

Lifelong Learning in 2040

The Next American Economy's Learning Series

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Introduction

Michael Moe, Chief Executive Officer of GSV Capital, recently remarked at the annual ASU-GSV Summit that “you will no longer fill up your knowledge tank until age 25 and drive off through life; you will continuously replenish it (Moe 2016).” This paper examines why the American workforce needs an adaptive, lifelong learning mindset. This paper also presents three design principles to facilitate lifelong learning at the learning enterprise level. For decades experts have debated *what* to teach to prepare the workforce; we argue the true imperative is to teach all students *why* lifelong learning matters and *how* to approach a lifetime of continuous learning.

The rapid rate of continuous technological progress will require a reconceptualization of why and how we learn. The profusion of technology into every aspect of modern life is fundamentally changing the nature of the American economy and the ways in which humans contribute to economic output. Acclaimed futurist and Google engineer Ray Kurzweil expects the rate of technological progress to advance so rapidly that by 2030, a thousand dollars of computer power will be a thousand times more powerful than a human brain. By 2040, this will contribute to radical innovations in genetics, nanotechnology, and robotics that will transform health care, manufacturing, agriculture, construction, and computer science (Kurzweil 2016). Some believe these innovations could render the human contribution to the labor force as we know it obsolete (Wohlsen 2014).

A more likely scenario, however, is that technological progress will continue to raise the wage premium for education. Analysis from the Georgetown University Center on Education and the Workforce estimates that this wage premium will continue to exacerbate economic inequality unless 20 million more Americans receive a college education over the next 20 years (Carnavale and Rose 2015). The U.S. is only on pace to produce 8 million new graduates in that time. How can we ensure that millions more Americans will succeed in the next American economy?



Lifelong Learning Skills

Americans must become lifelong learners. Learning enterprises (i.e., education institutions such as secondary schools, colleges, universities, and new types of hybrid organizations) must help learners develop and nurture an adaptive mindset toward continuous education. They must also help learners value and refine their uniquely human qualities (i.e., curiosity, problem solving skills, creativity).

Learners without a secondary or postsecondary degree will have different continuous learning needs than those with a postsecondary degree. Some learners will need remedial reading and arithmetic training. Others may need language or scientific inquiry development. The skills for lifelong learning, however, will be the same for everyone.

All learners will need to embrace the continuously evolving nature of the skills required to succeed in the workforce. Learners need to chart their own career and education pathway through informed decision-making processes. Learners will also need to refine the skills that technology has yet to replicate (social skills, creativity, and a strong curiosity for learning).

Continuously Evolving Skills

Technology alters how work is done, and the technical skills required for success are changing (Manyika, et al. 2013). Walk into any manufacturing facility and you will see fewer line workers running machines with their hands and more technicians operating complex computer systems. As technological change causes economic disruptions along shorter and shorter timeframes, the pace at which Americans are required to learn new skills will continue to accelerate. As John Seely Brown, the co-chairman of the Deloitte Center for the Edge, explains, “We’ve shifted from stable stocks of knowledge and an archived world to a world of information flows, participation and states of confusion. Now we create as fast as we learn. The game is more complicated (The Aspen Institute 2014).”

To succeed in the next American economy, Americans must be equipped to embrace these changes. Lifelong learners will adapt quickly in a shifting economic landscape by understanding changes in the market and identifying educational experiences that respond to these changes. For computer science professionals, this might mean understanding the evolutions and various utilities of Java, Objective C, and Python, among other programming languages, including those yet to be created. Similarly, a communications professional should not only know how to navigate the complex world of media relations in the broadcast and cable worlds but also understand how that world is changing as a result of the blogosphere and social media platforms. Data science professionals should know how to model phenomena using traditional statistics and economics, while also knowing how to leverage big data (as well as the risks of doing so). Equipped with these adaptive mindsets, Americans will become lifelong learners who appreciate the historical nature of the evolution of skills, and who are prepared to keep pace as these trends continue into the future.

