

## How to Use This Map

The 2006-2016 **KWF/ITF Map of Future Forces Affecting Education** is intended to help you think about the future of education in the United States in an engaging and constructive way. The map presents a forecast of external forces that are important in shaping the context for the future of public education and learning in the next decade. It is an outside-in perspective that will help reframe current critical challenges related to education in a broader, longer-term context of change. Your task is to use the map to create compelling stories about how education may evolve in this future context.

In essence, this map is a conversation catalyst. It is a thinking tool for telling provocative, insightful stories about the future of education, rather than a definitive representation of a single future. Its purpose is to spark new conversations about education, engage a broader audience, and provide a common framework to explore innovations, new solutions, and experiments. Using the map this way, you don't have to agree with each trend to find the map useful. Assume that a trend is a reasonable possibility and work from that perspective.

### Think FORESIGHT to INSIGHT to ACTION

This thought process will help you pull threads from the future into the present in meaningful and actionable ways.

**FORESIGHT:** Using a marker or sticky notes, identify spots on the map that resonate with you as you think about your role in education or the issues that matter to you most. These may be specific trends on the map or combinations of trends. Why do these trends resonate with you? What questions do they raise about the future of education?

**INSIGHT:** For each highlighted spot, imagine the implications for stakeholders, providers, and beneficiaries of public education. What is the deeper meaning of this trend for education or your organization? These insights may form the basis of a strategy for your organization or group.

**ACTION:** For each insight, develop a list of possible strategic actions, including new research, partnerships, competencies to develop, communications plans, and programs.

### A KEY TO ELEMENTS ON THE MAP

**TREND:** Trends are the core of the map and represent major shifts, new phenomena and concepts, and driving forces that will shape the future context of education.

**HOTSPOT:** Hotspots are trends that we think have broad impacts on education and make good starting points for exploring the map.

**DILEMMA:** Dilemmas are problems that can't be solved and won't go away. They require new strategies that go beyond either-or thinking.

## GRASSROOTS ECONOMICS

From economies of scale to economies of groups

Grassroots economics is an emerging set of rules for creating value from collaboration more than negotiation, from bottom-up rather than top-down processes, and from shared resources rather than private property. *What existing and new players can catalyze grassroots education innovation?*

## FAMILY & COMMUNITY

**A NEW LOCALISM**  
Local communities become the focus of experiments in sharing (or "gift") economies, sustainable environments, and new civic processes.

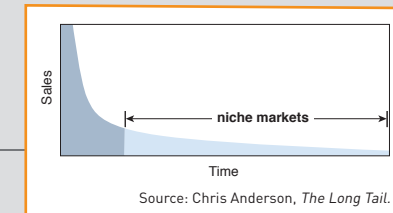


## MARKETS

**AN EXPANDING LEARNING ECONOMY**  
The knowledge economy and a growing consumer value on personal growth drive a diverse market for educational and learning experiences, ranging from food, toys, and games, to housing and travel.

### THE RISE OF LONG-TAIL ECONOMICS

Niche markets become cost-effective to serve, enabling personalization.



### COMMUNITY VALUE NETWORKS

Map and make visible tangible and intangible assets (like knowledge, trust, reputation, loyalty) to create richer relationships of exchange.



rivalrous	non-rivalrous
excludable	private good
non-excludable	public good
	toll good

Source: Elinor Ostrom, *Governing the Commons*, 1990.

### UNBUNDLED EDUCATION

Open content and curriculum, social media, and communities of action redefine the role of schools and their distinct identity.

- Network hubs
- Resource coordination
- Ongoing assessment
- Managing student development



A forum for building bridges between educators and neuroscience

www.teach-the-brain.org

Collaborative teaching and learning frameworks

sll.stanford.edu/consulting/tools/efolio/



Pacoima Beautiful Youth Environmentalists

Source: PacoimaBeautiful.org

## INSTITUTIONS

### URBAN LEARNING COMMONS

Educational and learning resources are treated as critical common-pool resources (much like clean water, healthy oceans, and fertile land) necessary for sustainability in an innovation-driven economy.

