

CRAFTING THE FUTURE WITH ARTIFICIAL INTELLIGENCE



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CRAFTING THE FUTURE WITH ARTIFICIAL INTELLIGENCE

Artificial intelligence, or AI, took a giant leap forward with the introduction in November 2022 of ChatGPT, an AI technology capable of producing remarkably creative responses and sophisticated analysis through human-like dialogue. It has triggered a wave of innovation, suggesting we might be on the brink of an era of interactive, super-intelligent tools. While this era will likely bring positive changes in fields like Healthcare or Education, it is also predicted to majorly disrupt employment, and the “Future of Work”.

In the next decade, the landscape of various professions is expected to undergo radical transformations due to the integration of Artificial Intelligence. As a result, several studies have already investigated the impact of Generative AI on work. This framing paper will review some of the most significant ones published since January 2023, and discuss the launch of a new initiative on AI & the Future of Work.

A new collaboration between Columbia University’s Center for Sustainable Development and Future Investment Initiative Institute is bringing together key stakeholders, spanning the private and public sectors, government, and educational institutions. Its goal is to envision the evolution of each profession by 2050, considering the current and anticipated capabilities of AI. Several Task Forces have been created to look into specific key topics. One of the goals of the project is to help develop tailored curricula for universities (starting with Columbia University), ensuring that students today are equipped with skills relevant to the evolving job market. The emphasis is on preventing the emergence of workers in 2024/2025 who could become obsolete by 2030, necessitating significant retraining.

The FII PRIORITY Compass finds that 40% of the globe see Generative AI as a threat to society with strong potential for job destruction, and that less than half of the Global North feels prepared for the digital age^[1].

In January 2024, the IMF reported that 40% of jobs in emerging markets could see negative impact from AI because of a digital divide brought

by the technology^[2]. One key component of this project will be to work with Emerging and Developing Economies (EDMEs) universities to prevent a divide between High Income Countries and EDMes, and therefore prevent the negative impact of a digital divide caused by AI in EDMes.

SPOTLIGHT

- 1 The FII PRIORITY Compass finds that 40% of the globe see Generative AI as a threat to society with strong potential for job destruction.
- 2 Less than half of the Global North feels prepared for the digital age.
- 3 The IMF reported that 40% of jobs in emerging markets could see negative impact from AI because of a digital divide brought by the technology.

BACKGROUND

The year 2024 marks the second year of the democratization of AI and close to 18 months after the release of the revolutionary ChatGPT 3.5, has Generative AI already been a “game changer”?

Generative AI (GenAI), or narrative artificial intelligence, has driven up stock prices for major tech companies, fueling hopes for economic transformation and accelerated growth. AI and automation are driving innovation and creating new job categories, such as AI system trainers and AI maintenance specialists. Additionally, there is a growing demand for professionals skilled in AI ethics, policy, and governance. Automation also enhances workplace accuracy and safety by reducing errors and handling hazardous tasks, thereby minimizing workplace accidents and ensuring worker safety.

However, this optimism is tempered by concerns about potential widespread job losses and doubts about the technology's true impact. The rise of AI and automation leads to job displacement, particularly in sectors dependent on routine tasks. This necessitates retraining programs and policy

^[1] <https://fiiprioritycompass.org/reports/FII%20PRIORITY%20compass%20-%20Executive%20Report.pdf>

^[2] <https://www.imf.org/en/Publications/Staff-Discussion-Notes/Issues/2024/01/14/Gen-AI-Artificial-Intelligence-and-the-Future-of-Work-542379>

interventions to mitigate the impact. The need for retraining and credentialing means that the productivity benefits of AI may not sufficiently offset job losses, particularly for low-skilled workers. This highlights the importance of comprehensive support systems for affected employees.

Furthermore, AI's demand for specific skills can disadvantage workers without the necessary education or experience, exacerbating economic inequalities. To address these challenges and promote inclusivity, a well-designed career navigation system is essential^[3].

Experts and the media often overestimate the negative impact of technology on employment^[4]. Case studies indicate that fears of technology-induced unemployment are frequently exaggerated, as seen with the McKinsey Global Institute reversing its AI forecasts and the actual growth in jobs once predicted to be at high risk of automation.

Flexible work arrangements, technical recertification, and creative apprenticeship models provide real-time learning and adaptable skills development, helping workers prepare for future labor market and technological changes. These approaches offer practical solutions to the evolving demands of the workforce.

GenAI tools significantly cut costs and time in content creation, enhancing productivity and profitability. Despite these benefits, they could pose risks of copyright infringement and heightened data security concerns. J.P. Morgan Research^[5] projects that generative AI could boost global GDP by \$7–10 trillion, or up to 10%. Over the next one to three years, this technology may lead to a substantial increase in workforce productivity, potentially altering the economic cycle's dynamics.

