

Artificial Intelligence Literacy in Education and Health Sectors

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Generative artificial intelligence (AI) is advancing exponentially. What is happening at the frontier of research and application? How are novel techniques and approaches changing the risks and opportunities linked to frontier, generative AI models? Will we invest and implement digital tools for surveillance, automation, or to empower workers by creating new productive tasks? Optimistic forecast regarding the growth implications of AI is abound. The drive toward automation is perilous. To support shared prosperity, AI must complement workers – not replace them. AI offers an opportunity to complement workers skill and expertise if we direct its development accordingly. Middle-income countries and many lower-income countries also have much to fear from the existing path. New capital-intensive technology will soon be applied everywhere. There is no guarantee that, on its current path, AI will generate more jobs than it destroys. If we redirect AI onto a more human-complementary path, while using it to address pressing social problems, all parts of the planet can benefit. But if this just-automate approach prevails, shared prosperity will be even harder to achieve. AI could increase global Gross Domestic Product (GDP) over the next five years, although not as substantially as enthusiasts claim. It might even modestly raise GDP growth in medium term. However, on our current trajectory, the first-order impact is likely to be increased inequality within industrial countries. All this underscores perhaps the most important aspect of technology: *Choice*. There are often myriad ways of using our collective knowledge to improve production and even more ways to direct innovation.

The purpose of this document is to provide a balanced perspective on this cutting-edge technology – artificial intelligence (AI), that was released for public use in November 2022. Its rapid adoption has raised questions about capabilities, limitations, and risks. This article presents an overview of currently available AI technologies, and their use in health sector. It also provides suggestions on how to optimize the use of this tool. The question is not whether AI will reshape technology as we know it, but the extent of that transformation. There is always a possibility of use of these open-AI and other models available to public for large-scale disinformation and cyber-attacks. **AI is a tool – that is very much in human control. It is the intentions of the humans that should stay in control.** Governance of AI is also discussed. Our aim is to ensure that national AI strategies are guided by ethical principles.

Definition

What is artificial intelligence (AI)? There are many definitions of AI. One such definition for AI is “AI is a science and a set of computational technologies that are inspired by – but typically operates quite differently from – the ways people use their nervous systems and bodies to sense, learn, reason, and take action.” (Source: National Institutes of Health [NIH]). AI refers to computer programs, or algorithms, which use data to make decisions or predictions. To build an

algorithm, scientists might create a set of rules, or instructions, for the computer to follow so it can analyze data and make a decision.

A specific definition of AI in a recommendation of the Council on Artificial Intelligence of the Organization for Economic Co-operation and Development (OECD) states: “An AI system is a machine-based system that can, for a given set of human-defined objectives, make predictions, recommendations, or decision influencing real or virtual environments. AI systems are designed to operate with varying levels of autonomy.”

AI can be created as software or tools that are able to mimic human intelligence in certain contexts or even exceed it in others. To be able to build AI, scientists need large, well-explained datasets that first help them understand the techniques and processes used by humans to analyze and interpret complex scenarios. The field of AI is a dynamic one, and researchers are consistently developing new techniques and tools.

What is machine learning and deep learning?

Machine learning (ML) and deep learning are fields of study frequently mentioned in the context of AI. Both kinds of learning are subfields of AI. Machine learning is a process by which machines can be given the capability to learn about a given dataset without being explicitly programmed on what to learn. Machines can usually learn in either a supervised or unsupervised manner. Under supervised learning, scientists (e.g., people with coronary heart disease and those without) that the machine can use to infer hidden qualities of the data and distinguish the categories from each other. It is then able to use this knowledge to work on the test data and make informed predictions (e.g., which people in a population are likely to develop coronary heart disease).

In an unsupervised learning setting, machines can recognize patterns in large datasets and make predictions about the real world without requiring any additional help from humans. When machines can learn in an unsupervised manner, they are considered to be learning “deeply.” Deep learning is a relatively modern technique used to implement machine learning. A deep learning algorithm takes a data set and finds patterns and critical information by imitating how a human brain’s neurons interact with each other. The algorithms are artificial neural networks – a computing system that simulates the brain’s ability to weigh the importance of some data versus others, and handle bias.

Artificial intelligence (AI), the Economy and Society

A Friend or A Foe

Macroeconomics of Artificial Intelligence (AI) Growing Stage of AI Adoption and Impact.

