EXECUTIVE SUMMARY

We are at a crossroads.

Robots and AI threaten to either put millions out of work or create a society so unequal it shatters our democracy.

At the same time, we are facing a once-in-a-century opportunity. Over the next 20 years, not only robots and AI but virtual and augmented reality, digital fabrication, and other emerging tech will become ubiquitous. Emerging tech will create an abundance of wealth, and it could become a vital part of revitalizing communities from Compton to Appalachia.

But there's a catch. To take advantage of this opportunity, we need to pull off the seemingly impossible: train as many people as possible in every community to become developers and designers, so they can either get jobs or create co-ops/small businesses in emerging tech.

How do we do that? By recognizing that the road to a better future runs through our past.

# What Extension Services and Citizenship Schools Can Teach Us

Extension Services

In the late 19th and early 20th century, US farming faced a similarly daunting task. The modern agricultural revolution couldn't occur unless millions of farmers mastered a wide range of new technical knowledge and skills. After several efforts failed to have a big enough impact, the US created a community-oriented approach called Cooperative Extension Services aka Extension Services. Extension Services was a smashing success, radically transforming the way millions of US farmers practiced farming.

In the introduction, the report argues that the reason Extension Services succeeded was because in its most effective incarnations, it:

* **Made Modern Farming Techniques Much Easier to Learn** by breaking down complex agricultural research and designing farming techniques so they could be easily understood by everyday farmers, and by creating feedback loops between researchers and community networks of farmers
* **Fostered A Rich Community-Based Web Of Support**, including clubs, local farmer demonstrations, and other forms of peer-to-peer learning
* **Operated On A Massive Scale**, providing every agricultural county with one or more extension agents, who organized large numbers of volunteers and identified & developed local leadership
* **Provided Real Accountability** by focusing on states and counties and demonstrating whether extension agents were transforming farming in their designated community -- unlike many well-meaning coding initiatives today, which may track how many individuals have taken a coding class but never measure whether their efforts are bringing about fundamental change in specific communities.

The report argues that the history of Extension Services also helps explain why so many people think the idea of truly democratizing coding is just wishful thinking. In many communities in the US, smart, dedicated, and passionate people who, despite operating on a shoestring, pour their heart and soul into trying to make programming accessible in their community. But they are hopelessly outmatched by the size of the problem. If we are going to succeed, we need a solution that operates at the same scale and scope as and employs as ambitious strategies as Extension Services did.

Citizenship Schools

Although Extension Services strategy has proven to be extremely effective at helping the audiences it's designed to serve, sometimes it's done tremendous harm by focusing on the needs of some audiences while relegating others -- e.g., helping white farmers while ignoring black farmers, turning its back on the small family farms it once embraced while shoring up Big Ag and damaging the environment.

How do we harness the strengths of the best traditions of Extension Services while ensuring no communities are left behind? By embracing the lessons of 1960s Civil Rights Movement's Citizenship Schools.

Citizenship Schools were a little-known but crucial part of the 1960s Civil Rights Movement. Southern states had passed voter suppression laws that required voters to be able to read and write. To teach basic literacy, Citizenship Schools used community-oriented strategies similar to those of Extension Services. But they also combined basic literacy with civic literacy, teaching their students the skills they needed to fight for their freedom and for their community.

When the Internet first took off, it was sold as a tool for empowering everyone; instead, it became one critical foundation of an economy where communities from Harlem to Harlan County were left behind. If we don't want to repeat that mistake, we must ensure that every community has a seat at the table -- and to do that, we'll need to draw on the lessons of Citizenship Schools. Only by ensuring that there are enough people in every community who understand both how to code and how to fight for their community's future can we be confident that emerging tech opportunities will be accessible in every community and that every community will have a real say in who benefits from this new economy.

# 3 Strategies for Truly Democratizing Emerging Tech

While the exact approach taken by each community will differ -- the Bronx, rural Kentucky, East LA and Youngstown, Ohio don't face identical challenges, circumstances, or culture -- the report argues there are 3 overarching strategies that are crucial to democratizing emerging tech in every community.

1) Smooth the Learning Curve

Why does training lots of people to become coders seem like Mission Impossible? Because right now, coding can be painfully hard to learn. But that's not a feature, it's a bug.