Productivity, defined as economic output relative to production inputs, is essential for sustained economic growth and improved living standards. Despite technological advancements, recent years have seen sluggish productivity growth, exacerbating a productivity-pay gap where gains benefit primarily higher-paid employees and corporate profits. GenAI, with innovations like the transformer architecture^[6], shows promise in

enhancing productivity across various sectors by automating tasks and supporting scientific progress. While AI may displace jobs, it also offers opportunities for better training, though the US currently lags behind other countries in workforce development investment^[7].

SPOTLIGHT

- 1 AI and automation are driving innovation and creating new job categories.
- 2 There is a growing demand for professionals skilled in AI ethics, policy, and governance.
- 3 J.P. Morgan Research projects that generative AI could boost global GDP by \$7–10 trillion, or up to 10%.

A report by investment bank Goldman Sachs projects that AI could replace the equivalent of 300 million full-time jobs, including a quarter of work tasks in the United States and Europe. However, the report also predicts that new jobs and a productivity boom could be associated with the rollout of AI, eventually increasing the total annual value of goods and services produced by 7%^[8]. The report notes AI's impact will vary across different sectors: 46% of tasks in administrative and 44% in legal professions could be automated but only 6% in jobs such as construction and 4% in maintenance. Additionally, 60% of workers nowadays are in occupations that did not exist in the 1940s, which shows a constant evolution of the job market.

It is currently difficult to predict accurately how many jobs will be replaced by GenAI. Since GenAI has the potential to increase the performance of workers with average skills, the first impact of AI will likely be to increase competition in various fields, leading to a decrease in salaries, not an immediate reduction in jobs. As GenAI becomes more adept in various fields, this impact will likely be expanded to a broader set of job types.

^[3]<https://nationalfund.org/ai-and-the-future-of-work/>

^[4]<https://www.aei.org/research-products/report/navigating-the-future-of-work-perspectives-on-automation-ai-and-economic-prosperity/>

^[5]<https://www.jpmorgan.com/insights/global-research/artificial-intelligence/generative-ai>

^[6]<https://www.techtarget.com/searchenterpriseai/feature/Transformer-neural-networks-are-shaking-up-AI>

^[7]<https://www.brookings.edu/articles/how-will-ai-affect-productivity/>

^[8]<https://www.goldmansachs.com/intelligence/pages/generative-ai-could-raise-global-gdp-by-7-percent.html>

SPOTLIGHT

- 1 A report by investment bank Goldman Sachs projects that AI could replace the equivalent of 300 million full-time jobs, including a quarter of work tasks in the United States and Europe.
- 2 60% of workers nowadays are in occupations that did not exist in the 1940s, which shows a constant evolution of the job market.
- 3 Bijal Shah, the interim CEO of Guild, emphasizes that while AI offers efficiency and innovation, it is ineffective without a workforce equipped with critical thinking, creativity, and emotional intelligence .

Since the 1980s, technological advancement has resulted in more worker displacement than job creation. If GenAI follows in the footsteps of earlier IT breakthroughs, employment may decline in the near future. Long-term predictions are extremely unpredictable since it is hard to foresee how technology will develop or how businesses will incorporate it into their operations.

The impact of Artificial Intelligence on “inequality” is also uncertain. Any new technology's effects rely on which important actors decide at critical points during its development. Automation is likely to result in more inequality, including between the professional class and the rest of the labor force as well as between capital and labor. On the other hand, the rise in inequality might be avoided if the course is concentrated on giving humans new responsibilities and abilities, since this has historically resulted in wage growth and shared prosperity in the decades after World War II.

The excitement around new technologies like AI often overshadows the critical role of human-centric skills in driving business success. Bijal Shah, the interim CEO of Guild, emphasizes that while AI offers efficiency and innovation, it is ineffective without a workforce equipped with

critical thinking, creativity, and emotional intelligence^[9]. Shah suggests that investing in these durable skills, in the context of appropriate educational curricula, is essential for all workers, as they underpin better decision-making, problem-solving, and collaboration.

Durable skills, also known as foundational professional skills, have a longer lifespan than technical skills and are crucial for effectively navigating technological advancements. Shah highlights an imbalance in investment, noting that while technical upskilling, especially in AI, receives significant focus, there is often a gap in nurturing leadership and creative thinking skills. These durable skills are equally sought after by executives and leaders, yet they are frequently underdeveloped.

Achieving success in the AI era requires a balance between technical proficiency and the development of durable skills. Shah advocates for a deliberate approach to fostering both, acknowledging that durable skills can be developed through intentional upskilling initiatives. By investing in a workforce equipped with both technical and durable skills, businesses can maximize the potential of new technologies while ensuring long-term adaptability and resilience. The path to driving business forward lies in cultivating a harmonious blend of technological advancement and enduring human-centric skills.

