacity to think and do, the use of cognitive prosthetics and social bots will become the norm for making sense of information and will blur the line between individuals and their tools and networks.

- **Outsourcing Memory** – Research suggests that we are outsourcing personal knowledge acquisition to search engines, simply remembering where the information can be found.

[news.columbia.edu/googlememory](http://news.columbia.edu/googlememory)

- **Web Ecology Project** – Teams compete to control user accounts on Twitter using social bots, influencing an unsuspecting cluster of 500 online users to do their bidding.

[webecologyproject.org/2011/01/help-robots-take-over-the-internet-the-socialbots-2011-competition](http://webecologyproject.org/2011/01/help-robots-take-over-the-internet-the-socialbots-2011-competition)

- **"Collaborations with My Other Self"** – Artist Harold Cohen collaborates with a computer program called AARON to produce paintings that have been exhibited in major art spaces worldwide.

[calit2.net/newsroom/article.php?id=1919](http://calit2.net/newsroom/article.php?id=1919)

## Reading Your Mind

Sophisticated decryption of brain signals under varying environmental conditions and during different cognitive tasks will improve the design of learning environments and experiences for attention, focus, creativity, and motivation.

- **NeuroFocus** – Uses brain wave monitoring in place of language-based focus groups to gain insight into responses and decisions regarding consumer goods.

[neurofocus.com](http://neurofocus.com)

- **Tactile Tactics** – Focuses on how the unconscious perception of our physical and material environment, including texture, color, weight, and other physical qualities, influences our thinking.

[news.harvard.edu/gazette/story/2010/06/how-touch-can-influence-judgments](http://news.harvard.edu/gazette/story/2010/06/how-touch-can-influence-judgments)

- **Picturing Thought** – Researchers at Princeton University use imaging technology to predict what people are thinking based on images of their brains.

[psych.princeton.edu/psychology/research/haxby/case.php](http://psych.princeton.edu/psychology/research/haxby/case.php)

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## Opportunity

Watch for massive data sets, learning analytics, and dashboards to enable radically and continuously personalized learning for all learners based on their performance and motivation.

## Challenge

Interventions based on automated alerts and signals could create data blindness by reducing human intuition and limiting insight; to the extent that automation correlates with lower cost, this risk could be especially pronounced in low-income communities.

# DE-INSTITUTIONALIZED PRODUCTION

Activity of all sorts will be increasingly independent of institutions as contributions become more ad-hoc, dynamic, and networked.

## The Rise of Socialstructs

Radically expanded options to architect massive collaborations in diverse technical and social settings will open new opportunities for creating, scaling, and sustaining efforts that both supplement and supplant traditional organizational models.

- **Time Banks** – Build community economies through the exchange of time and talent. Members of Hour Exchange Portland have swapped over 150,000 hours of service and have provided over 25,000 hours of free health care.  
[hourexchangeportland.org](http://hourexchangeportland.org)
- **Tilt: Flip's Adventure in 1.5 Dimensions** – Players around the world work together in this game app to earn points to plant trees in Madagascar.  
[tiltworld.com/game.info.html](http://tiltworld.com/game.info.html)
- **The Public School** – Provides a framework for anyone to socialstruct learning by proposing and organizing classes with other self-directed learners.  
[thepublicschool.org](http://thepublicschool.org)

## The Decline of the FTE

Full-time employment in a single institution or industry will decline as social production networks aggregate contributions from volunteers and pay-for-performance workers around the world.

- **SamaSource** – Connects women and youth living in poverty with dignified microwork via the Internet.  
[samasource.org](http://samasource.org)
- **oDesk** – Facilitates hiring and managing ad hoc professional task workers across the globe.  
[odesk.com](http://odesk.com)
- **PresenceLearning** – In response to a national shortage, distributes access to qualified speech and language professionals in high-need areas through virtual technologies.  
[presencelearning.com](http://presencelearning.com)

## DIY Credentialing

The increasing necessity of self-directed lifelong learning will make flexible credentials meaningful and will drive new tools and practices for communicating accomplishments.