The techniques to make coding easier already exist: user experience design (UX). UX is routinely used to make websites and apps easier to use and to entice users to buy more junk or spend more time clicking the Like button. But when it comes the coding languages and frameworks that are used to build those websites and apps? Not so much.

We need to do for emerging tech coding what Extension Services did for ag tech: make it a top priority to design it so it's easier for everyday adults to learn. Part 1 explains how:

* **Embrace Community-Oriented Coding UX** so we expand coding beyond the people who already find it easy to learn. Focus on the needs of everyday adults by creating collaborations between tech companies and community groups to improve coding UX. And in doing so, create coding UX expertise in the community that can lead to jobs or small businesses.
* **Create A Continuum Of Skill** from beginners to power users to "blue-collar coders" to skilled developers, so there are more opportunities to get into the industry. Then use coding UX to smooth the learning curve along that continuum. And along the way, strive to turn all types of coders from tool users to tool makers; as the report argues in "Hip-Hop Wasn't Created by Sound Engineers," you don't always need to be a rocket scientist to power innovation.
* **Get Coding UX Research Out Of Its Silo** so breakthrough techniques get out of the lab and into the hands of the coders who are creating and maintaining programming languages and frameworks.
* **Create Institutional Support For Coding UX**, particularly in Big Tech companies, VC, universities, and foundations.

2) Develop an Ecosystem of Community-Oriented Support

Making coding easier to learn is only half the battle; we also need to reduce the gap between tech and communities. In Part 2, the report argues that to do so we need to create an ecosystem of community-oriented support:

A) **Harness the Power of Community** inthe way we provide training and support. For example:

* **Create Multiple On-Ramps**, especially in community institutions such as churches or beauty parlors, where people can explore the idea of coding and put their toes in the water while surrounded by people they know and trust
* **Create Peer-To-Peer Support** and other forms of community-based learning in order to overcome insecurity, psychological barriers -- e.g., seeing oneself as someone who works with their hands -- and uncertainty
* **Explore Collaborations between Communities and Corporations** in creating a rich ecosystem of support that can address overlapping needs, helping to both underwrite community support and create informal connections that can lead to opportunities for jobs and creating small businesses
* **Operate at Scale**, using national nonprofit networks and other approaches to take advantage of combining resources across communities

B) **Build A Better Bridge Between Training And Work** so all the hard work and sacrifice that goes into getting trained pays off. The report discusses strategies ranging from exploring creating apprenticeships to helping rural and other communities where tech jobs are scarce find ways to kickstart their local emerging tech economy.

3) Combine Tech and Civic Engagement Training

In Part 3, the report argues that emerging tech will not only create new economic opportunities, it will upend some of our core assumptions about how markets work. As it does so, it'll open up possibilities to reshape the rules of the road so our economy starts working for everyone. But if we want more than a handful of people to be involved in these conversations, we must ensure that as many people as possible in every community learn both the technical and the civic skills needed to truly participate.

This strategy must be designed so it can assist people from a wide variety of political ideologies and perspectives learn how to shape the direction of emerging tech, our communities, and our society. In short, the goal isn't to push a specific political viewpoint, it's to help revitalize our democracy in an era of rapid technological and economic change.

In Part 3, the report:

* **Explains how emerging tech will transform our economy over the next 20-30 years**, requiringthat communities foster the skills of civic engagement around tech -- including addressing issues about the impact of emerging tech that go far beyond good paying coding jobs
* **Explores the lessons of Citizenship Schools**, which played a critical role in the 1960s Civil Rights movement in the South by combining basic literacy and civic literacy
* **Explores how to translate Citizenship Schools' lessons** for emerging tech by describing two thought experiments about how we could embed the development of civic literacy skills in technical training and support

Conclusion

In the conclusion, the report explains how to:

* **Get Started** implementing these ideas, including how to get your feet wet, how to set goals so you can know if you're making real progress, and how to ensure your efforts help to create diversity both in your community's emerging tech scene and the emerging tech industry as a whole
* **Scale Up** to create institutions and a movement that operates at a similar size and scope as Extension Services
* **Build Bridges** between communities in red and blue states

With the rise of emerging tech, we have a rare opportunity to help locked out communities today and create an amazing future tomorrow. But to seize it, the report argues, we need to learn the most important lesson from Extension Services and Citizenship Schools: we need to stop being afraid. We need to think boldly, dream, and then act on a big enough scale to reach those dreams.