Beyond appreciating the evolving nature of skills, lifelong learners should know how to navigate their education and career pathways, a competency known as career literacy. Jobs for the Future, a national nonprofit focused on ensuring educational and economic equity for all, defines career literacy as providing “instruction on how to apply information from a participant’s personal Basic Economic Security Table and Self-Sufficiency Standard, local



labor market information, assessment information, and other applicable local and national resources toward making education plans and career choices that lead toward economic security (Jobs for the Future 2012).” Applying the tools of career literacy is an iterative process. Learners should continuously monitor changes in their own industry and preemptively chart potential next steps in their career and education pathways.

Flexing Human Comparative Advantage

Technology’s ubiquitous influences should trigger learners to leverage and hone their most human traits. Learners must match their adaptive mindset (*ability to pivot*) with social skills and a continuous curiosity (*desire to learn*).

While perhaps initially counterintuitive, technology is placing an ever-increasing premium on social skills: critical thinking, problem solving, empathy, communication, and perseverance, among others (Thompson 2014). These skills are a constant in a typhoon of technology-driven economic change. Some critics argue that the increased mechanization of the economy will actually inhibit humans from finding employment, as robots take over larger and larger swaths of the labor market. We believe, however, that the human contribution to economic output will be more important than ever, and Americans should proactively prepare for this.

David Autor of the Massachusetts Institute of Technology contends that the profusion of technology in the world of work has resulted in an increased emphasis on and premium for social skills (Autor 2014). This phenomenon can be explained, in part, by an aphorism known as Polanyi’s Paradox. “We can know more than we can tell... The skill of a driver cannot be replaced by a thorough schooling in the theory of the motorcar; the knowledge I have of my own body differs altogether from the knowledge of its physiology.” Tacit knowledge of how the world works exceeds our explicit knowledge of how the world works. Explicit knowledge can be modeled, learned, and computerized. Tacit knowledge, however, is more difficult to comprehend and even harder to put into practice. Autor himself explains this point clearly:

Human tasks that have proved most amenable to computerization are those that follow explicit, codifiable procedures—such as multiplication— where computers now vastly exceed human labor in speed, quality, accuracy, and cost efficiency. Tasks that have proved most vexing to automate are those that demand flexibility, judgment, and common sense—skills that we understand only tacitly—for example, developing a hypothesis or organizing a closet. In these tasks, computers are often less sophisticated than preschool age children. The interplay between machine and human comparative advantage allows computers to substitute for workers in performing routine, codifiable tasks while amplifying the comparative advantage of workers in supplying problem solving skills, adaptability, and creativity (Autor 2014).

These ideas are further supported by Carl Frey and Michael Osborne (2013), economists from the University of Oxford, who argue that while algorithms can increasingly manage highly complex, even non-routine tasks, machines are less likely to accomplish tasks that require perception, manipulation and creative and social intelligence.

For Americans to be successful in the next American economy, it is essential for them to develop highly sensitive social skills that maximize their uniquely human contribution to economic output. The *New York Times*, *The Wall Street Journal*, *Marketwatch* and others have reported on the declining job prospects and diminishing wages of liberal arts majors (Fottrell 2014; Fuller 2015; Lewin 2013 & Schawbel 2014). Major efforts to steer students into



Science, Technology, Engineering, and Mathematics fields coincide with well-established reports on the declining job prospects and diminishing wages of liberal arts majors (Lewin 2013, Fuller 2015 & Fottrell, 2014). These trends have led many, like New York Times best author and workplace expert Dan Schawbel, to cast doubt on the efficacy of a liberal arts education in the 21st century (Schawbel 2014). To the contrary, technology has made a liberal arts education only more and more valuable. The Association of American Colleges and Universities believe that the liberal arts are key to instilling social skills, and businesses are increasingly competing for workers who demonstrate these social skills (Association of American Colleges and Universities 2016 & Perrault 2016). An education that incorporates the humanistic perspective trains students for the ambiguity and complexity of modern work, and is therefore more important than ever.

Beyond the economic realm, social skills will remain an indispensable salve to the tech-induced fragmentation of modern society (a phenomenon discussed by Jonathan Haidt (2016), among many others). Some even contend that our democracy could weaken as liberal arts and humanities majors continue to decline and our collective stock of social skills is depleted. As our lives become more fragmented and technology-driven, it is more important than ever to prioritize social skills. It is our humanistic values and competencies that will maintain a strong social fabric and vibrant democracy. Social skills help ensure that lifelong learners can live out these values in society.