Well-informed policy decisions are needed in shaping AI’s impact on productivity growth, the labor market, and industrial concentration. The collective decisions we make today will determine how AI affects productivity growth, income inequality, and industrial concentration. Economists have a poor track record of predicting the future. And Silicon Valley repeatedly

cycles through hope and disappointment over the next big technology. So a healthy skepticism toward any pronouncements about how AI will change the economy is justified. nonetheless, there are good reasons to take seriously the growing potential of AI – systems that exhibit intelligent behavior, such as learning, reasoning, and problem-solving – to transform the economy, especially given the astonishing technological advances of the past year. Getting to the better future will require good policy including:

- Creative policy experiments;
- A set of positive goals for what society wants from AI, not just negative outcomes to be avoided;
- Understanding that the technical possibilities of AI are deeply uncertain and rapidly evolving. Society must be flexible in evolving with them.

Economic Gains or Economic Losses

Despite the rapidly improving technical capabilities of AI, its adoption by businesses may continue to be slow and confined to large firms. Displaced workers might disproportionately end up in even less productive and less dynamic jobs, further muting any aggregate benefit to the long-term productivity growth rate of the economy. AI may also end up being less promising or less ready to bring to market than initially hoped. Any real economic gains, even modest ones, may show up in the data many decades after the first moments of technical promise, as has often been the pattern.

In addition, national regulators driven by any number of concerns may impose strict regulations that slow the speed of AI development and dissemination. They may even be urged on by the early developers of AI who are eager to protect their lead. Moreover, some countries, businesses, and other organizations may totally ban AI.

Higher-Productivity Future

But there is an alternate scenario in which AI leads to a higher-productivity-growth future. AI might be applied to a substantial share of tasks done by most workers and massively boost productivity in those tasks. In this future, AI lives up to its promise of being the most radical technological breakthrough in many decades. Moreover, it ends up complementing workers – freeing them to spend more time on non-routine, creative, and inventive tasks, rather than just replacing them. AI captures and embodies the implied knowledge, of individuals and organizations, by drawing on vast amounts of newly digitalized data. As a result, more workers can spend more time working on novel problems, and a growing share of the labor force increasingly comes to resemble a society of research scientists and innovators. The result is an economy not simply at a higher level of productivity, but at a permanently higher growth rate.

Will artificial intelligence (AI) lead to higher income-inequality?

AI is not a future of mass unemployment. But in this higher-inequality future, as AI substitutes for high-or decently-paying jobs, more workers are relegated to low-paying service jobs – such as hospital orderlies, nannies and doorman – where some human presence is intrinsically valued

and pay is so low that businesses cannot justify the cost of a big technological investment to replace them. The final bastion of purely human labor may be these types of jobs with a physical dimension. Income inequality increases in this scenario as the labor market is further polarized into a small, high-skilled elite and a large underclass of poorly paid service workers.

Creating a future of lower income inequality, AI may help labor in another more subtle, but profound, sense. If AI is a substitute for the most routine and fixed kinds of tasks, then by taking tedious routine work off human hands, AI may complement genuinely creative and interesting tasks, improving the basic psychological experience of work, as well as the quality of output. It may reduce worker turnover and increase customer satisfaction for those using the AI assistant.

Impact of AI on Industrial Concentration

Industrial Concentration – measures the collective market share of the largest firms in a sector. It has risen dramatically in the United States and many other advanced economies. The “visible hand” of top management managing resources inside the largest firms, now backed by AI, allows the firm to become even more efficient, challenging the advantages of small firms’ local knowledge in a decentralized market. More subtly, but perhaps more importantly, even in a world in which propriety AI does not require a large firms cost that only the largest firms can afford, AI might still disproportionately benefit the largest firms, by helping them better internally coordinate their complex business operations – of a kind that smaller and simpler firms do not have.

Today, when the effects of AI on society are like to be measured in trillions of dollars, for greater investment should be made in research on the economics of AI. Society needs innovations in economic and policy understanding that match the scale and scope of the breakthrough in AI itself. Re-orienting research priorities and developing a smart policy agenda can help society move toward a future of both sustained and inclusive economic growth.

Ethics and Governance of Artificial Intelligence (AI) for Health

While new technologies that use AI hold great promise to improve diagnosis, treatment, health research and drug development and to support governments carrying our public health functions, including surveillance and outbreak response, such technologies, must put ethics and human rights at the heart of its design, deployment and use. We have identified six consensus principles to ensure AI works to the public benefit of all countries. It also contains a set of recommendations that can ensure the governance of AI for health maximized the promise of the technology and holds all stakeholders – in the public and private sectors – accountable and responsive to the healthcare workers who will rely on these technologies and the communities and individuals whose health will be affected by its use.

