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THINK

POLICY BRIEF

(RE)SKILLING EMPLOYEES FOR FUTURE WORK: HOW G20 COUNTRIES CAN USE ARTIFICIAL INTELLIGENCE-BASED LEARNING TECHNOLOGIES TO SCALE UP WORKPLACE TRAINING

Task Force 6
ECONOMY, EMPLOYMENT, AND EDUCATION IN THE DIGITAL AGE

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موجز السياسة

إعادة تأهيل الموظفين من أجل العمل المستقبلي: كيف يمكن لدول مجموعة العشرين استخدام تقنيات التعلّم القائمة على الذكاء الاصطناعي لرفع مستوى التدريب في مكان العمل

فريق العمل السادس

الاقتصاد والتوظيف والتعليم في العصر الرقمي

المؤلف

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ABSTRACT

In a rapidly changing world, the workplace is shaped by the integration of artificial intelligence (AI) into all business functions through automation and digitalization, impacting all workers, jobs, professions, and societies. As the scope of AI expands to the realm of learning, workplace training demands the maximization of these new capabilities and the transition to a new frontier wherein the unique developmental needs of every worker are met through individualized training. Maximizing technology affordances does not only require the right organizational strategy but also collective economic and societal effort for a successful transformation to a new dimension.

في ظل عالم سريع التغير، يتم تشكيل معالم مكان العمل من خلال عملية دمج الذكاء الاصطناعي في جميع مهام العمل من خلال الأتمتة والرقمنة، مما يكون له أثر في جميع العاملين والوظائف والمهن والمجتمعات. ومع توسع نطاق الذكاء الاصطناعي ليشمل التعلُّم، يتطلب التدريب في مكان العمل زيادة القدرات الجديدة هذه إلى أقصى حد، والتحول إلى آفاق جديدة يتم فيها تلبية الاحتياجات التنموية الخاصة بكل عامل من خلال التدريب المصمَّم حسب احتياجات كل فرد. ولا يتطلب تحقيق أكبر استفادة من القدرات التقنية مجرد استراتيجية تنظيمية مناسبة فقط، بل يتطلب أيضًا جهدًا جماعيًّا اقتصاديًا واجتماعيًا للتحول بنجاح إلى أفق جديد.

CHALLENGE

In the coming decades, many rote activities that have dominated the workplace in the post-industrial age will be taken over by machines. Work activities will shift toward integrated human-machine interaction and unpredictable environments. These changes will result in increased complexity in the application of expertise. Despite the emerging impact of the digital age, workplace training has not changed fundamentally. We still use systems designed for an industrial society. Furthermore, workplace training to reskill and upskill employees has traditionally been designed around the behavioral and cognitive components associated with job tasks and performance standards.

The growing prevalence of AI, automation, robotics, digital transformation, and the Internet of Things is serving as a catalyst for workplace transformation, which can at times be disruptive. For example, AI is expected to become part of an important workplace function for over 70 per cent of companies by 2030, delivering over US$13 trillion In economic output (Bughin et al. 2018). However, AI will also result in major job losses and elimination of work due to substitution of labor. The transition of labor and work from repetitive job tasks to digital and cognitive skills and abilities that are difficult to automate, will be critical. Therefore, it will be vital to provide effective reskilling platforms to workers in order for them to remain in the labor market.

The International Labour Organization indicates that almost half a billion people around the globe cannot find decent work (ILO 2020), leading to a number of important issues. These include lower economic growth and lack of inclusiveness, major gaps in access to work, significant deficiencies in work quality, and substantial inequalities in access to work and work quality. One of the main causes for decreasing employment is the skills gap. As a result of the rapidly changing business world and workplace, demand for many existing job skills and expertise has diminished, while the need for new skills and knowledge has emerged. This has created a significant gap between the required and available talent. Furthermore, “the socioeconomic impact of low labor productivity growth has been aggravated by declines in labor shares and increases in wage inequality” (UN 2020, 22). Therefore, the growing skills gap has far-reaching global societal impacts beyond economies and labor markets. One of the Sustainable Development Goals of the United Nations is to promote sustained, inclusive, and sustainable economic growth; full and productive employment; and decent work for all (Goal #8). The widening skills gap remains one of the major obstacles in achieving the United Nations 2030 Agenda for Sustainable Development (UN 2015).