Introduction

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# The Threat

We live in an age of a technological paradox. The computing power that used to fill up a floor now fits inside your pocket, and the Internet and other new technology have produced staggering amounts of wealth. But despite claims that this technological revolution would empower everyone, wages for most workers have stagnated for decades, and communities from Compton to Harlan County have essentially been written off.

The future could be even more grim. Many experts believe that in the next 10-20 years, 25-75% of all jobs will be eliminated by robots/AI. If they're right, this crisis could end up devastating the middle class and the poor and destroying our democracy.

And if they're wrong? We still aren't off the hook. A recent McKinsey report argues that by 2030 every advanced economy will need to "retrain and redeploy tens of millions of midcareer, middle-age workers."

How big is that challenge? In terms of magnitude, it’s akin to coping with the large-scale shift from agricultural work to manufacturing that occurred in the early 20th century in North America and Europe, and more recently in China.

But in terms of who must find new jobs, we are moving into uncharted territory. Those ***earlier workforce transformations took place over many decades***, allowing older workers to retire and new entrants to the workforce to transition to the growing industries. But the speed of change today is potentially faster. The task confronting every economy, particularly advanced economies, will likely be to retrain and redeploy tens of millions of midcareer, middle-age workers. As the [McKinsey Global Institute] report notes, "***there are few precedents in which societies have successfully retrained such large numbers of people***" (emphasis added).[[1]](#endnote-1)

A challenge of this magnitude would be scary and exhausting if our society only had to tackle it once. But McKinsey's prediction just takes us to 2030. As robots and AI continue to improve, we can expect wave after wave of mass dislocation as both old and new jobs are eliminated by new rounds of automation.

Policies that support "lifelong learning," active labor market policies, and programs such as Universal Basic Income could soften this series of blows. But ultimately they're like buying better lifeboats for the Titanic.

Regardless of whether robots and AI lead to mass unemployment or mass displacement, we are facing a daunting future.

# The Opportunity: The Explosion of Emerging Tech

But our future doesn't have to be grim. Even as robots and AI's impact on work may pose a serious threat to our future, there is another technological trend that will give us a once-in-a-century opportunity to make our communities whole.

Over the next 20 years, not only robots and AI but also augmented and virtual reality, digital fabrication, and other emerging technologies will become ubiquitous, becoming one of the core driving forces in our economy. As they do so, they will create an abundance of wealth.

Robots and AI threaten to shatter the link between that wealth and broad prosperity: new industries may not create lots of good jobs. But if we can ensure everyday people get a seat at the table, if we can figure out how to train millions of people from Compton to Appalachia to become developers and designers, they should be able to capture a big enough slice of emerging tech's wealth to help revitalize our communities.

As we'll see in Part 3 and the conclusion, this opportunity won't solve all of the economic problems created by robots and AI -- e.g., not everyone is going to become a programmer or designer. But if we take advantage of this opportunity, it could serve as one of the central foundations for rebuilding our communities.

# Is Truly Democratizing Emerging Tech a Pipedream?

But can we train millions of everyday people to become developers and designers? Given where we are today, it's understandable that many think this goal is just wishful thinking.

It's not for lack of trying:

* Every day around the globe, people who are smart, dedicated, and passionate -- and who usually operate on a shoestring -- pour their heart and soul into making computer tech accessible in their community
* Many people in the tech industry work hard to create tools and languages they hope will empower millions of people
* Educators in academia and the tech industry have spent countless hours developing freely available online coding classes in order to reduce the barriers for everyday people to learn programming

This impressive work has made a real difference, often opening up possibilities for new careers and new journeys of self-discovery for the individuals they've helped.

But go to communities facing hard times and ask people if they think coding will create a lot of opportunities that people in their community can count on. You won't find many takers.

The problem we face is not that the people trying to democratize coding aren't driven enough or passionate enough or smart enough. The problem is that they are hopelessly outmatched by the scale and scope of the challenge. If emerging tech is to provide real hope for communities that our society has left behind, we need a new approach.