Leveraging institutional predictability & network adaptability

### INSTITUTIONS FOR COLLECTIVE ACTION

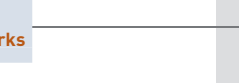
Peer-to-peer networks, distributed communication, and social-accounting systems enable new strategies for avoiding the tragedy of the commons.

Supporting teachers' rights & changing teachers' roles

### PARTICIPATORY PEDAGOGY

Students take an active role in reflecting on their learning.

- Interactive portfolios
- Wikis
- Ongoing, real-time updates
- Collective input



Participatory budgeting in Porto Alegre, Brazil

Source: PacoimaBeautiful.org

Participatory governance

Participatory civic practices reframe community priorities.

Participatory governance

Participatory governance

Participatory governance

Participatory governance

Participatory governance

## EDUCATORS & LEARNING

### DISTRIBUTED INNOVATION

Innovation networks, solutions markets, incubators, and Creative Commons licenses tap experts, entrepreneurs, and positive deviants who break rules in order to revitalize innovation in education.

www.thinkcycle.org

### GLOBAL TRADE IN PEDAGOGY

Maverick, edge educators and administrators sell and buy curriculum on the global market.

- China - math and science
- U.S. - creativity and innovation

### COLLECTIVE ASSESSMENT

New methods of group intelligence and problem-solving harness diverse educators to create rapid student assessment based on quantitative and qualitative learning outcomes.

### DO-IT-YOURSELF TOOLKITS

Range from diabetes management to starting your own home school or creating your own curriculum.

### AN EXPLOSION OF LEARNING AGENTS

New roles, processes, and relationships in the learning economy spawn new career paths in education.

- Content experts
- Learning coaches
- Network navigators
- Classroom managers
- Cognitive specialists

### CROSS MENTORING FOR URBAN SURVIVAL

Urban youth peer groups pioneer successful strategies for navigating extreme urban life.

### FIRST-PERSON VIEW OF GEOGRAPHY

Targeted information, embedded in place, turns each location into a personal space. Watch for schools, malls, and neighborhoods, to become digitally tagged for learning.

Integrating digital natives & digital immigrants

Integrating digital natives & digital immigrants

Integrating digital natives & digital immigrants

Integrating digital natives & digital immigrants

Integrating digital natives & digital immigrants

## TOOLS & PRACTICES

### OPEN ECONOMY PRINCIPLES

- Empower the periphery
- Connect network nodes
- Leverage self-interest
- Support self-directed work
- Build transparency and trust



www.meetup.com

### SMART MOBING

Increase in skills of local businesses, health practitioners, parents, educators, and activists to form ad hoc groups to break the rules and catalyze change.

### RESCRIBING LIFE

The standard narratives of adolescence, early adulthood, and post-retirement get rewritten.

- Web logs, photo logs, video logs
- Wikis
- Podcasting
- Machinima, mashups

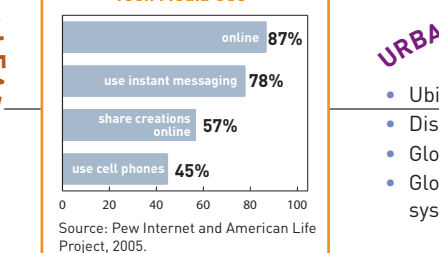
### HEALTHY SHOPPING

People expect more health benefits from products and services, including from their schools, teachers, and neighborhoods.

### DEVELOPING READINESS AND RESILIENCE

- Rapid adaptation
- Social networking
- Health and energy management
- Cooperative work practices
- Futures thinking
- Ad hoc organization

### MEDIA-SAVVY YOUTH



### URBAN COMPUTING

- Ubiquitous wireless
- Displays everywhere
- Global positioning
- Global information systems

### TECHNOLOGIES OF COOPERATION

- Enable networks of groups to form and create new economic, social, and political structures.
- Mobile computing
  - Social-accounting and reputation tools
  - Knowledge collectives
  - Peer-to-peer production

### NETWORKING IQ

- Six key factors:
- Group participation
  - Making referrals
  - Online lifestyle
  - Personal mobile computing
  - Uses location-based applications
  - Computer connectivity



Platform for self-expression and social networking

www.myspace.com

### PERSONAL DIGITAL MEDIA

Collaborative, social, and interactive:

- Web logs, photo logs, video logs
- Wikis
- Podcasting
- Machinima, mashups

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# Directions of Change

## Key Environmental Shifts

Behind the forecasts on this map are some clear shifts that characterize the general directions of change that will have impacts on education.

