

DAY **ONE** **PROJECT**

**Using Artificial Intelligence and
Virtual Reality/Augmented
Reality to Deliver Tailored and
Effective Jobs Training**

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Summary

To address the critical challenges of lifelong learning, evolving skills gaps, and continuous labor market transformation and automation, all Americans need to have access to agile and effective jobs training. Artificial intelligence (AI) and virtual reality/augmented reality (VR/AR) capabilities can deliver training tailored to the unique backgrounds, preferences, and needs of every individual. In this memo, we propose a two-stage approach that the Biden-Harris administration can adopt to help prepare Americans for the jobs of the future through responsible use of AI and VR/AR.

Stage 1 would launch a one to three pilot programs that leverage AI and VR/AR technologies to provide targeted training to specific communities.

Stage 2 would establish a national prize competition soliciting proposals to build and deliver a federal lifelong learning platform for the nation.

Challenge and Opportunity

The impact of emerging technologies on the future of work has been the subject of much research and concern. Recent studies have shown that the advent of automation, AI, and similar technologies could force up to 375 million workers worldwide (14% of the global workforce)^{1,2} to switch jobs. 14% of existing jobs may disappear in the next 15–20 years, and another 32% are likely to change radically.³ This is the pressing reality of an increasingly technology-driven world. In the United States, the study found that rapid automation adoption in industry could potentially lead to almost 55 million workers having to shift occupations by 2030.

Minimizing the societal and economic impacts of technological disruption requires better ways to assess current and nascent job opportunities, as well as education and training systems that foster lifelong learning and make it easy for all Americans to reskill, upskill, and transition between jobs and economic sectors. Many initiatives exist to modernize and strengthen traditional education at both the Pre-K–12 and college/university level with these goals in mind. But there are relatively few national initiatives exploring how emerging technologies could be deployed at scale to improve the quality of existing learning processes and systems, increase access to educational opportunities, and ensure that Americans are better prepared for a rapidly evolving labor market.

Addressing this deficiency could do much to help President Biden lead an economic recovery that is “broad-based, inclusive, sustained, and strong”, as stated in the opening letter of the US Government budget draft for fiscal year 2022. Widespread availability of world-class training that enables American workers of all kinds to adapt

¹ Bick, R.; et al. (2020). [The future of work: Reskilling and remote working to recover in the 'next normal'](#). McKinsey Digital, July 7.

² Manyika, J. (2017). [Jobs lost, jobs gained: What the future of work will mean for jobs, skills, and wages](#). McKinsey Global Institute, November 28.

³ OECD. (2020). [Trustworthy AI in Education: Promises and Challenges](#).

DAY ONE PROJECT

to an ever-changing economy will make it possible for the Biden-Harris administration to provide jobs electrifying vehicles and upgrading ports, airports, and transit systems; revitalizing America's digital infrastructure through a cutting-edge electric grid; and expanding high-speed broadband networks. The capacity to reskill and upskill workers on a large scale is also an important component of strengthening U.S. resilience to future pandemics, natural disasters, and other crises.

Plan of Action

We propose a two-stage approach that the Biden-Harris administration can adopt to help prepare Americans for the jobs of the future through responsible use of AI and VR/AR.

Stage 1 would launch one to three pilot programs that leverage AI and VR/AR technologies to provide targeted training to specific communities. We suggest the first pilot be designed to support transitioning military personnel and their families when re-entering civilian society. Subsequent pilots could target other high-priority groups, such as fossil-fuel workers displaced by the transition to a clean-energy economy. These pilots would demonstrate the feasibility and utility of deploying VR/AR to upskill and reskill workers in specific economic sectors.

The pilot programs would be overseen by a task force comprising representatives from relevant government agencies, including the White House Office of Science and Technology Policy (OSTP), the General Services Administration (GSA), and the Departments of Defense, Education, Energy, Labor, Transportation, and Veterans Affairs. Pilots would be conducted in partnership with trusted employment-assistance and training programs (both governmental and non-governmental), universities, and unions, as well as with technology companies and with organizations experienced in using VR/AR for educational purposes. For instance, a pilot targeted at transitioning military personnel and their families could engage the Department of Defense Transition Assistance Program⁴ and the White House Joining Forces initiative⁵ to provide insight into the types of employment support that would be most useful for that group of people. The pilot could also explore a partnership with Microsoft HoloLens, which recently signed a contract with the U.S. Army to provide AR headsets for use in military training.