Innovative technologies are needed to help worker reskilling efforts, globally. Existing training approaches attempt to address gaps around critical technical skills. However, they lack the required capacity and flexibility to provide highly personalized, customized, safe, and scalable workplace learning experiences. Immersive learning technologies, such as virtual reality, have already been used to simulate technical processes that are difficult to create in traditional learning environments. They also provide more interactive and experiential learning opportunities. More recently, immersive learning environments, such as virtual reality (VR), augmented reality, serious gaming, and mixed reality have demonstrated capacity for technical and social skills development (Akdere and Acheson-Clair 2019; Daniela and Lytras 2019). Considering the fast-paced workplace changes and the need for rapid reskilling to cope with the technological advances disrupting industries, there is an emerging need to develop training simulations based on such technologies for human performance augmentation and skill acquisition

PROPOSAL

Policy Action 1:

The Group of 20 (G20) should establish a working group (including members from the Think 20, Labour 20, and Business 20) to examine the socio-economic potential of immersive learning technologies and identify its impact at the employee, company, industry, national, and regional levels.

Such an effort should focus primarily on AI-based technological advancement, exploring significant benefits and challenges for the individual learner (employee), organization, industry, society, and world at large. The findings of the working group can form the basis of national and global policy decisions related to innovating and scaling up employee training.

Many workers from both developing and developed countries are facing job replacement and job extinction in a volatile, uncertain, complex, and ambiguous (VUCA) world (OECD 2018). Manual and repetitive work is rapidly being replaced by automation and AI. Preparing workers and helping them to reskill for new jobs that would emerge from this shift will become vital to the survival of families, communities, societies, and the humanity at large.

VR technology presents new opportunities for workplace reskilling efforts through experiential, customizable, and scalable employee learning. However, most applications of VR have been limited to an organizational level in private corporations. There is a need for large-scale national efforts that concentrate on exploring and utilizing AI-based VR technology in technical and non-technical employee reskilling. Furthermore, these efforts should be empirically assessed for effectiveness in terms of transfer of learning for individual employees. The results can provide important, new insights into developing national policies for AI-based training in the digital age.

Traditionally, employees have received workplace training through employer-sponsored and professional, organization-led programs. However, such approaches will not necessarily remain viable considering the rapid work changes and the need for effective solutions for continuous employee talent development. A key challenge of developing employee talent in the digital world is finding a balance between substantial economic and logistical constraints and evidence-based outcomes of effective workplace training, such as experiential learning, critical reflective thinking, and a safe learning environment with individualized feedback. Adaptive VR technology presents a unique opportunity to update and improve traditional approaches to workplace training and talent development.

Policy Action 2:

The G20 should find ways to increase awareness around the potential implications of AI-based technologies on societies.

This should focus both on the benefits of AI-based technologies, such as increasing economic efficiency and creating intelligent connectivity among workers, organizations, industries, and nations, as well as its challenges, such as forcing the workforce to evolve and crossing ethical and legal boundaries. The G20 should develop and publish standards for the ethical and legal implementation of AI. These should outline general issues, challenges, and problems associated with AI, and provide solutions for the ethical and legal implementation of AI-based technologies across sectors, industries, and nations. This will enable the G20 member countries to safely and effectively utilize the emerging AI-based technologies, especially in reskilling employees for future work.

The initial step in responding to the changing nature of the workplace and the needs of workers is to consider the duality of the problem. The Organisation for Economic Co-operation and Development recently reported that many adults do not have the right skills for new jobs (OECD 2019a). Furthermore, AI will introduce widespread workplace automation and digitalization, resulting in a loss of over 75 million jobs globally by 2021, which are primarily repetitive and mundane in nature (LinkedIn 2019). However, human skills and expertise will be critical for some new jobs, jobs tasks, and job functions to augment such automation and digitalization, which will create over 133 million new jobs (LinkedIn 2019). In other words, AI (represented either through robots, virtual, or embedded) will need human expertise and experience to augment its capabilities. Therefore, high tech and high employment do not have to be mutually exclusive (Kasriel 2019). As a result, rapid reskilling through customized and micro-learning capabilities of immersive learning technologies, such as adaptive VR, will address this challenge.