Women’s Health and Education Center (WHEC) endorses these six key ethical principles. We hope these principles will be used as a basis for governments, technology developers, companies, civil society and inter-governmental organizations to adopt ethical approaches to appropriate use of AI for health.

1. Protect autonomy: The principle of autonomy requires that the use of AI or other computational systems does not undermine human autonomy. In the context of healthcare, this means that humans should remain in control of healthcare systems and medical decisions. This also means that healthcare professionals have the information necessary to make safe, effective use of AI systems and that people understand the role that such systems play in their care. It also requires protection of privacy and confidentiality and obtaining valid informed consent through appropriate legal frameworks for data protection.

2. Promote human well-being, human safety and the public interest: AI technologies should not harm people. Preventing harm requires that AI does not result in mental or physical harm that could be avoided by use of an alternative practice or approach. The designers of AI technologies should satisfy regulatory requirements for safety, accuracy and efficacy for well-defined use cases or indications. Measures of quality control in practice and quality improvement in the use of AI over time should be available.

3. Ensure transparency, explainability, and intelligibility: AI technologies should be intelligent or understandable to developers, medical professionals, patients, users and regulators. Two broad approaches to intelligibility are to improve the transparency of AI technology and to make AI technology explainable. Transparency requires that sufficient information be published or documented before the design or deployment of an AI technology and that such information facilitate meaningful public consultation and debate on how the technology is designed and how it should be or should not be used. AI technologies should be explainable according to the capacity of those to whom they are explained.

4. Foster responsibility and accountability: Humans require clear, transparent specifications of the tasks that systems can perform and the conditions under which they can achieve the desired outcomes performance. Although AI technologies perform specific tasks, it is the responsibility of stakeholders to ensure that they can perform those tasks and that AI is used under appropriate conditions and by appropriately trained people. If something goes wrong with an AI technology, there should be accountability. Appropriate mechanisms should be available for questioning and for redress for individuals and groups that are adversely affected by decisions based on algorithms.

5. Ensure inclusiveness and equity: Inclusiveness requires that AI for health be designed to encourage the widest possible appropriate, equitable use and access, irrespective of age, sex, gender, income, race, ethnicity, sexual orientation, ability of other technology, should be shared as widely as possible. AI technology, like any other technology, should be shared as widely as possible. AI technologies should not encode biases to the disadvantage of identifiable groups, especially groups that are already marginalized. Bias is a threat to inclusiveness and equity, as it can result in a departure, often arbitrary, from equal treatment. AI tools and systems should be monitored and evaluated to identify disproportionate effects on specific groups of people. No technology, AI or otherwise, should sustain or worsen existing forms of bias and discrimination.

6. Promote AI that is responsive and sustainable: Responsiveness requires that designers, developers, and users continuously, systematically and transparently assess AI applications during actual use. They should determine whether AI responds adequately, appropriately and

according to communicated, legitimate expectations and requirements. Responsiveness also requires that AI technologies be consistent with wider promotion of the sustainability of health systems, environments and workplaces. AI systems should be designed to minimize their environmental consequences and increase energy efficiency. That is, use of AI should be consistent with global efforts to reduce the impact of human beings on the earth's environment, ecosystems and climate.

Laws, Policies and Principles of Artificial Intelligence (AI) in Health Sector

Bioethics laws and policies play a role regulating AI, and several bioethics laws have been revised in recent years to include recognition of growing use of AI in science, healthcare and medicine. Regulation of AI technologies is likely to be developed and implemented by health regulatory authorities responsible for ensuring the safety, efficiency and appropriate use of technologies for health care and therapeutic development. Many regulatory authorities are preparing considerations and frameworks for the use of AI, and they should be examined, potentially with the relevant regulatory agency. Governance of AI through regulatory frameworks, the largest national regulatory agencies, such as the Food and Drug Administration (FDA) in the USA, have been developing guidance and protocols to ensure the safety and efficacy of new AI technologies.

Several legal issues will affect the patenting of AI technologies. One is whether AI-guided machines that develop new products or services can be considered inventors, which would lead to questions about defining the threshold for meeting the criteria for patenting an innovation, such as an inventive step. In January 2020, the European Patent Office ruled that machines cannot be listed as inventors under current patent laws, the US Patent and Trademark Office has issued a similar declaration. (*See Suggested Reading*)

Another legal issue is whether diagnostic methods and algorithms can be patented. While in the USA securing patent protection for diagnostic methods and mathematical models is highly restricted, the European Union (EU) has provided several grounds for the issuance of patents. While patent monopolies could encourage the development of new technologies with greater medical benefits, patenting of such methods and services could limit their diffusion, access and benefit-sharing with the populations that contributed the data used to train or validate the technology.