Moving From:	Moving Toward:
Hierarchical structures	→ Hybrid networks and hierarchies (heterarchies)
Centralized control	→ Empowered periphery
Blue-ribbon panels	→ Context-based experience and tacit knowledge
Measuring resources and assets	→ Mapping flows of value and benefits
Solving discrete problems	→ Managing ongoing dilemmas
Individual computing	→ Participatory media
Proprietary knowledge and resources	→ Collectively generated and managed knowledge
Computer labs	→ Pervasive, media-rich learning
Consumer culture	→ Do-it-yourself culture
Acute illness	→ Chronic illness
Service providers	→ Platform developers
Stable professions	→ Dynamic, entrepreneurial professions
Ubiquitous, monolithic infrastructure	→ Lightweight, smart, ad hoc infrastructure
One size fits all	→ Custom fit
Design for average users	→ Design with expert users

## FAMILY & COMMUNITY

### Local value grows

Economies of group connectivity—combined with fears of globalism, political gridlock, and concern over dominance of big business—will create a revival of localism. Interra's card-based payment system develops deep links across merchants, local non-profits, and community organizations to retain more dollars within communities. Renaissance Health uses e-mail, mobile telephony, and in-person visits in a new model of primary care based on intimate, real-time communication between doctors and families.

### Youth media defines community networking

Millennial (Gen Y and Z) smart networkers will push the organizational edge for employers and community leaders. Their experiences with shared presence through instant messaging and video chat, gaming as a structure for thinking and interacting, and multiple digital and physical worlds will create new modes of work, socializing, and community learning that stress cooperative strategies, experimentation, and parallel development.

### Families become deeply diverse

Communities will need to learn how to negotiate more complex and layered identities as citizens develop a range of affinities based on attributes in addition to race, ethnicity, education, and income. Genetic history, mixed families, household diversification (multi-racial, multi-generational, same-sex, adoptive), and religious personalization create multiple layers of identity that define a complex topology of ideas and values. Developing forums for building bridges across extreme, often polarizing, ideological perspectives will be a major challenge for community institutions.

### It's harder to be healthy

It will be increasingly difficult—and expensive—for people to achieve good health. Developed economies are beset by chronic diseases such as obesity and diabetes. Poor urban residents in the United States with marginal access to fresh foods, green spaces, and pollution-free environments will suffer disproportionately. More children will need access to ongoing medical care but in ways that don't impact their ability to participate fully in school.

### Humans become an urban species

During the next decade, more than half of the world's population will live in cities. The shift to cities will be greatest in developing countries, yet small cities with populations less than 50,000 will be among the fastest growing in both the developed and developing worlds. The emerging megacities will constitute an urban wilderness presenting extreme conditions that will require existing institutions to provide new infrastructures (physical and social) and develop new adaptive strategies.

### Urban environments become VUCA focal points

The VUCA environment—volatile, uncertain, complex, and ambiguous—touches all institutions and community members, including schools. In extreme urban areas decimated by poverty, pollution, and economic instability, public schools become the zone of health and security—physical, intellectual, and emotional. Schools will be expected to play a leadership role in addressing the interrelated issues of learning, health, and civic intelligence.

### The community becomes the classroom

Ubiquitous computing and wireless connectivity, embedded in physical environments, will turn physical places into aware contexts—environments that recognize people, information, and activities, and then respond appropriately. As place-based information becomes more accessible, educational services will be customized to place, making learning increasingly visible in the community.