As the impact of AI on the future of work is being investigated, by our team and many others, it is critical to explore various facets that intersect with this transformative technology. Here are four critical topics to study:

1. Automation and Job Displacement:

Investigate how AI technologies are automating tasks traditionally performed by humans across different industries. Examine which jobs are at risk of displacement and the potential socio-economic implications of widespread automation. Understanding the dynamics of job displacement and its potential consequences is

^[9]<https://fortune.com/2024/03/18/mpw-summit-guild-ai-future-of-work/>

crucial for preparing individuals and societies for the future of work.

2. Skill Shifts and Upskilling: Explore how AI is reshaping the skills landscape in the workforce. Identify the emerging skills and competencies that will be in demand in AI-driven industries and occupations. Investigate strategies for upskilling and reskilling the workforce to adapt to the changing job market, including the role of education and training programs, lifelong learning initiatives, and policy interventions.

3. Human-AI Collaboration: Examine the evolving relationship between humans and AI in the workplace. Investigate how AI technologies can augment human capabilities, improve productivity, and enable new forms of collaboration. Explore the challenges and opportunities associated with integrating AI systems into existing workflows, including issues related to trust, transparency, and ethical considerations.

4. Social and Ethical Implications: Delve into the broader social, ethical, and policy implications of AI-driven changes in the workforce. Explore questions related to fairness, bias, privacy, and algorithmic accountability in AI-powered decision-making processes. Examine the potential impact of AI on job quality, income inequality, and the distribution of wealth. Investigate policy frameworks and regulatory approaches aimed at ensuring that AI technologies contribute to inclusive and sustainable economic development. Finally, investigate the ethics of use of GenAI in research.

In the second part of this framing paper, we will explore how the “AI and Future of Work” initiative will aim to directly address some of these topics as part of an international consortium of experts from academia, the public and private sector, UN agencies and government.

SPOTLIGHT

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LAUNCH OF THE ARTIFICIAL INTELLIGENCE AND FUTURE OF WORK INITIATIVE

In March 2024, Columbia University in New York hosted the launch of the "Artificial Intelligence and Future of Work" initiative. This event, organized by the Center for Sustainable Development (CSD) in collaboration with the Future Investment Initiative Institute (FII Institute), brought together over 40 academicians from various Columbia University Schools, international universities, government agencies, and the private sector. The gathering aimed to discuss the profound impact of Artificial Intelligence on the future of work and strategies to address these changes.

The initiative unveiled by the Center for Sustainable Development focuses on preparing the workforce for future AI challenges by revolutionizing educational curricula. The goal is to create a workforce proficient in AI and ready to tackle sectoral transformations anticipated by 2030. Prof. Yanis Ben Amor, the Center's Executive Director, emphasized the importance of global collaboration, particularly with Emerging and Developing Economies (EDMEs), to mitigate disparities in education and opportunities. The initiative aims to leverage Columbia's Global Centers network to extend educational advancements worldwide, addressing concerns raised by the recent IMF report^[10].

Keynote speaker Prof. Jeffrey Sachs highlighted AI's potential to reshape societal and economic landscapes, akin to past technological revolutions. He stressed the lack of predictive models for AI's long-term economic impacts and the necessity of ethical considerations in AI development.

^[10]<https://www.imf.org/en/Publications/Staff-Discussion-Notes/Issues/2024/01/14/Gen-AI-Artificial-Intelligence-and-the-Future-of-Work-54237v9>

SPOTLIGHT

- 1 Prof. Yanis Ben Amor, the Center's Executive Director, emphasized the importance of global collaboration, particularly with Emerging and Developing Economies (EDMEs), to mitigate disparities in education and opportunities.
- 2 Prof. Jeffrey Sachs highlighted AI's potential to reshape societal and economic landscapes, akin to past technological revolutions.

Presentations from international universities, government agencies, and private sector representatives illustrated diverse approaches to integrating AI in education and practical applications. The discussions underscored the importance of strategic planning and international collaboration to ensure AI's benefits are equitably distributed globally.

The event concluded with the launch of four Task Forces focusing on Macroeconomics, Education, Health, and Ethics to explore AI's impacts across various domains, as well as an additional cross cutting fifth Task Force focusing on Emerging and Developing Economies.

OBJECTIVES OF THE PARTNERSHIP BETWEEN FII INSTITUTE AND COLUMBIA UNIVERSITY

As AI has become the fastest growing topic of interest since 2023, several groups worldwide are interested in the impact of AI on the Future of Work.

The partnership between FII Institute and Columbia University has the following objectives:

1. Identify Potential Impacts: Members of the Initiative have created several Task Forces and will discuss and identify the potential impacts of AI on various aspects of the Future of Work, including skill shifts, poverty and inequalities, impact on Emerging and Developing Economies (EDMEs) among many others. The Initiative will aim to understand

the opportunities and challenges that AI presents for different stakeholders, and the critical role played by a university such as Columbia

2. Share Knowledge and Insights: The Initiative will facilitate knowledge sharing and exchange of insights among stakeholders from all regions of the world about current trends, research findings, and best practices related to AI and the Future of Work.