WHEC's Recommendations *for* Accountability and Global Governance

1. The Working Group for Ethics and Governance in AI in collaboration with the UN, WHO and ITU, should ensure clear understanding of which types of rights will apply to the use of health data and the ownership, control, sharing and use of algorithms and AI technologies for health.
2. Governments, research institutions and universities involved in the development of AI technologies should maintain an ownership interest in the outcomes so that the benefits are shared and are widely available and accessible, particularly to populations that contributed their data for AI development.

3. Governments should consider alternative “push-and-pull” incentives instead of Intellectual Property (IP) rights, such as prizes or end-to-end funding, to stimulate appropriate research and development.
4. Transparency in regulatory processes and in interoperability should be enhanced and should be fostered by governments as deemed appropriate.
5. Governments should ensure that any use of AI to facilitate access to healthcare is inclusive, such that uses of AI do not exacerbate existing health and social inequities or create new ones.
6. Governments and national health authorities should ensure that decisions about introducing an AI system for healthcare and other purposes are taken not only by civil servants and companies but with the democratic participation of a wide range of stakeholders and in response to needs identified by the public health sector and patients. They should include representatives of public interest groups and leaders of marginalized groups, who are often not considered in making such decisions.
7. Civil Society Organizations (CSOs) should participate in the design and use of AI technologies for health as early as possible, in their conceptualization.
8. Governments and international organizations agencies should engage non-governmental organizations (NGOs) and community organizations, particularly for marginalized groups, to provide diverse insights.

Global governance of use of AI for health will consist partly of adapting governance structures, including the policies and practices of global health agencies, treatment guidelines and global agreements to meet certain health objectives, such as eliminating HIV and AIDS by 2030. Furthermore, global standards should be set for all ethical concerns of AI for health, such as impacts on labor, data governance, privacy, ownership autonomous decision making.

Harnessing AI for Health and Bridging Gaps

AI is already playing a role in diagnosis and critical care, drug development, disease surveillance, outbreak response, and health-systems management. **The future of education- and health-sectors is digital.** We must do what we can to promote universal access to these innovations and prevent them from becoming another driver for inequality.

Through collaborative efforts and pooled investments, WHEC aim to create a global community of experts and resources that foster knowledge sharing and collective action, accelerating the impact of AI in healthcare. WHEC is committed to developing and promoting sustainable models for the implementation of AI programs at the country level, making AI solutions accessible and impactful across diverse healthcare systems. Within the realm of AI for Health, WHEC strategic approach centers around three pillars:

1. **Enable.** Standards, Policies, Governance, and guidance on evidence-based AI for health.
2. **Facilitate.** Pooled Investment & a global community of experts.
3. **Implement.** Sustainable models of AI programs implementation at the country level.

Prioritizing AI for healthcare is crucial, given its potential to enhance healthcare and address global health challenges, including the achievement of SDGs. The urgency is exacerbated by a

significant pacing gap, with technology outpacing legal frameworks. WHEC envisions a future where AI serves as a powerful force for innovation, equity, and ethical integration in healthcare. The overall goal is to help Member States take AI to people, to enable enhanced, sustainable, and smarter health care.



Figure 1. Emerging uses of artificial intelligence (AI) for health. Source: World Health Organization (WHO)

Bridging Gaps: Building Skills, Building Capacity

For AI-based digital health systems, to benefit people equitably around the world, multiple important gaps need to be addressed – these include robust governance, ethical considerations, and strong public trust. Systems must be developed with regulatory guardrails that secure people from harm, and avoid deepening social, economic, and ethnic disparities within and between countries. WHEC welcomes UN Partners to join the Global AI initiative to address actors’ fragmentation and work towards a better coordinated governance of AI for health.

Least Developed Countries (LDCs) are the world’s greatest untapped resource, whose needs must be addressed to achieve the SDGs. One out of every three of 2.7 billion people who remain unconnected to the Internet live in the 46 LDCs. Halfway through the Decade of Action on the UN SDGs, these countries face daunting challenges. Together, let us make 2024, a year of progress for digital transformation in the LDCs.