## MARKETS

### The market values learning

Learning becomes a key customer filter that shapes decisions in the market across income categories, expanding markets adjacent to public education. Leveraging networking tools, open knowledge repositories, and peer-to-peer production methods (rather than hierarchical production systems), learners and educators will increasingly experiment with sharing and exchanging learning resources across market boundaries growing a more integrated learning economy. Models for organizing learning experiences over time will diversify and extend beyond those found today in private, parochial, home schooling, and charter schools.

### Public schools become hubs in value networks

Lower network-coordination costs make it cost-effective to meet the needs and desires of "long-tail" niche markets in industries as diverse as music, health, and education. Numerous and diverse niche markets of learners become targets for all sorts of providers of learning experiences in the expanding learning economy (public, private, parochial, charter, home and other informal schools, and commercially based providers). Value network mapping becomes an important tool for tracking the exchange of tangible and intangible learning assets that flow between public schools and the rest of the learning economy. These exchanges create richer relationships between public schools and the community.

### People make their own worlds

Extending the trend toward choice and customization in everything from media and appliances to food, health, and education, people are becoming more active participants in creating their own worlds, whether it means do-it-yourself home projects, peer-to-peer media exchanges, or open-source collaboration. The result: a much more personalized world.

### Education becomes a health issue

Major impediments continue to plague the traditional U.S. health care system, from uninsurance to shortages of health workers and administrative waste. While an aging population redefines consumer markets in terms of health benefits, children's health status and needs redefine and reprioritize educational agendas, including school lunch programs, nutrition curriculum, physical education, school health staff, and onsite health services. Children's health issues create an opportunity for radical change in public schools.

### Infrastructures are flexible and localized

In a world of rapid urban growth, constrained urban resources, and increasing mobility, building and maintaining basic infrastructure will be an ongoing challenge. The concept of permanent, large-scale infrastructure will likely give way to more temporary, localized, and ad hoc solutions—in effect creating temporary structures for bounded purposes or lightweight, portable, and personalized infrastructures. This is true for infrastructures like telecommunications and energy, but will be increasingly true for social, economic, and political structures as well like micro-finance and micro-insurance, home-based health care, small schools, and even micro-learning structures. Technologies and structures that were once intended to provide independence for rural areas could well become tomorrow's urban solutions.

### New norms create new expectations for childhood

Hyper-parenting will continue to spread and intensify as genetic report cards and body modification with technologies that build the capacity of children become mainstream. These enhancements will create new ideals for "the normal child"—with new kinds of cognitive divides. For example, kids with access to digital appliances, pharmaceuticals and nutritional supplements, and even surgeries and implants may think differently than kids without access.

## INSTITUTIONS

### Communities create common-pool resources

Common-pool resources (e.g., grazing land and fisheries), are non-excludable and subtractable—that means everyone has access to them and individual users can deplete or damage the resources if they are not managed properly. Elinor Ostrom's pioneering work shows there are principles for creating institutions for collective action that maintain and nurture successful commons. Innovative communities, like the eLearning city in Espoo, Finland, treat their educational resources as a commons—a resource maintained by the community that sustains the community's innovative drive. How would public educational and learning resources (teachers, facilities, students, funding) change if they were treated as common-pool resources?

### Unbundled education supports personalized learning

The convergence of networks, emergent self-organization, and cooperative strategies sets the stage for a host of new business models that function as platforms for value creation among distributed knowledge workers, innovative users, and customers. EBay doesn't sell anything, but it provides a platform for buyers and sellers to meet, for individuals to develop careers as Power Sellers, and for third-party businesses, like Picture It Sold, to prosper. Schools and districts that become open platforms for development of innovative and diverse learning models will have a distinct advantage.

### Urban frontiers as innovation zones

An open economy empowers innovation at the periphery—it allows individuals with local, tacit expertise to effect change on the whole system through locally appropriate solutions. MIT's FabLab does this by bringing personal fabrication tools to rural India or remote Norway and helping residents innovate in ways that fit their distinct needs. Lightweight infrastructures will provide modular, flexible systems for urban social entrepreneurs, cutting-edge thinkers, and expert users to customize meaningful local solutions that could become sources of innovation for school districts.