Perhaps the most crucial uniquely human skill of all for the next American economy will be curiosity. Tom Stafford, a cognitive scientist at the University of Sheffield, explains it this way: “Evolution made us the ultimate learning machines, and the ultimate learning machines need a healthy dash of curiosity to help us take full advantage of this learning capacity (Stafford 2012).” The return on curiosity in the next American economy will manifest in many ways. First, while machine learning and artificial intelligence have made big strides in this arena in the past few years, robots are far from being able to self-generate an independent, intentional interest in a question beyond what their programming allows (Johnson and Noorman 2013). Humans, on the contrary, have an innate tendency to explore, probe, and question, an instinct dependent on no algorithm or logic. This instinct must be nurtured. Secondly, as we discussed earlier, the pace of technological change is accelerating. The far-reaching economic implications of this acceleration will require a constant acquisition of knowledge. Those who are continuously curious and eager to embark on new learning opportunities will be able to meet these changes in an adaptive, constructive manner.

Learning Enterprises

Institutions of learning have an imperative to innovate and adapt to nurture lifelong skills among more Americans. The present-state design of most educational institutions is quite static. Educational institutions offer time-bound learning experiences that in the secondary and postsecondary context are primarily associated with career preparation and sometimes coupled with civic engagement and personal development. New technologies, however, are changing the distribution methods of knowledge and the learning preferences of students, creating a new dynamism in education. Exploding costs, low completion rates, and state divestment also threaten the financial models of existing educational institutions.

Bo Cutter, Senior Fellow and Director of the Next American Economy Project at the Roosevelt Institute, argues that a revolution in education is needed. Cutter emphasizes the need to facilitate more flexible models of learning by leveraging technology and bundling learning experiences as micro-courses and micro-credentials (Cutter 2015). We suggest coupling these changes to the *form* of education with a new *mindset* of lifelong learning. We refer



to education institutions that deliver this mindset of lifelong learning as learning enterprises.

Learning enterprises can more explicitly teach the ethos of lifelong learning through continuous, cyclical education and career planning (as opposed to linear, step-wise planning). By developing flexible career and education pathways tools, and coupling these tools with curricula that acknowledge the evolutionary nature of skills, learning enterprises can enable students to adapt their own career and education plans to technological change. Beyond nurturing an adaptive mindset and training students in traditional liberal arts and humanities to develop their social skills, learning enterprises can design and develop infrastructure to help facilitate this process.

Lifelong Learning: Infrastructure

Learning enterprises can design the infrastructure to make learning more appealing and accessible throughout learners' lifetimes. Such infrastructure could take many forms. We offer three design principles we anticipate will be helpful to a broad range of learners.

1) Learning infrastructure must distill information from many sources.

Lifelong learners need smooth on-ramps with real-time data to help enhance decision-making as they move through their education and career pathways. Americans regularly express great optimism regarding the potential career impact of education. They express concern and confusion, however, with regard to *how* to achieve this impact. Education platforms like Skillful, a project led by the Markle Foundation in partnership with Arizona State University (ASU), LinkedIn, and edX, help address this information asymmetry. ASU designed the online platform, which provides an on-ramp for college "stop outs"—individuals with some college who were unable to complete a degree or certificate—seeking to "upskill" and re-career. The Skillful platform leverages best-in-class tools from LinkedIn, edX, and Burning Glass to provide users with real-time information on existing employment opportunities in their local geographies, as well as direct links to the education content that will prepare them for these careers.

Me3 is another example of an early stage on-ramp and data-hub that ASU is testing with high school students. Me3 is a gamified college advising tool that helps students determine their interests and select an education and career pathway. Then, students can work backwards to plan their high school class selections, which helps the students to see the relevance and significance of school. Furthermore, Me3 feels like a familiar social media experience; students build a profile and track their progress using their smart phones. The tool is aligned to the Holland Codes/RIASEC and leverages open jobs data.¹ It provides students who may otherwise not know what courses to take or career to pursue an interactive platform powered by relevant data and information to help guide their decision-making.