In brief, components of the pilot programs would include the following:

- Collaboration with educational institutions and local employers to define and develop reskilling and training curricula targeted at a specific economic sector and/or worker group.

⁴ In 1991, the National Defense Authorization Act (NDAA) established the [Transition Assistance Program](#) (TAP), an outcome-based program that provides opportunities, services, and training to support transitioning military personnel in meeting post-military goals.

⁵ The White House. (n.d.). [Joining Forces](#).

DAY ONE PROJECT

- Collaboration with tech companies to adapt curricula for chosen delivery platforms (AR, and/or VR).⁶
- Recruitment of workers to serve as test participants in the pilot programs. Recruitment could be led by trade organizations or unions.
- Assessments of the skills and employment-support needs of each test participant.
- Delivery of personalized reskilling program — tailored based on assessment results — to each test participant. Program curricula would be designed for completion within a short time frame (2–4 weeks).
- In-depth program review by a partnering educational institution or non-partisan think tank, including a survey administered to all test participants and focus groups with select participants.
- Program update and revision based on feedback from the review, followed by a second program test with a new batch of workers.
- Second review and preparation for roll-out at larger scale and/or extension to other economic sectors and worker groups.

An estimated \$20 million would be needed to fund the Stage 1 pilot programs.

Stage 2 would establish a national prize competition soliciting proposals from the private, nonprofit, and academic sectors to design and deliver the Job Market Situational Awareness Platform (JMSAP, pronounced “gem-sap”): a federal lifelong learning platform for the nation. The platform would integrate heterogeneous data in real time and leverage AI capabilities to (i) identify national skill shortages and surpluses across sectors, and (ii) match job-seeking individuals with tailored, AR/VR-based training (i.e., training piloted in Stage 1). Precedent for this effort can be found in other sectors. The National Weather Service, for instance, conducts large-scale data-fusion and analysis in real time to generate sophisticated weather forecasts. The National Center for Epidemic Forecasting and Outbreak Analytics is considering launching a similar effort for disease preparedness and response.

Data powering JMSAP would be sourced from federal agencies (including the National Science Foundation and the Departments of Defense, Education, Health, Labor, and Transportation), private-sector job-search companies (e.g., LinkedIn, Monster, Indeed, Glassdoor), private-sector tech platforms (e.g., Google, Facebook, Twitter, Microsoft), and civil-society institutions (e.g., labor unions, research centers, universities, think tanks). Auxiliary data (e.g., data on earth observations or data on sentiment analysis in social media) could also feed into the platform.

⁶ For more on the ways in which AI and AR/VR can support workforce training, see: Hyman, E. (n.d.). [Transforming Workforce Training Through Federal Leadership in XR Technology](#). Day One Project.

The prize competition should encourage proposals for platform designs that promote diversity, equity, and accessibility in the labor market. Participants should also be provided with a set of guidelines (aligned with the OECD AI Principles⁷) for ensuring ethical, equitable, and responsible data use. Outreach to raise awareness about the platform would be targeted to workers most vulnerable to automation-related job loss (Figure 1).

The prize competition would be organized through a public-private partnership, likely led by the XPrize Foundation and relevant U.S. government entities such as OSTP and GSA. An aggressive but feasible timeline for the competition would be six to nine months. This includes the time needed to plan the competition, coordinate with stakeholders, solicit proposals, evaluate proposals, and select the winner(s). It does not include the time needed for actual platform development. An estimated \$2–3 million would be needed to design and administer the prize competition. An estimated \$200 million would be needed to build the platform and launch it at a national scale.