Luckily, we don't have to figure out a solution from scratch. This isn't the first time our society has faced the need to bring about a massive transformation of the technical skills and knowledge of millions of people. The road to our future runs through our past.

# Lessons from Our Past: Cooperative Extension Services and Citizenship Schools

Cooperative Extension Services

In the late 19th and early 20th century, the US faced a similarly daunting task. A modern society can't function unless farmers are productive enough so they can feed the vast majority of people who no longer work the land. To pull off this agricultural revolution, millions of farmers had to master new skills and knowledge -- the key elements of soil science, plant science, entomology, and a wide range of other information and practices that made up modern farming practices.

Just like efforts to democratize tech today, the first few attempts to solve this problem fell short. Eventually, the US succeeded by creating a community-oriented approach called Cooperative Extension Services, aka Extension Services[[2]](#endnote-2).

Cooperative Extension Services were successful because they created a rich web of support to help farmers make the transformation to modern farming. In doing so, they employed 4 strategies:

* **Focus on Communities, Not Just Individuals**. Most of today's efforts at democratizing tech are focused on individuals. And although this approach has some advantages, it often ends up masking the fact these efforts are creating opportunities in some communities but not others. Extension Services used a community-oriented approach which asked whether communities, not just individuals, were succeeding in adopting modern agricultural practices.
* **Harness the Power of Community**. As we'll see in Part 2, by being deeply embedded in communities, Extension Services was able to leverage a community's assets, including the bonds of friendship and support among farmers, to have a far greater impact than they otherwise could have. Without drawing on each community's strengths, it's doubtful that Extension Services could have succeeded.
* **Move the Tech Closer to the People**. Extension Services agents not only helped to translate complex scientific concepts so they were accessible to ordinary farmers, they also helped create a feedback loop that ensured that the tools and practices proposed by researchers were modified so they fit farmers' needs and incorporated their experience.
* **Operate at Scale**. Extension Services operated in every agricultural community across the US. Every county had one or more extension agents who fostered this rich web of support, most of whom were backed up by faculty and staff from their state's Land Grant colleges. And in a significant number of states, the scope of Extension Services' operation was remarkable. In New York State, for example, by 1948 Extension Services had built a network of 32,000 trained volunteer local leaders and committee members, who were supported by 383 agricultural and home economics staff affiliated with state colleges and universities.[[3]](#endnote-3)

The Limitations of Extension Services

But Cooperative Extension Services also has a more complicated lesson to teach us. Extension Services has demonstrated that it's a remarkably effective way to serve a specific audience. However, at different times and in different places in the US (and around the globe), it has often been designed to help some audiences while inflicting terrible harm on others. For example:

* Throughout much of its history it actively discriminated against African-American farmers and ignored the needs of immigrant farm labor
* Over time, as it began to embrace the ethos of "get big or get out," it increasingly focused on the needs of Big Ag to the detriment of the small farmers it was originally designed to serve

At the same time, the most bottom-up, grassroots-oriented traditions of Extension Services have become so important to today's efforts to reduce global poverty that in 2015, Bill and Melinda Gates argued that

investing in extension so that it helps more farmers in more places—women as well as men, smallholders as well as more commercial farmers—is the only way to reap the full benefit of innovation.[[4]](#endnote-4)

How do we embrace the best parts of Extension Services' traditions and avoid the worst? By learning the lessons of another remarkable educational effort: the 1960s Civil Rights Movement's Citizenship Schools.

Citizenship Schools

One of the major challenges facing the 1960s Civil Rights Movement was how to overcome voter suppression laws designed to stop African-Americans from voting by requiring that voters must be literate. How could the movement help African-Americans throughout the rural, agriculturally-dominated South to learn to read and write in a relatively short period of time so they could build political power? The solution: Citizenship Schools.

As we will see in Part 3, Citizenship Schools played a vital role in the success of the Civil Rights Movement. Like Extension Services, Citizenship Schools were designed so they were deeply rooted in their communities -- critical if they were going to help people overcome their feelings of shame about being illiterate and their fears of violent retaliation. And like Extension Services, they operated at scale: a total of 1,000 Citizenship Schools were set up throughout the Deep South.