- **Tappestry** – Helps users track what they have learned, catalog it, and share it to create an informal learning community.  
[itunes.apple.com/us/app/tappestry/id533195694?mt=8](http://itunes.apple.com/us/app/tappestry/id533195694?mt=8)
- **Degreed** – Scores and validates lifelong education from both accredited and non-accredited sources, enabling users to demonstrate mastery across learning experiences.  
[degreed.com/about](http://degreed.com/about)
- **Pathbrite** – Lets people collect, track, and share a lifetime of experiences via digital portfolios in pursuit of dream schools, internships, or careers.  
[pathbrite.com](http://pathbrite.com)

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## Opportunity

Watch for schools to access specialized services and talent from global networks, creating new differentiated roles for “in-house” learning agents and setting higher standards for both learning agents and learning resources.

## Challenge

In a world with wide-ranging learning options, new and varied credentials, and continuously changing demands, identifying essential knowledge and skills will be increasingly complex.



# CUSTOMIZABLE VALUE WEBS

Innovative, open business models will leverage complex networks of assets and relationships to create ultra-customer-centric experiences across industries.

## Digital Mediators and Brokers

Web service brokers, interactive maps, APIs, and technical standards will become essential tools for helping learning agents, learners, and parents find, organize, and curate learning resources and experiences.

- **Aristotle Circle** – Matches pre-K to career learners and their parents with the appropriate coaching, mentoring, and preparation.  
[aristotlecircle.com](http://aristotlecircle.com)
- **Shared Learning Collaborative** – Supports personalized learning for all K-12 students by building an integrated and scalable technology infrastructure that links to the Common Core State Standards.  
[slcedu.org](http://slcedu.org)
- **LearningJar** – Helps users understand the skills needed for specific roles and careers, learn informally, and then prove mastery.  
[learningjar.com](http://learningjar.com)

## Agile Schools

As the costs of coordinating learning resources and convening learning communities decline rapidly, diverse and flexible forms of hyper-focused schools will multiply.

- **PlayMaker School** – Middle school students learn through play, making, discovery and inquiry, and interest-driven design, with each student charting his or her own unique journey through the school year from an Adventure Map.  
[gamedesk.org/playmaker-school](http://gamedesk.org/playmaker-school)
- **Knowmia** – Creates personalized mini-courses for high school students, with expert teachers assembling video lessons for individuals.  
[knowmia.com/home/minicourseSignup](http://knowmia.com/home/minicourseSignup)
- **Open Learning Exchange (OLE)** – In response to the millennial goal of universal basic education, offers a modular school in a kit for creating a school anywhere with Internet access.  
[ole.org](http://ole.org)

## Transmedia Learning Productions

Like Hollywood production teams, transmedia learning networks and free platforms will provide access to celebrity learning agents, offer compelling curriculum, and structure vibrant blockbuster learning environments that integrate multiple digital media formats.

- **Rock Star Teachers** – At no cost to their students, Sebastian Thrun, Gautam Kaul, Sal Khan, and others reach hundreds of thousands of students with world-class learning experiences of high production value.  
[coursera.org/course/introfinance](http://coursera.org/course/introfinance)
- **Fluid Environments** – Shows how transmedia creates seamless connections among new online tools and technologies and traditional books and web-based resources to bring curriculum alive to learners.  
[eduscapes.com/fluid/4a.html](http://eduscapes.com/fluid/4a.html)
- **TED-Ed: Lessons Worth Sharing** – Supports educators in “flipping” high-quality videos to create interactive learning experiences.  
[ed.ted.com/lessons/introducing-ted-ed-lessons-worth-sharing](http://ed.ted.com/lessons/introducing-ted-ed-lessons-worth-sharing)

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## Opportunities

**Watch for schools to create distinct value propositions and identities and to partner with other organizations as part of complex value webs that offer personalized learning for all students.**

## Challenge

**If inertia prevents today's public education system from responding constructively to disruptions, students, parents, and learning agents will create alternative value webs that may or may not be accessible to all.**

# SHAREABLE CITIES

Next gen cities will drive social innovation, with urban infrastructure shaped by patterns of human connection and contribution.

## Context-Aware Cities

Networks, apps, and other platforms will provide real-time feedback to residents, improving their access to services while helping to integrate urban structures and solutions both locally and regionally.