3. Discuss Policy and Regulatory Considerations: Engage stakeholders, in the various specific Task Forces, in a discussion about the policy and regulatory considerations necessary to harness the benefits of AI while mitigating potential risks and challenges.

4. Foster Collaboration and Partnerships: The Initiative, which benefits from the expertise of colleagues and collaborators from every continent, will foster collaboration and partnerships among stakeholders to address common goals and challenges related to AI and the Future of Work. Through the Task Force and general meetings, the Initiative will encourage dialogue and networking opportunities to facilitate the exchange of ideas, resources, and opportunities for collaboration on research projects, pilot initiatives, and policy advocacy efforts.

TASK FORCES

Summary

- **Macroeconomics, Poverty and inequity:** Delve into the macroeconomic implications of AI adoption and its effects on workforce development strategies. Explore innovative approaches to tackle challenges and capitalize on opportunities presented by AI in the swiftly evolving job market.

- **Application of AI in Healthcare:** Explore cutting-edge applications of AI in healthcare, elucidating how AI technologies are transforming patient care, medical research and opportunities for healthcare workers and patients in Emerging and Developing Economies (EDMEs)

- **Application of AI in Education:** With the opportunity to provide personalized learning experiences and improve teachers and professors' pedagogy, applications of AI in Education could revolutionize the field. But are there redlines to define when it comes to how and what AI will teach to our children?

- **Ethics:** Explore all the ethical questions, opportunities and challenges raised by the integration of Artificial Intelligence in the Future of Work, society and Research, ensuring that tools developed are for the benefit of mankind and the planet.

A fifth Task Force will convene all members from EDMEs from the other Task Forces to strategically think about linkages with their countries and universities.

- **AI and Future of Work in EDMEs:** Create an environment of dialogue and exchange with universities in Emerging and Developing Economies (EDMEs), and strategize on effective dissemination of information concerning AI and the Future of Work in LMICs, ensuring equitable access to knowledge and opportunities for all.

RESEARCH FOCUS OF EACH TASK FORCE

Macroeconomics, Poverty and inequity: The Macroeconomics of AI-Driven Change

Economists are just now coming to grips with the enormous scale of change ahead, a scale that is likely to rival the consequences of other great technology-driven social changes: the steam engine, electrification, the automobile, broadcasting. Indeed, this change may even be larger, since AI seems to be integrating into every sector of the economy and society. The basic idea of macroeconomic change is that the AI revolution will boost productivity and opportunities for more leisure time and other benefits, but simultaneously widen income inequalities, impoverish a part of the workforce, and lead to enormous windfall

gains for the lucky few. The uses of time, patterns of jobs, roles of education, and political power balances, are all likely to change. Not to mention that AI technologies are rapidly being militarized for autonomous warfighting, cyberwarfare, and other potential disastrous major conflicts.

There are six main macroeconomic consequences of AI that will be explored:

1. Accelerated economic growth resulting from rising productivity in both the goods-producing and service sectors. The national accounts, however, will mismeasure much of the improvement in productivity, so that an accurate assessment of AI's contribution to growth will also require new metrics and methodologies for the national income accounts (to incorporate dematerialized goods, non-market goods, freely available goods, savings of commuting and shopping time, and other non-market improvements in efficiency).

2. The increase in social and economic inequalities between those who are benefited by AI and those who are adversely impacted, especially through job loss or a decline in earnings. Previous economic research has exposed two kinds of shifts in the income distribution: from labor income to capital income; and from unskilled labor to skilled labor. Both of those trends are already underway, and are likely to be exacerbated by rapid adoption of AI;

3. A dramatic shift in time use over the life-cycle, including: a reduction of average work hours, as AI and robots substitute for human labor; an increase of time spent in education and job skilling, including life-long learning (adult education and skill enhancement); a reduction of shopping and commuting time, as goods and services are dematerialized (e.g., home entertainment rather than theatre-based entertainment), and as work-from-anywhere increases; a longer retirement period as life-expectancy rises;

4. Disruption of occupations and job tasks in all sectors of the economy, including the continued shift from goods production to services; the rise of the care economy; the increased share of the labor-force in AI-allied fields, including STEM; and the rise of digital assistants in all occupations;

5. Increased concentration of ownership and economic activity through the increasing role of digital platforms, cloud computing services, LLMs, and other parts of the AI ecosystem. This increased concentration will exacerbate income and wealth inequalities as well as inequalities of political power, and will provoke new approaches to anti-trust, privacy, decentralization, and ownership of personal data;

6. A greater role of public outlays in many areas, including: social protection, basic incomes, publicly supported science and technology, digital public services, universal access to 5G and 6G, higher education and job training, and others. This rise of public outlays will also require a reassessment of long-term fiscal policy.