Where Citizenship Schools differed from Extension Services is that Citizenship Schools were deeply rooted in civic literacy and activism. While some traditions of Extension Services were grounded in civic engagement, Citizenship Schools were designed from the ground up to help their students learn how to fight for their freedom and for their community.[[5]](#endnote-5) In addition to teaching basic literacy, Citizenship Schools taught their students the civic skills necessary to win the struggle for voting rights as well as to understand the nuts and bolts of how the political system worked so students could use political campaigns and community organizing to make their voices count.

When the Internet first took off, it was sold as a tool for empowering everyone; instead, it became one critical foundation of an economy where communities from Harlem to Harlan County were left behind. If we don't want to repeat that mistake, we must ensure that every community has a seat at the table -- and to do that, we'll need to draw on the lessons of Citizenship Schools. Only by ensuring that there are enough people in every community who understand both how to code and how to fight for their community's future can we be confident that emerging tech opportunities will be accessible in every community and that every community will have a real say in who benefits from this new economy.

Letting Go of Fear

Ultimately, the most important lesson we can learn from Extension Services and Citizenship Schools is that we need to stop being afraid to think big.

We have a rare opportunity to make more emerging tech jobs more accessible today and to create a better future for all tomorrow. But to seize it, we need to think boldly, dream, and then act on a large enough scale to realize those dreams.

# Applying the Lessons of the Past to Build A Better Future

From West Baltimore to Letcher County, Kentucky to East LA to Youngstown, Ohio, every community faces distinct challenges and circumstances that will require a unique set of solutions. But there are some approaches that will provide the foundation to any community's approach. This report argues that the following 3 strategies are the key to our overall success:

1) Smooth the Learning Curve

For most emerging tech, there is a chasm of knowledge between its users and its creators, and the learning curve between the two is intimidatingly steep. Extension Services faced a similar challenge in the gap between the technical knowledge of agricultural researchers and farmers. The best traditions of Extension Services figured out how to bridge the gap by creating a feedback loop between farming communities and academia that made cutting-edge farming techniques accessible and practical. Part 1 argues we'll need to similarly revolutionize emerging tech so it's easier for everyday people to learn emerging tech basics and to move along the path to mastery.

To do that, we need to take the "user experience" (UX) design movement that's transformed modern web design and adapt it to the world of coding. This includes:

* Create a tech culture of community-oriented coding UX design
* Create a continuum of skill from beginners to power users to skilled developers and use UX design to smooth the learning curve along that continuum
* Get academic research on coding UX out of its silo so new breakthrough techniques for radically reducing the time it takes to learn coding can become widely used
* Create institutional support for coding UX, particularly with big tech companies, VC, foundations, and universities

2) Develop an Ecosystem of Community-Oriented Support

Making coding easier to learn is only half the battle; we also need to reduce the gap between tech and communities. In Part 2, we will show how to do so by:

* Changing the way we provide training and ongoing support so it harnesses the power of community
* Building a better bridge between training and work, from exploring apprenticeships to helping rural communities where tech jobs are scarce to find ways to kickstart their local emerging tech economy
* Doing all of this in a way that will both honor the unique issues and concerns of each community while operating on a scale comparable to Extension Services.

3) Creating a Community Tech Culture of Civic Engagement

Emerging tech will not only create new opportunities for jobs and creating co-ops and small businesses, it will open up possibilities for fundamentally rethinking how the economy works -- and with it a chance to reshape its rules so the economy starts working for everyone. To take advantage of these possibilities, we will need many people in every community who are fluent in emerging tech, not only because some of these struggles will revolve around highly technical issues but also because some of the most important decisions will get made not in the halls of Congress or state legislatures but through formal and informal industry standards & best practices.

This strategy should not promote a particular ideology but instead aid people from different political backgrounds, communities, and identities/perspectives to help shape the direction of emerging tech, our communities, and our society. In short, the goal isn't a specific policy outcome, it's to assist in revitalizing our democracy in an era of rapid technological and economic change.

In Part 3, the report:

* Explains why the way emerging tech will affect our economy over the next 20-30 years will require that communities foster the skills of civic engagement around tech
* Explores methods for embedding the development of civic literacy skills in technical training and support

In the conclusion, the report will outline how people in the tech world and people who are active in their community might use or adapt these ideas to build a better future.