### Everyone is a donor or lender

New bottom-up financial infrastructures will leverage social accounting tools, reputation systems, and peer-to-peer connectivity creating access to credit, savings, and insurance for urban residents cut off from traditional institutions. Developing alternative funding strategies will become more important as education competes with health and disaster response for funds. Microfinance experiments will utilize social networks to secure loans in communities where traditional lending practices may not succeed, like those pioneered in developing countries by the Grameen Bank. Prosper Market models itself on eBay, matching prospective lenders with borrowers. Aggregation of microtransactions, such as those initiated with eScrip and School Pop, will become more sophisticated and targeted. Web-based fundraising taps the social networks of potential donors, such as Omidyar Network's DonorsChoose that allows individuals to donate in-kind to schools.

### The built environment becomes instrumented and responsive

Sensor-based technologies that currently track resources and manage logistics, will also be used to monitor and manage the complex, interacting environments of daily life including homes, workplaces, and schools. With ubiquitous wireless Internet access, location-based information, and displays everywhere, schools become adaptive learning environments that respond to the changing needs of administrators, students, and their families. Facilities management becomes a strategic function, working collaboratively with those involved in curriculum development, technology integration, and pedagogical objectives.



Welcome to the 2006–2016 **Map of Future Forces Affecting Education** prepared for KnowledgeWorks Foundation by the Institute for the Future (IFF). Public education in the United States is at a critical crossroads. The knowledge economy and globalization continue to challenge the basic industrial-era assumptions upon which most public schools, curricula, and evaluation mechanisms are based. New interactive digital media are diffusing rapidly, even in lower-income communities, fostering a youth media culture that is crashing into schools and educators like a tsunami, raising issues of privacy, pedagogical relevance, and equity. Student performance is inconsistent across the country, and average U.S. performance indicators lag disappointingly behind those of other countries.


KnowledgeWorks Foundation commissioned this map because we believe that excellent education is critical to the future. We bring to the map our passionate concern for certain fundamental values—high expectations, high quality, public engagement in public education, and equal opportunity for all, especially for those who have been denied opportunity in the past. These are at the center of our own strategic planning around the map. But we also think it is time for education strategy to be more proactive, and to pay more attention to how the world is changing. We are sharing the map with other catalysts for change in education because we hope it will also inspire them to take advantage of the possibilities opened by trends affecting families, communities, markets, institutions, educators, learning, tools, and practices.

For more information about this map and the series of workshops, navigational tools, and resources that complement it, please visit [www.kwfdn.org/map](http://www.kwfdn.org/map) or contact Barbara Diamond ([diamondb@kwfdn.org](mailto:diamondb@kwfdn.org)) or Andrea Saveri ([asaveri@iff.org](mailto:asaveri@iff.org)).



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# Pull-Out Section

Please pull out this insert and use it in administrative workshops and planning sessions

## EDUCATORS & LEARNING

### Knowledge collectives catalyze innovation

Look to new forms of innovation networks that support open aggregation and remixing of knowledge—idea markets like Innocentive that match problem solvers with solution seekers or design collectives like ThinkCycle that match the needs of NGOs with design schools around the world. Creative Commons licenses offer flexible means of managing copyrights that protect creators but extend unfettered use of innovations. Government agencies can focus on removing barriers and encouraging innovation networks to form. Educational innovation zones will emerge that spark regional trade in pedagogical specialties.

### Educational careers forge new paths

As education is unbundled into a constellation of functions and roles to meet the needs of the emerging learning economy, the teaching profession will experience a creative breakout. New administrative, classroom, and community roles will differentiate educational careers, attracting new entrants and providing new avenues for experienced educators to branch out—as content experts, learning coaches, network navigators, cognitive specialists, resource managers, or community liaisons. Interactive media will link diverse groups of educators and students in ad hoc groups to perform new kinds of collective assessment and evaluation of both students and educators.