Current-task automation potential, average wages, and educational requirements for representative occupations

Occupation	Average wage	Automation potential	Typical education required
Packaging and Filling Machine Operators and Tenders	\$31,000	100%	Less than Bachelor's Degree
Food Preparation Workers	\$23,000	91%	Less than Bachelor's Degree
Payroll and Timekeeping Clerks	\$44,000	87%	Less than Bachelor's Degree
Light Truck or Delivery Services Drivers	\$35,000	78%	Less than Bachelor's Degree
Computer Network Support Specialists	\$68,000	62%	Less than Bachelor's Degree
Medical Assistants	\$33,000	54%	Less than Bachelor's Degree
Retail Salespersons	\$27,000	47%	Less than Bachelor's Degree
Computer Programmers	\$85,000	38%	Bachelor's Degree or More
Registered Nurses	\$72,000	29%	Bachelor's Degree or More
Maids and Housekeeping Cleaners	\$24,000	18%	Less than Bachelor's Degree
Home Health Aides	\$24,000	11%	Less than Bachelor's Degree
Software Developers, Applications	\$105,000	8%	Bachelor's Degree or More
Management Analysts	\$92,000	4%	Bachelor's Degree or More
U.S. total	\$49,600	46%	

Figure 1. Automation potential of a suite of representative occupations. (Source: Muro, M.; Maxim, R.; Whiton, J. (2019). Automation and Artificial Intelligence: How machines are affecting people and places. Brookings, Metropolitan Policy Program, January.

Alignment with President Biden’s budgetary priorities. The President’s FY 2022 budget requests \$40 billion to invest in the Department of Labor’s Dislocated Workers Program and sector-specific job training. The Dislocated Workers Program provides reskilling, upskilling, and other training services to help workers who have lost jobs find new employment. The sector-specific job training is intended to prepare workers of all kinds for employment in growing, high-demand sectors such as clean energy, manufacturing, and caregiving. The budget also requests \$100 billion to invest in proven workforce-development programs targeted at underserved groups. Either or both funding streams could be used to support the pilot programs and prize competition proposed in this memo.

⁷ OECD. (n.d.). [OECD Principles on AI](#).

Conclusion

Enabling effective and seamless lifelong learning to equip the American workforce for continuous labor-market transformation and automation, as well as addressing widespread mismatches between available and requisite skills among today's workers, are frontier challenges for our nation. The Biden-Harris administration can begin to address these challenges by funding high-utility pilots that elucidate how emerging technologies such as AI, VR, and AR can be used to effectively train priority populations, such as military veterans and their spouses, for new and attractive jobs. The administration should also consider launching a national prize competition for proposals to design and deliver a national lifelong learning platform. The platform will couple real-time fusion of multiple data streams with responsible, AI-based data analytics to reduce employment friction in a highly dynamic economy. Together, these steps will help realize the President's vision for a rapid and robust recovery from the COVID-19 pandemic and ensure that all Americans can participate successfully in the modern economy.

Frequently Asked Questions

1. What is the role of the federal government in the prize competition? What is the role of the XPrize Foundation?

Representatives from the federal government will prepare the problem statement for participants to respond to, define required and desirable components of a winning solution, review submissions, and select the competition winner(s). The federal government will also help advertise the competition to potential participants. The XPrize Foundation will oversee the “nuts and bolts” administration of the prize competition, including hosting the submission portal, responding to questions, and so on.

2. Why is a federal prize competition the best way to develop the JMSAP platform?

A federal prize competition will incentivize actors across the public and private sector to propose practical and innovative solutions for addressing the grand challenges of promoting lifelong learning, ensuring that training opportunities align with market demand, and reducing employment friction in a highly dynamic economy. The competition will allow the federal government to: (i) pay only for success; (ii) maximize return on taxpayer dollars by stimulating private-sector investment; (iii) disperse risks of striving for ambitious goals among competition participants; (iv) increase the number and diversity of individuals, organizations, and teams engaged in finding viable solutions; and (5) motivate and inspire the public to tackle scientific, technical, and societal problems.

3. Are there past examples where the federal government has used federal prizes to incentivize innovation?

Many! Since 2010, federal agencies have conducted nearly 1,000 prize competitions. An excellent recent example of a prize competition aligned with this memo is the 2020 [Veterans' Employment Challenge](#), which challenged participants to build “a better application to match the skills of those who have served in the military with employer needs.”