Implementing these strategies will require a lot of hard work, but **it's not rocket science**. Similar strategies have already been tested out in the real world by Extension Services and Citizenship Schools. All we need to do is to figure out how to translate them so they can address emerging tech's needs.

# Report Scope

Adults

This report is focused on addressing the needs of adults, not children. There are 3 reasons for this decision:

1) From Black Girls Code to code.org to AI4ALL, there are already many groups doing terrific work focused on the needs of children.

2) When it comes to children, it's less necessary to advocate for the report's ideas because some of these ideas are already being implemented. For example:

* As we will see in Part 1, there's plenty of work being done on improving coding UX for kids
* Most children are already enmeshed in a variety of community networks, from school to after-school clubs to church programs, and some of these networks are encouraging kids to get involved in coding and design

3) Adults and children have very different needs. For example:

* If you're introducing a nine-year-old to coding, you can count it as a success if they get a coding job 13 years in the future. Adults need coding jobs today.
* Adult learners face very different emotional challenges than children do. If you've been out of work or have had a series of low-paying jobs or have lost a good paying job to automation, learning something as complex as coding can seem overwhelming.
* Adults also face different financial challenges than most children do -- e.g., while they are learning they also have to put food on the table.

The Robot/AI Threat to Jobs

This report is agnostic as to whether robots and AI will lead to mass unemployment. While McKinsey studies are better than a Magic 8 Ball, there's simply no way to know who's right. Instead, this report is based on the assumption that we should stop obsessing over trying to predict the future and start focusing on creating a strategy to build more just, prosperous economy regardless of the impact robots/AI have on jobs.

Furthermore, this report is ***not*** an attempt to build a comprehensive version of that strategy. As mentioned earlier in this chapter, even if our society becomes far more effective at training many people in every community to become developers, it's unrealistic to expect that everyone will do so. As the report discusses in Part 3 and the Conclusion, we will need other approaches to ensure that everyone can lead a life with dignity and security and that all communities can be made whole. This report is simply an effort to lay out an approach for building one important piece -- but only one piece -- of the broader strategy our society needs.

The US

This report is focused on the circumstances facing the US. But the ideas and techniques it proposes could certainly be modified to fit the needs and circumstances of other countries.

Version 0.1

The problems we face in attempting to truly democratize emergent tech are far too complex for any one person or small group to have all the answers. The goal of this report is not to provide a definitive solution but to start a conversation about what it'll take to democratize emerging tech on a much larger scale.

1. Pablo Illanes, Susan Lund, Mona Mourshed, Scott Rutherford, and Magnus Tyreman, "Retraining and Reskilling Workers In The Age Of Automation," McKinsey Global Institute, January 28, https://www.mckinsey.com/global-themes/future-of-organizations-and-work/retraining-and-reskilling-workers-in-the-age-of-automation [↑](#endnote-ref-1)
2. In the US, Cooperative Extinction Services has been known by a wide range of names, including Agricultural Extension Services, Extension Services, and Extension. For the purpose of this report, we will use either Cooperative Extension Services or Extension Services. [↑](#endnote-ref-2)
3. Ruby Green Smith, The People’s Colleges: A History of the New York State Extension Service in Cornell University and the State, 1876-1948 (Cornell: Cornell University Press, 1949), pp. xxxi-xxxii. [↑](#endnote-ref-3)
4. Bill Gates and Melinda Gates, "Our Big Bet For The Future: 2015 Gates Annual Letter," https://www.gatesnotes.com/2015-Annual-Letter (if your browser has difficulty reading it, see https://www.ozy.com/opinion/bill-gates-where-the-third-world-gets-health-right/39034). [↑](#endnote-ref-4)
5. Civic engagement is an important part of some Extension Service traditions, but the author of this report believes it's accurate to say that it was rare for their brand of civic engagement to go as deeply as Citizenship Schools did. Citizenship Schools were attempting to fundamentally change how the economy and society was ordered, changing the balance of power so African-Americans would become equal citizens. If Extension Services had been operating in an equally deep level, it's hard to see, for example, how it would have turned from supporting small farmers to focusing on Big Ag without sparking a national, highly organized resistance by the small farmers it was beginning to abandon. [↑](#endnote-ref-5)