- **LIVE Singapore!** – Gives data back to residents as they generate it through their actions, allowing them to be more in sync with their environment and to make decisions that reflect the actual state of the city.  
[senseable.mit.edu/livesingapore](http://senseable.mit.edu/livesingapore)
- **MatchingMarkets** – Mobile network of street vendors uses real-time communication to optimize distribution, increase awareness of local products, respond to seasonal activity patterns, and strengthen connections between local food supply and demand.  
[senseable.mit.edu/matchingmarkets](http://senseable.mit.edu/matchingmarkets)
- **Forage Tracking** – In the absence of a formal recycling system, uses location-detecting hardware and software along with participatory platforms to help informal recyclers organize their activities and connect their cooperative to citizens.  
[senseable.mit.edu/foragetracking](http://senseable.mit.edu/foragetracking)

## Hacking the City

As state, regional, and federal supports lag behind urban needs, local and collaborative activity will drive urban innovation, revitalization, and micro economies from the ground up.

- **Shareable: Cities** – Online magazine and community blog supports the sharing of projects, tools, and approaches for bringing open source, collaborative problem solving and crowdsourcing to cities across the US.  
[shareable.net/channel/cities](http://shareable.net/channel/cities)
- **San Francisco Great Streets Project** – Planning department creates more public space by supporting citizen development of parklets in parking spots.  
[sfgreatstreets.org/parklets](http://sfgreatstreets.org/parklets)
- **Artisanal Manufacturing** – Former industrial-scale factory in Brooklyn now houses several dozen small factories, each with a niche clientele in local markets.  
[nytimes.com/2012/08/08/nyregion/small-factories-thrive-in-brooklyn-replacing-industrial-giants.html?\\_r=3&pagewanted=all](http://nytimes.com/2012/08/08/nyregion/small-factories-thrive-in-brooklyn-replacing-industrial-giants.html?_r=3&pagewanted=all)

## Inside-Out Urban Schools

Close partnerships and data sharing with civic organizations will create robust urban learning landscapes that weave learning throughout the community, expanding and integrating access to learning resources.

- **Hive Learning Network** – Leverages community organizations and mentors to distribute learning beyond the classroom and across networks of libraries, museums, science centers, and art studios.  
[hivelearningnetwork.org](http://hivelearningnetwork.org)
- **Expanded Schools** – Expand the time and scope of school by partnering with AmeriCorps volunteers and community organizations to create an immersive school day.  
[tascorp.org/section/what\\_we\\_do/develop\\_program\\_models](http://tascorp.org/section/what_we_do/develop_program_models)
- **Y-PLAN** – Engages young people as agents of change who collaborate with college mentors and adult allies to plan for real changes in their schools, neighborhoods, and cities.  
[citiesandschools.berkeley.edu/engaging.html](http://citiesandschools.berkeley.edu/engaging.html)

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## Opportunity

Watch for learning resources and experiences to meld with other city services and infrastructures, such that urban indices rank cities by their learning landscapes, driving urban reinvention.

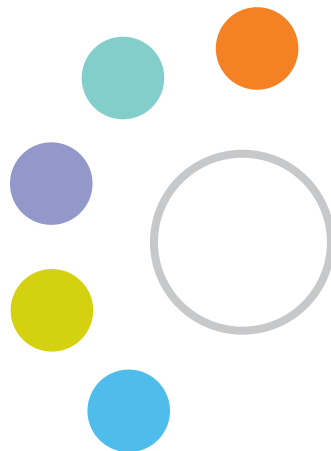
## Challenge

As learning becomes networked across city spaces and organizations, learning agents will need to ensure that all learners have access to the same range of services and that those services and their providers are of the highest quality.