4. Why is AI an important component of JMSAP?

AI is an important component of JMSAP for three reasons. First, AI will enable efficient analysis of large, heterogeneous data to provide insights into skills surpluses and shortages nationwide. Second, AI will make it possible to assess the capabilities, strengths, and weaknesses of each platform user and to tailor the types and pace of training provided via the platform based on user data. Third, AI will enable JMSAP to adapt to changing market conditions and to learn over time from successful cases of worker reskilling and hiring. As such, JMSAP will be more effective and responsive than traditional static training programs.

5. How will JMSAP integrate datasets from so many different organizations and providers without violating privacy restrictions?

Large-scale data fusion has advanced considerably in the last decade thanks to research and development in the computer science and AI community. Many startups and enterprise products now allow different datasets to be cost-effectively combined and accessed at scale. Competition participants will be expected to identify and propose solutions to technical challenges associated with large-scale data fusion in their proposals. Competition participants will similarly be expected to integrate privacy-protecting safeguards (e.g., federated learning or homomorphic encryption models) into their proposals. As JMSAP advances from the proposal to the development and implementation stages, the federal government should implement strong privacy-protecting measures. These measures could be modeled on existing legislation (e.g., the California Consumer Privacy Act) and frameworks (e.g., the United Nation's Global Data Access Framework⁸ or the aforementioned OECD AI Principles).

6. Why would private entities want to participate in the development and deployment of JMSAP? Have any private entities already demonstrated interest?

Private entities have a vested interest in remaining at the forefront of innovation and emerging technologies, and in helping direct those technologies towards the future of work. Companies such as Google, Microsoft, LinkedIn, and even Amazon already support initiatives with educational content, such as Google's "[nanodegrees](#)"⁹ and LinkedIn's [course content](#). We expect that private entities will want to participate to forge strategic partnerships, engage with government agencies and leaders who may become partners in the future, and understand the needs of populations that need to be reskilled to participate in the future of work. Our team has already initiated soft engagement discussions with large U.S. data platforms that have demonstrated

⁸ United Nations Global Pulse. (n.d.) [Global Data Access Framework](#).

⁹ Havazelet, N. (2018). [Meet the Google and Udacity Nanodegree graduates-turned developers](#). Google, September 18.

experience in education and AI applications (including applications involving AR/VR capabilities), with positive response.

7. Are there existing reskilling/upskilling platforms and programs that JMSAP can leverage?

The platform can leverage existing AI-powered educational systems from leading U.S. and international startups on AI and education; massive open online course (MOOC) programs from universities and companies like EdX, Udacity, and Coursera; and leading U.S. technology platforms such as Google AI Education (with a focus on Google Career Certificates), Microsoft AI Education, Apple Education, and IBM Watson Education.

8. How would JMSAP differ from existing platforms in the public sector?

JMSAP will build on existing federal platforms and/or projects including [CareerOneStop](#), [mySkillsmyFuture](#), and [WorkforceGPS](#). JMSAP will add value by introducing AI and VR/AR to the federal employment-assistance digital ecosystem. The prize competition to launch JMSAP will help foster a culture of open innovation throughout this ecosystem.

9. Will new educational material have to be developed for the platform? If so, who will develop this material?

Competition participants will have to propose a plan for either developing new educational material and/or the curating and repurposing of existing educational material to achieve the JJMSAP objectives. All educational material available on the platform will be reviewed to ensure that it is authoritative, accessible, and up to date.

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Cyrus Hodes is a Partner at FoundersX Ventures, a VC firm based in Silicon Valley. He is with of the Global Partnership on AI (GPAI) Pandemic Response group and the Climate Change & Biodiversity committee, a member of the OECD Expert Group on AI (ONE AI), and of the European Parliament STOA international Panel. Cyrus was educated at Sciences Po Paris where he lectured on International Security, has a M.A. from Paris II University in Defense & Geostrategy and a M.P.A. from Harvard University.



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About the Day One Project



The Day One Project is dedicated to democratizing the policymaking process by working with new and expert voices across the science and technology community, helping to develop actionable policies that can improve the lives of all Americans, and readying them for Day One of the next presidential term. For more about the Day One Project, visit dayoneproject.org.

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