A potential solution that may strike this balance is the use of AI-based instructional approaches, such as adaptive VR, which utilizes decision-tree algorithms to provide a customized learning environment for each worker. Immersive, online learning environments, such as augmented reality games, virtual military environments, and immersive second-language learning environments are newer learning aids that have demonstrated capacity for technical and non-technical skill development (Monahan, McArdle, and Bertolotto 2008). Based on these advancements, immersive learning technologies have significant potential to serve as effective educational environ-

ments to promote all three domains of workplace learning: knowledge (cognition), attitudes (affect) and skills (behaviors).
"AI will not only make existing education more efficient but it will also change the context where learning occurs and where it becomes socially relevant" (Tuomi 2018, 29). In fact, AI already impacts all three learning domains. At the cognitive level, AI can help trainers gain insights into workers' learning styles, existing levels of knowledge, and aptitudes. At the affect level, AI can simulate hypothetical scenarios in which workers are challenged on their attitudes and assumptions. Finally, at the behavioral level, AI can be used to diagnose worker behaviors, including attention, emotion, and communication dynamics in job task completion. Essentially, AI promotes learning across all three learning domains, as well as internalization of content and subsequent transfer of that learning. It is predicted that AI will play an important role in assessing human expertise and competencies. This will be critical in developing adaptive, customized micro-learning to assist workers in closing skill gaps by mobilizing workplace knowledge, skills, and abilities to meet the complex demands of new jobs, or new job tasks, and functions that have emerged as a result of automation and digitalization. Adaptive VR presents an innovative solution to help address these emerging issues.

Policy Action 3:

The G20 should work cooperatively to provide access to emerging AI-based training technologies to all workers across all industries. This will enhance and advance efforts for workforce development, while contributing to a global scale transformation of employee (re)skilling through AI and ensuring equal access opportunities to all.

Adaptive VR is a technology that presents innovative approaches to learning in the workplace, both for technical and non-technical training. For technical areas, adaptive VR can expose workers to real-life situations that may pose great risks for their safety and require hazard protection, or may be impossible to simulate. For non-technical areas, adaptive VR would provide a psychologically safe learning environment. This is vital for non-technical skills development, especially interpersonal skills, such as creativity, persuasion, collaboration, adaptability, and emotional intelligence (LinkedIn 2020). In addition, adaptive VR presents a rare opportunity for immediate large-scale deployment (Lee and Banerjee 2011), providing scalable solutions at the micro and macro levels. Apart from the development costs of training simulations, adaptive VR also offers affordable solutions for workplace learning through head-mounted displays and cardboards, which are becoming widely available at affordable prices (Cao et al. 2019). Furthermore, demand for such non-technical skills will continue to increase in the presence of AI and automation (LinkedIn 2019).

In the digital age, being mobile and having the ability to reskill and upskill throughout one's career is a must for remaining not only competitive but also relevant in the workplace. Providing access of this technology to workers across industries will be key in achieving rapid employee reskilling and creating a sustainable workplace learning environment (National Research Council 2012). Technology has the potential to provide safe, scalable, and affordable workplace training environments to all workers. Access to such technology should be considered equally important to avoid creating a new digital divide among workers from developed versus developing economies, as well as minorities and underrepresented populations (OECD 2018). Therefore, government policies and resource allocations should underpin the principle of equal and equitable access to technology for all their citizens.

Policy Action 4:

The G20 should emphasize the importance of AI-based technologies and recognize its impact on individual employees, employers, and society. It should work collectively to create repositories of AI-based, VR training simulations for worker reskilling and upskilling across all industries.

The COVID-19 pandemic has demonstrated the need for rapid reskilling and upskilling of healthcare professionals globally. AI-based adaptive VR simulations can provide immediate and cost-effective approaches for such a global crisis. G20 members, through their engagement groups, should implement and coordinate a strategy forum to encourage science, research, and technology cooperation across member nations. The interests of educational institutions, workforce development agencies, national policymakers, and global corporations should be considered. A global repository of AI-based adaptive VR simulations should be formed to address local, national, regional, and global crises be it a pandemic, natural disaster, or human tragedy. "Adapting employees' skills and roles to the post-pandemic ways of working will be crucial to building operating-model resilience" (Agrawal et al. 2020, 1).

