



19 February 2024

**To:** National Artificial Intelligence Advisory Committee  
Workforce and Opportunity Working Group

**From:** Keith Moore, President, IEEE-USA

**Re:** *IEEE-USA's expression of interest in participating in future discussions about ensuring an AI-capable American workforce*

IEEE-USA would like to participate in the NAIAC Working Group's future discussions to help find ways for the United States to support lifetime employment and career opportunities for workers as they navigate workplace changes brought on by AI. In the Federal Register notice (*89 FR 7376*) of the upcoming February 22nd public meeting, NAIAC identified two areas for input. We offer some initial thoughts below and look forward to continuing discussions throughout 2024. If you have any questions, please do not hesitate to contact Erica Wissolik at [e.wissolik@ieee.org](mailto:e.wissolik@ieee.org) or (202) 530-8347

**1. Perspectives from workers on the impact of automation, AI, and other factors in their lives, jobs, and careers. This could include feedback on the nature and quality of support programs and resources available to them and ideas for how employers, government, and other stakeholders can help them today.**

In 2023, we surveyed the IEEE membership – including both the wider engineering and computer science members as well as those specifically working with AI systems – and found that many are particularly concerned about use of AI by employers for workplace surveillance, its potential to replace the human workforce, use of AI to manipulate individuals, especially children, and AI being used to further exacerbate inequalities.

Sizeable majorities of those surveyed said they supported policies that protect individual data privacy, address AI-generated misinformation, require risk assessments for medium or high-risk AI products, place transparency or explainability requirements on AI systems, and place restrictions on autonomous weapon systems. A large majority disagreed that the public is adequately informed about AI, and just as many disagreed that the development of AI will make our society more equal.

The future of the American economy depends on a resilient and robust workforce. This means reimagining America's adult education and worker retraining infrastructure to ensure that individuals affected and displaced by AI systems are not left behind.

If you would like more details, exact response rates, and specific comments included in the IEEE membership survey, please do not hesitate to contact us.

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## **A. Job Displacement and Insecurity**

Many workers are concerned about job displacement due to automation and AI. We have already seen many companies openly mention the onset of generative AI as an excuse for layoffs in their sectors. Employees fear that their jobs may become obsolete or that they may be replaced by AI technologies. This leads to a chilling effect with respect to employee adoption of these technologies.

Some workers report experiencing increased workload and stress as a result of AI technologies. They may be required to learn new technologies or take on additional responsibilities, leading to burnout and mental health issues.

## **B. Privacy Concerns**

Workers are increasingly concerned about the potential for employers to utilize AI technologies in ways that encroach upon their privacy rights. With the widespread adoption of AI systems for monitoring employee performance, analyzing productivity, and even predicting future behavior, there is a growing fear that personal data may be exploited without consent or transparency. Employees worry that AI-driven surveillance tools could lead to invasive monitoring of their online activities, communications, and even physical movements within the workplace.

## **C. Upskilling and Reskilling Challenges**

While AI may create opportunities for new jobs and skill requirements, many workers find it challenging to upskill or reskill to adapt to these changes. These jobs may not always offer the same level of stability, benefits, or wages as the ones they replace. Access to affordable training programs and resources may be limited, especially for workers in low-income or marginalized communities, and workers that may be advanced in age.

## **D. Concerns about Bias and Discrimination**

Bias and algorithmic discrimination used in hiring, performance evaluation, and other decision-making processes are a real and present threat. These technologies may perpetuate existing inequalities and undermine efforts to promote diversity and inclusion in the workplace. For instance, in hiring processes, AI algorithms may inadvertently favor certain demographic groups or penalize others, thereby exacerbating disparities in employment opportunities. Similarly, in performance evaluations, biases embedded within AI systems could unfairly disadvantage individuals from marginalized groups, hindering their career advancement and perpetuating systemic inequalities.

Special care must be taken to ensure that adoption of AI does not inadvertently lead to age discrimination or discrimination against those who are differently abled. AI systems must be meticulously designed and rigorously tested to mitigate the risk of perpetuating ageist or ableist biases. Employers must proactively address these concerns by implementing robust safeguards, such as regular audits of AI algorithms, diversity impact assessments, and ongoing training for personnel involved in AI deployment. This includes measures to ensure transparency, accountability, and fairness in AI decision-making processes, as well as mechanisms for addressing grievances related to discriminatory outcomes.

## **E. Need for Support Programs and Resources**

Workers may feel a lack of adequate support programs and resources to help them navigate the challenges posed by automation and AI. They may need assistance with upskilling, career counseling, job placement, and financial planning.

**2. Ideas for new frontiers for supporting workers, career pathways, and otherwise expanding opportunity as AI changes the economy and nature of work. This could include explaining data and knowledge gaps that, if closed, would help workers, organizations, policymakers, and others make better, data-informed decisions; and, elaborating on nascent ideas and innovations with the potential for national impact and scale.**

### **A. Create an AI Education Pipeline**

Principles of AI literacy, along with critical thinking and computational science, should be integrated into the core curriculum at all levels of a student's academic journey. This AI educational pipeline is necessary to ensure that the federal government encourages an AI-ready workforce. Where possible, curricula should closely integrate foundational courses in mathematics, computer science, robotics, statistics, and probability. Courses should:

- Provide students with insights into the ethical issues that arise from the deployment of emerging technologies, along with responsible uses; and,
- Ensure that interested students are prepared for and have access to introductory courses in data science and/or machine learning in high school.