Within the macroeconomics task force of this project, Columbia University Professor Jeffrey Sachs will mobilize a global network of economists and international institutions (at the IMF, World Bank, OECD, and universities) to support various areas of research on these complex and novel macroeconomic topics. This work will be part of and supported by the program on The World in 2050, a major global project of the UN Sustainable Development Solutions Network.

APPLICATION OF AI IN HEALTHCARE

According to the World Health Organization (WHO), 4.5 billion people worldwide do not have access to essential healthcare services. Most of those patients in need of essential services live in Emerging and Developing Economies (EMDEs). Healthcare systems in EMDEs face many challenges that

include: shortage of healthcare workers, financial constraints, insufficient training of staff, poor quality of care, health information systems challenges, limited accessibility to healthcare services (impracticable roads, long distances to facilities), cultural and social barriers, political and economic instability, and public health challenges such as recurring infectious diseases.

SPOTLIGHT

According to the World Health Organization (WHO), 4.5 billion people worldwide do not have access to essential healthcare services.

To try to address the impact and opportunities presented by Artificial Intelligence in Health, the “Application of AI in Healthcare” Task Force will specifically review three main priority areas: the role of AI in the transition of care (addressing workflow, gaps, and fragmentation), the role of AI in electronic health records (EHR), including documentation, clinical decision support, continuous professional development (CPD), and large language models (LLM), and the role of AI in co-production of healthcare, focusing on patient empowerment, health literacy, and health workforce empowerment. In the initial stage of work, the Task Force will focus on one priority area: empowering patients and families, as well as empowering the health workforce, specifically in Emerging and Developing Economies (EMDEs).

EMPOWERING PATIENTS AND FAMILIES

Artificial Intelligence offers numerous benefits to empower patients and families in healthcare. One significant advantage is the improved access to medical services through telemedicine and remote consultations. This technology allows patients to receive medical advice and consultations from the comfort of their homes, eliminating the need for travel and reducing waiting times. Moreover, mobile health applications enable patients to monitor

their health, track symptoms, and manage chronic conditions effectively, enhancing their engagement in their healthcare journey.

AI also plays a crucial role in improving health education and awareness, often referred to as health literacy. Through personalized information and recommendations, patients can gain a better understanding of their health conditions and the necessary steps to maintain or improve their health. This empowerment leads to more informed decisions and better health outcomes.

SPOTLIGHT

One significant advantage (of AI) is the improved access to medical services through telemedicine and remote consultations.

In terms of cost reduction, AI-driven solutions enhance the efficiency of healthcare systems, minimizing unnecessary hospitalizations and enabling remote monitoring. These advancements make healthcare more affordable and accessible to a broader population, especially in low-income settings.

Optimizing resources is another key application of AI in healthcare. Tailored care plans, remote monitoring, and wearable devices ensure that patients receive personalized care while also supporting caregivers and facilitating better care coordination. This optimization not only improves patient outcomes but also enhances the overall efficiency of healthcare delivery.

Furthermore, AI improves work conditions for healthcare professionals by automating routine tasks, reducing administrative burdens, and providing decision support. This allows healthcare workers to focus more on patient care, improving job satisfaction and reducing burnout.

EMPOWERING HEALTHCARE WORKERS

AI also offers numerous applications that empower healthcare workers by enhancing their capabilities and improving overall efficiency. One significant benefit is the rapid analysis of vast amounts of clinical data, including data from wearable devices and health apps. This allows healthcare professionals to access comprehensive patient information quickly, leading to more informed and timely decision-making. Personalized treatment planning is another area where AI significantly impacts. By analyzing individual patient data, AI helps tailor treatment plans to each patient's unique needs, improving outcomes and patient satisfaction. Remote patient monitoring further supports this personalized approach, allowing healthcare workers to track patients' health remotely and intervene when necessary.

In addition, AI facilitates real-time monitoring and disease tracking, enabling healthcare workers to monitor patients' health statuses continuously and respond promptly to any changes. This real-time capability is particularly valuable in managing chronic diseases and monitoring patients in critical conditions. Additionally, AI enhances the interpretation of medical imaging, improving diagnostic accuracy and helping healthcare providers identify issues more precisely and at earlier stages.

AI also contributes to improving the quality and safety of healthcare. By standardizing procedures and reducing variability, AI enhances patient safety and reduces medication errors. Additionally, AI streamlines administrative tasks, such as data entry and appointment scheduling, freeing up healthcare workers to spend more time on patient care. Analysis of large datasets also supports drug discovery, where AI accelerates the identification of new medications and improves drug safety by predicting potential adverse effects and interactions. This will further improve the quality and safety of healthcare.