2) Learning infrastructure must strike a balance between technology-enhanced and human-supported interventions. Platforms must be coupled with human navigation support to assist lifelong learners at times when technology alone is insufficient. While technology will continue to improve its ability to advise and counsel, several crucial advising roles fall squarely in Polanyi's Paradox.

¹ The Holland Codes or the Holland Occupational Themes (RIASEC), is a theory of careers and vocational choice based upon personality types. It was developed by the psychologist John L. Holland. Four additional studies refined and provided support for the validity of Holland's (1997) RIASEC (Realistic, Investigative, Artistic, Social, Enterprising, and Conventional) typology.



For example, while the Skillful platform leverages “high-tech” tools, there is a corresponding “high-touch” element: Users who need additional help will be able to call a career coach on the phone or visit with a workforce navigation expert in person. Similarly, the Starbucks College Achievement Plan, which offers all part- and full-time benefits-eligible U.S. employees full tuition coverage to earn an ASU bachelor’s degree, relies on both technology and human support systems. Starbucks Partners (what Starbucks calls all its employees) receive support from a dedicated team of coaches and advisors as well as round-the-clock tutoring support services on a variety of subjects. Employees interested in enrolling in the program have access to customized onboarding support to help sift through career and workforce pathways aligned to more than 50 undergraduate degrees through ASU’s research-driven and top-ranked program, delivered online. Additionally, coaches and advisors help the employees navigate financial aid and academic preparedness questions.

3) Learning enterprises must reimagine and customize funding models. Colleges and universities currently have a business model based on the credit hour, which fails the institutions and students alike. The credit hour system disincentivizes colleges and universities from accepting credits from other institutions because the way that credit hours are defined can vary widely, and this in turn hurts transfer students and students looking to engage in stackable credential educational pathways. “Seat-time,” a unit commonly used to measure the credit hour, is difficult to measure for an online student or in a hybrid learning context. Competency-based learning, where students learn at their own pace, is also not amenable to the credit hour system (Fain 2012). Thus, the credit hour will not have as much significance in a lifelong learning context because learners will need more flexibility.

The funding model for the Starbucks College Achievement Plan was customized to remove the students’ financial burden. It is an example of how learning enterprises can advance price restructuring and diversify who pays for education. As Jon McGee argued in *Breakpoint: The Changing Marketplace for Higher Education*:

Though typically framed, incorrectly, as doing less with less (an almost completely unappealing market proposition) or more with less (an unattainable hope in many cases), in the face of change, contraction is better approached as requiring that we do *differently* with less – which puts the premium on gaining the greatest effect possible from any given level of resources (McGee 2015).

Examples of how other learning enterprises and systems have reimaged their pricing structures will inform new designs. The Australian government, for example, bases the prices of its degrees on an index derived from the degree’s market value and Australia’s national priorities. Students also face different pricing options for degrees based on major selected, and some students are able to access income-contingent loans. This differentiates the cost of higher education in a way that the American system does not (Dillard 2016). Federal tax credits could also stimulate further employer investment in lifelong learning, from basic literacy and English language learning all the way to advanced graduate studies. The Center for American Progress proposed making the Lifetime Learning Tax Credit—a tax credit of up to \$2,000—available to a far wider swath of the adult population, which could also stimulate more lifelong learning (Bosworth 2007).

Learning enterprises will contribute significantly to lifelong learning infrastructure by investing in high-quality tools and resources that assist students in navigating education and career pathways. As funding models become more flexible, learning enterprises must move beyond stagnant funding regimes in order to provide more students access to education in a manner that is most responsive to the students’ learning needs and financial situations.



Conclusion

If Americans move through their careers fully cognizant of the technical skills they must continuously acquire and refine, secure in the sophisticated social skills required for an ambiguous workplace, and inspired by an insatiable curiosity for learning, they will be well-prepared for the economy of 2040. With these skills, Americans will be able to leverage technological disruption to their own benefit and do so throughout their lives, which will allow them to succeed in an economy that is constantly evolving.



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