### Personalized learning focuses on the craft of teaching

Personalized learning plans will leverage new media, brain research, and school structures to create differentiated learning experiences based on individual needs. Interactive and collaborative digital spaces, such as wikis, will provide shared learning portfolios where students, educators, parents, and other learning stakeholders can perform assessments and real-time interventions. New classroom approaches will be controversial for many teachers because they will require "unlearning" many basic assumptions about the nature of teaching. Unions may resist the diversification of educator roles or embrace it as an opportunity to be real leaders of change.

### Youth pioneer new urban survival skills

In VUCA communities, youth will become the mentors for older community members in new methods of urban survival including urban computing, urban agriculture, and new literacies for building cooperative strategies. Combined with a growing youth media culture, youth may develop a public voice at younger ages, even becoming influential in political or religious movements.

### Public places become personal spaces

This decade will become the decade of information in place—geocoded data will be linked through the Internet and accessible through a variety of mobile tools from cell phones and PDAs to augmented-reality devices (like eyeglasses). The result will be an increasingly first-person view of places, where rich streams of personalized media "redraw" streets, storefronts, schools, and community locations. Educational content and curriculum will become context-specific, aligning personal learning needs with places.

### Learning gets physical

Digital-physical fusion enables the community to truly become the classroom. Learning has always had physical and emotional components that have been minimized as computers isolate students from each other, teachers, and the real world. Now technology enables mediated immersive learning. Students learn while moving through real environments with the mobile technology—so their cognitive apprenticeship involves not only their brains, but also their bodies in informal learning environments.

## TOOLS & PRACTICES

### Technologies of cooperation leverage the open economy

An emerging set of social technologies—from mobile computing and reputation systems to open, collective knowledge repositories and peer-to-peer production—is greatly expanding our human capacity to cooperate. These technologies will drive experimentation with new forms of economic production, social organization, and civic governance. Specifically, cooperative technologies facilitate group formation, network building, transparency, aggregating distributed resources, and leveraging self-interest to create broader social value.

### Smart mobbing becomes a primary social-networking skill

Communities and families will become differentiated by their ability to catalyze collective action and mobilize resources for specific and targeted priorities. Smart mobs, self-organizing swarms, and other hybrid ad hoc groups will become familiar social forms that guide civic action and change communities.

### Media become personal and collaborative

As economic identity shifts from consumer to creative producer, digital technology will turn the world of media into a very personal world. Increasingly, people will take advantage of simple tools and a worldwide platform to express themselves in everything from blogs (personal Web pages) and wikimedia (Web pages that can be edited by anyone) to podcasting (sharing audio or video files for downloading to iPods), machinima (remixed animated computer games), and mashups (video, music, or graphic media that are re-mixed). The social nature of these tools will encourage sharing, appropriating, and reinventing others' inventions in a rapid stream of collaborative innovation. The impacts of this innovation will run deep in our social and economic systems.

### Toolkits drive a do-it-yourself culture

The prevalence of DIY toolkits will grow among the media and information exchanged in the burgeoning sharing economy. Whether they are instructions for hacking your TiVo, managing your glycemic level, or designing a lesson on the solar system, DIY toolkits will support a society of home producers and locally grown value.

### Disciplines of readiness focus on building resilience

A VUCA world demands preparedness and clarity for unexpected futures. Personal life skills such as rescripting a coherent, meaningful narrative of one's personal life path outside of traditional social family and lifecycle norms become critical for navigating the surprises of VUCA. Communities will respond to VUCA with participative forms of governance, such as the bottom-up, participatory budgeting practice in Porto Alegre, Brazil, which has lifted the city to one of the best places to live in Brazil. Developing a culture and practice of readiness for students, families, and communities becomes a core function of public schools in VUCA communities.

### Life and learning become serious games

As the barriers between physical and digital spaces come down, people will move seamlessly between digital game spaces and urban neighborhoods. The intermingling of world building (alternate reality) games and real-life interactions in physical-digital space will create a culture of layered realities, where strategies from the worlds of gaming and simulation will increasingly be employed in non-game situations. For learning, this means that the cooperative, critical-thinking, and problem-solving practices encouraged in digital games will make serious games a key form of pedagogy.