Training and continuous professional development (CPD) are also enhanced by AI-driven tools, providing healthcare workers with advanced training resources and up-to-date knowledge. All these improvements lead to reduced costs, making healthcare more efficient and accessible while maintaining high standards of care.

AI TOOLS

To explore how AI can positively impact the empowerment of patients and the health workforce in EDMs, the Task Force will focus on several key areas. First, the TF will identify accessible and affordable AI solutions that can be used on low-cost smartphones and internet connections commonly found in EDMs. The TF will use a prioritization matrix that highlights the following criteria:

- 1- Implementability.
- 2- Scalability.
- 3- Repeatability in other countries.
- 4- Impact "Pareto Principle": (identifying the 20% of AI tools that provide 80% of impact vis a vis patients and healthcare workers in LMIC).

These AI systems will be selected to understand local languages, dialects, and cultural contexts, which are all crucial for effective communication with patients and healthcare workers. For example, potential AI tools identified will be utilized to provide health education, raise public awareness about preventive care, disease management, and available healthcare services tailored to local needs and literacy levels.

Further, the TF aims to identify (or develop) cost-effective training and capacity-building programs for healthcare workers to enhance their skills and efficiency in utilizing AI tools.

Developing AI tools for diagnostic support, particularly for diseases prevalent in EDMs, will help healthcare workers achieve accurate and

timely diagnoses even in resource-constrained settings, while addressing potential biases. Implementing AI-powered telemedicine platforms and remote monitoring systems will enable access to healthcare services in rural and underserved areas. Ensuring robust data privacy and security measures will protect patient information in countries with less stringent regulations. Finally, fostering collaboration between governments, healthcare providers, tech companies, and research institutions will help co-create and implement AI solutions that address specific healthcare challenges and needs in EDMs.

APPLICATION OF AI IN EDUCATION

The "AI & Education" Task Force has narrowed its focus to two main topics to be investigated.

Key competencies for the future of education

Competencies can be defined as a combination of knowledge, skills, abilities and behaviors mobilized by a person to act in an appropriate manner in a professional situation. With the use of technology, academic honesty is a challenge for every university in the world, embedding values that are guaranteeing the mastery of knowledge and competencies for the future of work and profession.

SPOTLIGHT

- 1 AI can positively impact the empowerment of patients and the health workforce in emerging markets and developing economies (EDMs).
- 2 Developing AI tools for diagnostic support, particularly for diseases prevalent in EDMs, will help healthcare workers achieve accurate and timely diagnoses.

Traditional assessment methods, which often prioritize rote learning and written examinations, may no longer be sufficient in evaluating the competencies necessary for the future. With the rise of AI tools like ChatGPT, the ability to write and produce content can be significantly augmented by technology. Therefore, assessments should focus more on evaluating critical thinking, problem-solving, and the ability to use AI tools effectively.

As Task Force members have observed in their discussions, certain tasks taught to students/learners can be delegated to AI in certain learning situations (such as calculations, translation, synthesis, production, etc.). These tasks emerge in the first iterations of AI tools as the most likely to be adopted due to the satisfactory results provided by the AI tools when used for these purposes.

While these basic skills should be still acquired by students and learners, they are nonetheless transferable to AI. Consequently, some key and strategic competencies to take into account for the future of education are the ones that are pedagogically and ethically challenging to transfer to AI. These skills should be added to a list of “non-negotiable” skills that all students and learners must continue to master, regardless of the advancements in AI. For example, literacy skills (research, reading, and comprehension) are crucial, as are skills related to AI outputs: discernment, decision-making, critical thinking development creativity, intercultural interpretation of content, teamwork, problem-solving, and oral expression.

There is also an imperative to develop human skills, often relegated to the background, which will become differentiating factors in a world where technology will play an increasingly prominent role: empathy, active listening, conflict management, self-awareness, and emotional intelligence. The objective of the AI & Education Task Force is to identify these key and strategic competencies for education and to conceive devices (activities, programs, experiences) that prioritize these key competencies, including inter-regional and intercultural contexts.

OBJECTIVES:

- Identify “non-negotiable” skills for education and define tools including some specific AI (EdGPT) could train students to strengthen the acquisition of essential skills (math skills for example) with selected and reliable data, for fair use, with local-used less energy, and in order to avoid ethical bias. Other AI devices could train student to exercise them and to question them rather than give them answers.
- The future of professions, managers and leaders requires a base of key competencies that responds to the market. Identify key competencies (differentiating factors) for the future in the AI era (critical thinking, decision making, problem solving, teamwork, etc.) and conceive programs (curricula) in this purpose.
- Identify principles and recommendation for pedagogical innovation to train students with key competencies excluding the use of AI or mixing the use of relevant AI devices.
- Finally identify some relevant assessment methods to prove the acquisition of competencies.