The initial phases of developing effective and successful repositories of adaptive VR simulations for workplace reskilling across industries and sectors will demand investments from governmental entities, professional organizations, and trade associations. However, the long-term return of investment will better equip nations to cope with future unforeseen crises like that of the COVID-19 pandemic. From an educational perspective, the highly contagious nature of COVID-19 has demanded a shift in K-12 and higher education practice globally, in a matter of weeks. It has compelled educators, students, parents, policymakers, and governments to envision the continui-

ty of education in unimaginable circumstances or unsafe and hostile environments. Most educators are using existing e-learning resources to manage the crisis.[5] However, online/distance learning presents numerous challenges to both learners and educators and can exacerbate issues of access to education or social inequality. From a workplace training perspective, while most companies had already shifted their workplace learning efforts to virtual online video platforms, most of these are deemed ineffective as they are based on one-dimensional passive learning approaches (Kolås 2015). Therefore, professional organizations and trade associations, both national and global, as well as other stakeholders, such as corporations and industry partners, governmental agencies, and international forums must collaborate. They must initiate a large-scale program to transform workplace training by investing in immersive learning technologies that have the potential to successfully prepare workers and organizations to better cope with future unknowns and risks.

Utilizing AI in developing immersive workplace training simulations to address both existing and emerging learning needs will present new platforms for workplace training. The development of such repositories and discoveries of new technological approaches to augment human learning will forever change the approach to learning in general, and workplace training in particular. For example, embedding basic skills training, blended learning, and story-based learning in the workplace are considered effective approaches to engage adults in workplace learning (OECD 2019b). Adaptive VR environments have the capability to combine all these learning approaches into one platform, ultimately leading to experiential and hands-on learning that is more conducive to successful training programs.

While this policy brief highlights the use of AI-based VR technology, other immersive technologies, such as augmented reality, extended reality, and mixed reality, have also been used in the workplace to augment different job tasks. These technologies play a significant role in creating a smart workplace, where workers are provided with information as part of their task accomplishment. They also present new horizons for team collaborations in which cross-disciplinary approaches to work are the norm. Training is a key driver of organizational productivity and firm competitiveness. VR and other immersive learning platforms present new capabilities and affordances to augment human cognition and learning in the context of workplace reskilling and upskilling.

Policy Action 5:

The G20 should create a new engagement group, focusing on Human Resource Development ("HRD20") to revamp employee focus and advocate developing both human capital and employee well-being.

The latest advances in technology, and increased natural disasters and pandemics, have impacted both employees and organizations. The demands of business are rapidly transforming the workplace. Such dramatic shifts call for a focus on the employee as the nature of jobs and work tasks evolve. Human resource development (HRD) is "a process of developing and unleashing expertise for the purpose of improving organizational system, work process, team, and individual performers" (Swanson and Holton 2009, 3). As such, the latest workplace changes require organizations to consider their employees as internal customers. They must revise their human resource structures to adapt to this new approach, as employees are critical assets.

HRD is not solely concerned with the individual employee. In fact, it is "a process or activity that, either initially, or over the long term, has the potential to develop adults' work-based knowledge, expertise, productivity, and satisfaction, whether for personal or group/team gain, or for the benefit of an organization, community, nation, or, ultimately, the whole of humanity" (McLean and McLean 2001, 313). The G20, as the premier forum for international economic cooperation, has many engagement groups that are independent collectives and led by organizations from the host country. In an effort to increase the focus on employees and their rapidly evolving needs for learning and development, a new engagement group for HRD should be instituted ("HRD20"). HRD20 would help the G20 coordinate its efforts to help employee (re)skilling and technology adoption.

Disclaimer

This policy brief was developed and written by the author and has undergone a peer review process. The views and opinions expressed in this policy brief are those of the author and do not necessarily reflect the official policy or position of the author's organization or the T20 Secretariat.

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