To positively influence students' development, IEEE-USA recommends that the Department of Education along with relevant agencies, facilitate access to PreK-12 AI building blocks at an early age by working with state-level departments of education to implement AI education across PreK-12 classrooms. Where possible, curricula should closely integrate foundational courses in mathematics, computer science, robotics, statistics, and probability. Courses should:

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In addition, these agencies, and as appropriate other federal stakeholders, should receive additional appropriations to fund:

- PreK-12 teacher professional development and resources to teach technical and non-technical AI principles;
- Research on AI education curriculum and course integration best practices; and,
- Creation and dissemination of AI education and careers information to elevate the importance and relevance of AI-related coursework.

**Postsecondary** – At the post-secondary level, proper incentive structures are the key to securing an AI-ready workforce. To that end, federal and state education departments should:

- Increase undergraduate, graduate, and post-doctoral scholarships and fellowships for students pursuing studies and research in AI and AI related fields;
- Promote alternative pathways into the AI workforce by evaluating AI related programming, credentialing, and community and technical colleges; and,
- Formally evaluate non-traditional methods of funding educational expenses to cultivate alternative pathways into the AI field and increase its diversity (e.g., income-sharing agreements).

**Public-Private Partnerships** – The Department of Education, in partnership with state and local education agencies should encourage partnerships between educational institutions and AI-based firms, industry associations, and non-profits. These partnerships should be evaluated and scaled if proven effective. Collaboration between the academy and industry is fundamental to ensuring that students gain a valuable perspective on potential careers and roles within the AI industry. Also, to enhance the technology transfer between basic research and its application in the private sector, the Small Business Administration should enable partnerships between small/medium enterprises and university researchers specialized in AI.

## **B. Tailored Training for Adults**

To secure the future of the American economy and uphold a resilient workforce, it is essential to reimagine the nation's adult education and worker retraining infrastructure, ensuring that individuals impacted and displaced by AI systems are not overlooked. This entails collaborative efforts between the Department of Labor, National Science Foundation, Census Bureau, Department of Education, and other relevant stakeholders to assess past, present, and future sectors affected by workforce changes. Subsequently, tailored programs or mechanisms, such as increased funding for community colleges or vocational training centers, should be implemented to mitigate these impacts effectively.

## **C. Assist Affected and Displaced Workers**

The future of the American economy depends on a resilient and robust workforce. This means reimagining America's adult education and worker retraining infrastructure to ensure that individuals affected and displaced by AI systems are not left behind. To that end:

- The Department of Labor, National Science Foundation, and Census Bureau should identify the sectors where and how workers are affected in the past, present, and future. They should then work with the Department of Education and other stakeholder agencies to determine what programs or mechanisms, such as increasing funding to community colleges or vocational training centers, would best ameliorate their impact.
- Displaced workers will need a strong social safety net to ensure stable access to housing, medical care, and other needs during periods of transition. Therefore, the federal government should research cost-sharing programs. This includes the expansion of unemployment insurance programs that would require firms to internalize a portion of the external costs they impose on workers and society when workers are displaced by AI systems and left without the resources needed to remain in the workforce.

## **D. Diversity**

All individuals, regardless of their demographic and socioeconomic characteristics, deserve equal opportunities to enroll in educational institutions or participate in the AI workforce. If embraced, a diverse population provides organizations with not only access to insights, methods, and ideas that can

significantly advance their overarching goals, but also creates an environment where unique perspectives can thrive. To improve the diversity of academia and industry:

- A coalition of federal and state agencies should develop organizational best practices or standards to maximize the opportunities for all groups to participate in the learning and development of AI methods and applications;
- These agencies should open a dialogue with AI-related professional associations to build guidelines or standards for improving the diversity of teams that design and deploy AI;
- Demographic affinity groups in AI-related industries should be incentivized to take concrete steps in improving their members' participation in academia and the labor force;
- The Department of Labor should research best practices that encourage employers to proactively recruit STEM workers from diverse backgrounds;
- Congress should create incentives to motivate international STEM graduate students to establish themselves in the United States, improve the diversity of our AI workforce, and contribute to our economy, by reforming our immigration laws to allow more international students studying AI and AI related fields to remain in the country after graduation.

#### **E. Lifelong Learning Platforms**

Building robust lifelong learning platforms that provide accessible, affordable, and flexible educational opportunities is essential for enabling workers to adapt to evolving job requirements. These platforms could leverage AI and personalized learning algorithms to tailor educational content to individual needs and preferences, offering micro-credentials, online courses, and mentorship programs.

#### **F. AI-Powered Career Navigation Tools**

Developing AI-powered career navigation tools that help workers identify potential career pathways based on their skills, interests, and the evolving job market could empower individuals to make informed decisions about their professional development. These tools could provide personalized recommendations for upskilling, reskilling, and job transitions, taking into account factors such as labor market demand and salary projections.

#### **G. Addressing Ethical Implications**

Given the ethical considerations surrounding AI deployment, it's essential to address the potential societal impacts of using AI in the workplace on workers. Government agencies should collaborate with AI developers and ethicists to establish guidelines and frameworks for responsible AI development and usage, specifically keeping in mind data protection, employment related laws and principles of free speech. This includes ensuring transparency, accountability, and fairness in AI algorithms and decision-making processes.

#### **H. Regulatory Framework**

To foster innovation while safeguarding against potential risks, there is a need for a regulatory framework tailored to AI technologies. The US government should work alongside industry experts to develop regulatory standards that balance innovation with ethical and legal considerations. This framework should encompass data privacy, algorithmic transparency, and accountability measures to mitigate potential harms. Educating the public about AI technologies and their implications is crucial for fostering trust and acceptance.

The US government should launch public awareness campaigns to promote understanding and awareness of AI concepts, applications, and potential impacts on society. Additionally, engaging stakeholders through public forums, workshops, and consultations can facilitate meaningful dialogue and informed decision-making around AI policies and regulations.

## **I. Public Awareness and Engagement**

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