“HUMANLY AUGMENTED” AI LEARNING EXPERIENCE

As previously observed with the emergence of technology in education, the introduction of AI will necessitate educators to innovate pedagogically by drawing inspiration from active learning methods in authentic situations. However, the challenge with these approaches lies in addressing the affective and volitional aspects crucial for cognitive engagement. These aspects delve into the learner's personality, the learning activity as an embodied experience, the meaning of learning, motivation (in terms of commitment and persistence), and sometimes a spiritual dimension (awe, inspiration, values, etc.).

Moreover, they involve reflecting on these experiences to enhance metacognition and enrich the learning experience in all dimensions. The task for this group is to theoretically explore these key dimensions to create conditions for active learning but, more importantly, to conceive learning experiences that are "humanly improved," integrating the use of AI.

OBJECTIVES:

- Define active learning methods to train students with key competencies excluding the use of AI or mixing the use of relevant AI devices. Some mixed methods can be used with AI to improve students learning (e.g. flipped classroom) but with strongly selected, smart data.
- Define pedagogical innovations to boost active learning and engagement (service learning, real cases, real time project, role play, experiences review)

ARTIFICIAL INTELLIGENCE & ETHICS

AI serves as a valuable lens through which to examine the ethical purpose of the production of knowledge, which has a huge impact on the future of work, therefore on education and competencies future workers will have to develop. Overall, it impacts the ethical choices decision-makers will have to take for the societies they oversee, including in EDMs.

There are three main angles to consider:

RESEARCH: AI integration in research prompts questions about the pursuit of scientific truth, knowledge construction, and the ethical grounding of scientific inquiry. Key issues include how knowledge is valued, and research as an ethical safeguard. Additionally, the impact of AI on the areas must be considered with in specific cultural, economic, and scientific contexts.

This examination can reveal new ethical challenges and guide the responsible incorporation of AI in scientific research.

TRAINING: The incorporation of AI into university curricula raises important questions about the university's educational mission and ethical responsibilities as a training institution. This involves rethinking the conception of education and the goals of the university in light of AI. It is crucial to determine who should be trained and how AI influences pedagogy and curriculum design. These considerations align with the discussions of the AI & Education Task Force, focusing on preparing students ethically for a future where AI is pervasive.

SERVICE FOR THE COMMUNITY: Universities, institutions and the private sector must also consider their societal mission, specifically who should be trained and what competencies are necessary for societal benefit. Integrating AI training with an ethical focus can guide how universities, institutions and private firms serve their communities. These questions complement the research conducted by the Task Force on Macroeconomics, Poverty & Inequity, ensuring that AI education and training contributes positively to societal needs and ethical objectives.

SPOTLIGHT

- 1 The incorporation of AI into university curricula raises important questions about the university's educational mission and ethical responsibilities as a training institution.
- 2 Universities, institutions and the private sector must also consider their societal mission, specifically who should be trained and what competencies are necessary for societal benefit.

FOCUS ON AI ITSELF AND THE ETHICAL ISSUES IT RAISES

One primary focus will be to examine the ethical issues related to AI itself, including its design, training, and production. Reports and articles have already delved into these questions, and the task force will clarify the unique intellectual contributions it aims to make, possibly with an international perspective. Key points to explore include how AI is ethically grounded within specific contexts even before its design, the ethical justifications formulated, and the objectives set by designers from the outset. Additionally, it is crucial to understand the intended outcomes of AI: whether it serves the common good, promotes ethical values such as human dignity, combats poverty, enhances well-being, and supports environmental preservation.

Another significant area of scrutiny is the societal impact of AI, particularly on work and education, from an ethical standpoint. The task force will explore these issues through various lenses, including a regional lens with perspectives from North and sub-Saharan Africa, the Middle East, North and South America, South Asia and Europe. This comprehensive examination will help determine how AI can be designed and implemented to uphold ethical values and contribute positively to society.

The Task Force will also delve into some ethical dilemmas that integration of AI may raise, specifically regarding the future of work.

KNOWLEDGE CREATION AND VALUE CREATION

Work is being impacted by AI, automation, and so-called intelligent devices in general. This division of labor issue is part of a historical continuum that has existed in the context of industrial and post-industrial forms of production, especially from the beginning of the industrial age.

On a positive side, to what extent is a machine capable of taking on tasks that have previously been

considered repetitive or redundant and performed by human beings? How can we distinguish so-called intelligent, creative tasks from those deemed repetitive?

The corollary to this question is the following: as machines become more intelligent, will humans become less intelligent, less reflexive, and less capable of creativity? Taking AI into account at work, through the issue of knowledge creation, opens a number of concrete ethical questions:

- Is it the scientists and engineers (i.e. Humans) who drive and train intelligent systems? If that is the case, does it imply that Humans' know-how will eventually be "swallowed up" by machines?
- Or will machines help Humans produce knowledge in the future? And would that imply that humans will end up relying on machines, abandoning their capacity for reflection and creativity?