# Learners

As we regenerate the learning ecosystem, customizable value webs will allow self-directed learners to navigate diverse resources and opportunities and to co-develop highly personalized learning pathways with the support of learning agents. Learners and learning agents will be mutually responsible for seeking out the support of learning experts and maintaining robust networks. Specifically, learners will need to:


- Use personal performance feedback from multiple digital data streams and dashboards to inform their own learning and development
- Draw upon their intrinsic motivation to take responsibility for evaluating available learning opportunities and for co-designing their unique learning pathways with learning agents
- Seek out and work with mentors, peer learning groups, and digital and human learning agents to support and further their learning experiences
- Use those same resources to navigate the array of choices offered by the learning ecosystem
- Engage with a wide variety of learning tools, resources, and learning formats to acquire and apply core knowledge and essential skills such as collaboration, initiative, global awareness, creativity, critical thinking, and perseverance
- Demonstrate mastery of core knowledge and essential skills through performance-based assessments and digital portfolios that represent each learner's unique potential to the world.





# Learning Agents

As we regenerate the learning ecosystem, the number and type of learning agents will expand dramatically. Existing educators will redefine their professional roles to match their strengths. In addition, developers, entrepreneurs, and technologists will create new roles and opportunities for themselves. Successful learning agents will:

- Use and create multi-layered visual dashboards to discern meaning from learning analytics that guide instruction and communicate progress
  - Integrate technology to customize learning on a continuous basis and to make performance predictions that allow for early interventions designed to prevent failures and drop-outs
  - Collaborate with other learning agents and use community and global resources to facilitate engaged learning that ignites students' intrinsic motivation and builds students' core knowledge and essential skills
  - Integrate performance-based assessments and guide learners in building digital portfolios that represent their unique potential to the world
  - Cultivate their own entrepreneurial skills in using public and private resources to develop customized learning pathways for all students
  - Re-envision their own roles by exploring new ways of blending digital learning tools with other services and resources to leverage their professional strengths and passions in working directly or indirectly with learners
  - Establish professional peer communities to develop their knowledge about deepening and accelerating student learning and closing achievement gaps
  - Use digital portfolios to manage and represent their own continuous learning.
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# Learning Ecosystem

The learning ecosystem will regenerate unevenly over the next decade. In regions of rapid recombination, engaged edu-citizens, a vibrant edu-preneurial culture, and an urban emphasis on openness and sharing will remove barriers and encourage smart risk-taking. To achieve more consistent regeneration of the learning ecosystem where the needs of all learners are met, stakeholders will need to:

- Develop interoperability across programs, services, data-scapes, and learning platforms
- Support the development of public-private partnerships and harness social innovations that can expand the array of resources, organizational formats for “school,” and opportunities available to all students
- Lead the process of articulating what learners will need to know and be able to do in a dynamic world where knowledge is a commodity
- Create and cultivate socialstructs by using mechanisms such as community design, game mechanics, diverse pay and reward structures, and intrinsic motivation to encourage collaboration
- Allocate resources and attention to research and development efforts and communicate about successful edu-preneurial activities, advocating for public policy and partnering with others to encourage innovations to scale
- Establish transparent, meaningful, and accessible reporting of formative and summative performance data at all levels of the learning ecosystem
- Ensure that everyone in the learning ecosystem has access to, and the capacity to use, the data needed to make effective decisions about learners
- Integrate knowledge from the expanded and diverse range of professionals entering the learning ecosystem and reconsider the most effective definitions of roles for a variety of learning agents
- Collaborate with stakeholders across the learning ecosystem to identify ways of evaluating the quality of diverse learning agents and learning providers
- Create rigorous and meaningful learning experiences that support learning agents in continuously improving their effectiveness
- Track and address any new inequities that emerge within the learning ecosystem.

*Created in collaboration by*



**KnowledgeWorks**

Cincinnati | Napa | Oakland | Columbus | Washington  
**knowledgeworks.org**

Through our portfolio of school and community approaches, KnowledgeWorks scales sustainable learning innovations by providing tools, training, assistance, and thought leadership to stakeholders across the learning ecosystem. Since 2005, we have studied trends shaping our world and have created conversations and strategies for change with leaders who are thinking about the future of learning.

**SAVERI**  
CONSULTING

**andreasaveri.com**

Saveri Consulting makes the future actionable for clients through research-based foresight, highly creative engagement experiences, visual maps, and forecast artifacts. With over 20 years experience in diverse organizational settings, Saveri partners with clients to create clear strategic pathways to transformation and resilience in this complex world.

*With input from the Institute for the Future, [iftf.org](http://iftf.org)*