A concrete example are surgeons who, in the future, are likely to make greater use of AI capabilities for operational purposes, in the same way that they use increasingly sophisticated robots and systems for surgical operations. Since Generative AI works by correlating data, it provides the results of compiled statistics. Therefore, it does not allow to consider the singularity of each person? As a result, it is important for a doctor or surgeon to also consider the singularity of the patient he is examining and for whom he has to make a medical decision?

QUALITY OF KNOWLEDGE AND TRUST

From this topic stems a concrete ethical question for educational institutions, companies, and private sector: what skills must professionals routinely acquire in order to guarantee the quality and ethical purpose of an action?

- AI can assist architects with the planning and construction of a home. Should the next generation of architects give up on learning how

to sketch plans? Architects may feel the limitations of space design, and experience the big picture of creating a space or building by learning to draw and mastering the ability of drawing blueprints.

- AI can only function based on the data it is trained on, to the extent that these data are reliable, and that the processing to which these data are subjected is reliable. There is therefore a strong need for reliability in areas where human life is at stake, as well as environmental protection, economic decisions made by a company or organization, or the protection of human rights.
- This means making the data collection, the processing and the production of AI robust, accountable, and reliable. It raises on the other hand the issue of racial-, gender-, minority-, culture- bias in the data that are provided for AI training. It also requires ethical training for the humans who enter the data, who create the processes for processing the data, and who use the results of this data for ethical purposes, for the common good.

AI DEVELOPMENT STRATEGY AND THE PURPOSE OF DECISION-MAKING

From an ethical perspective, AI should help improve decision-making on issues with environmental, societal, and political impact. However, the choice to engage in the massive use of AI, whether at corporate or government level, should itself be subject to ethical discernment:

- What kind of AI is necessary and sufficient for the desired purpose, while also taking into account the human and environmental impact of its use?

The energy, rare-earth and water resources required for the massive use of AI can become exponential. Given the increasing scarcity of these resources, an ethical dilemma now arises: should decision-makers opt for AI that uses scarce resources on a massive scale, if this jeopardizes people's access to water?

Is the use of AI acceptable if the environmental impact is greater than the expected benefits of AI use, at the risk of jeopardizing the survival of fauna, flora and the human population in the medium and long term?

SPOTLIGHT

From an ethical perspective, AI should help improve decision-making on issues with environmental, societal, and political impact.

- In a means/ends calculation, which AI is sufficiently necessary and useful, with the most moderate possible use of resources, to derive the targeted benefit for the well-being of populations and the preservation of the environment?

This leads to these specific questions:

- At a governmental decision-making level: which AI strategies should be favored, considering societal, economic, and environmental criteria?
- For the private sector: how AI can help develop quality of life at work, while integrating environmental impact and preserving the company's sustainability and competitiveness?

RESILIENCE AND THE TRANSMISSION OF EXPERIENCE AND KNOWLEDGE, FACED WITH THE RISK OF KNOWLEDGE SHORT-CIRCUITING

If AI is used on a massive scale as the main, or even sole, source of data, is there not a risk that human knowledge and know-how, accumulated over decades or even hundreds of years, will be lost?

All social and technical learning is based not only on data, but also on accumulated know-how and experience. This is particularly true in the field of medicine, but also in other sectors. By relying solely on data produced by Artificial Intelligence for learning and knowledge production, societies and organizations run the risk of short-circuiting transmission and losing know-how.

In a situation where the physical resources and material and social infrastructures required for AI to function may deteriorate, there is a risk that organizations will no longer be able to rely on "low-tech" solutions. This can be the case in situations of war, economic and social crisis, or degradation of electricity systems, etc.

- For example, in situations of military conflict, and in the absence of equipment, doctors working in emergencies without computer equipment or advanced medical infrastructures need to maintain a capacity for clinical diagnosis and care, even with rudimentary resources
- This argument may also prompt developing countries to deploy policies aimed at:
 - Identifying solutions that are "good enough" in terms of resources to continue training skilled people in parallel, ensuring a capacity for resilience and gradual development in line with a country's resources.
 - Making technological leaps: for example, the use of cell phones in Africa allowed innovation and new services, without having to deploy fixed telephone lines at high infrastructure cost. Similarly, second- or even third-generation AI solutions that are lighter on resources could be more agile and less costly to deploy than first-generation systems.

Ethical research on AI may therefore be essential to help decision-makers evaluate the AI impact on the future of work, not only considering short-term positive or negative outcomes, but also long-term perspectives. Ethical issues should

also be helpful to replace the AI impact in a broader picture that put on the forefront the common good for human societies and the preservation of environment.

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