Promises and Pitfalls of Artificial Intelligence in Health Sector

***ChatGPT* for the clinician in healthcare field**

ChatGPT is a cutting-edge AI that was released for public health use in November 2022. Its rapid adoption has raised questions about capabilities, limitations, and risks. *ChatGPT* was the

first among many AI chatbots released for public use in the last two years. From Google's Bard to Microsoft's Bing, technology companies are caught in a rapid arms race in the AI industry. The question is not whether AI will reshape technology as we know it, but the extent of that transformation.

Medical Queries

Chat GPT is a linguistic model rather than a search engine, so questions posed in natural language yield more helpful results. Including the clinical context and how you want the information displayed adds depth to the model's responses. Treat the query as a conversation, and the quality of the answer will improve.

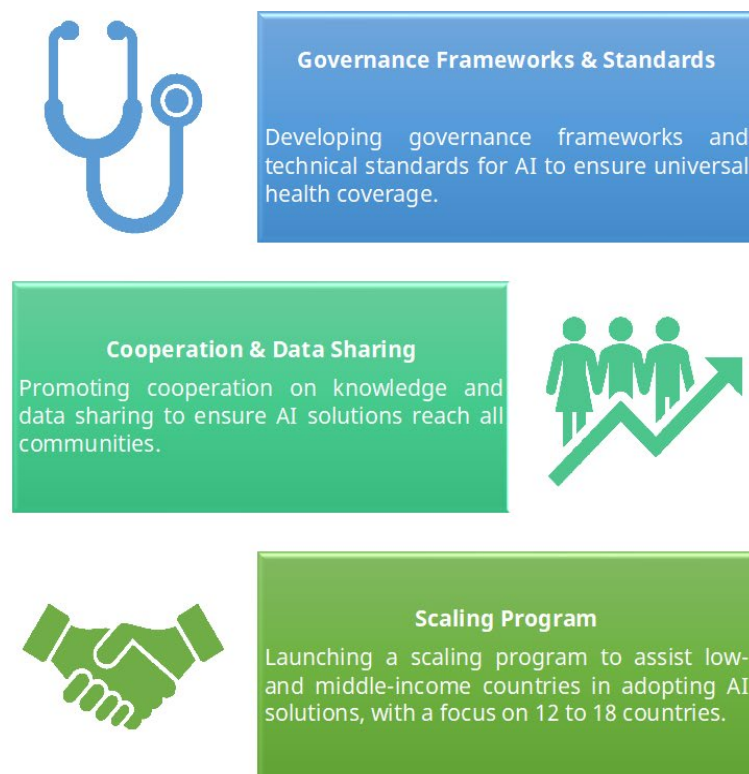


Figure 2.. Bridging Gaps. To harness a culture of innovation and ethics in healthcare, Women's Health and Education Center (WHEC) has partnered with UN and UN System, to establish the Global Initiative on Artificial Intelligence for Health, a collaboration effort that is shaping the future of healthcare through AI
Source: World Health Organization (WHO).

Although *ChatGPT* can provide general medical information, it is limited by static knowledge base and lack of specificity. It will not include any research or clinical updates published after September 2021, and it cannot refer to specific guidelines. Therefore, professional societies' guidelines remain essential cross-references to ensure accuracy and appropriate use.

Lastly, *ChatGPT* cannot incorporate context and nuance, which are critical for safe and effective patient care. Answers to clinical queries provided by *ChatGPT* should be considered preliminary or supplementary and always be cross-referenced or discussed with an expert.

Medical Documentation and Administrative Tasks

ChatGPT can improve medical documentation and reduce administrative burden. It has been used to generate accurate patient clinic letters, radiology reports, medical notes, and discharge summaries. After entering a brief description or document type, along with information such as symptoms, laboratory results, and ongoing treatments. *ChatGPT* can correctly group the information into appropriately formatted sections and generate the document, even when data are in abbreviated form. The technology has potential utility to automate administrative tasks as well. *ChatGPT* can be used for patient communication and education, appointment scheduling, prescription refills, and patient registration. Patients can receive automated, accurate information related to symptoms or medication questions through their patient portals. *ChatGPT* can be trained and integrated into scheduling systems, help physicians respond to insurance claims, and generate reports to drive quality-improvement measures. However, *ChatGPT* cannot handle sensitive patient information to manage confidential data.

Clinical Decision Support

ChatGPT can support physicians' clinical decisions and reduce errors in reasoning. It has proven high diagnostic accuracy for clinical cases with common internal medicine and chief symptoms, radiologic decision making, and generation of differential diagnoses. It can be useful for tests, final diagnoses, and management using clinical vignettes with a variety of age, gender identity, and emergency severity indices. Future potential uses of AI for clinical practice include real-time monitoring of vital signs and laboratory values to identify patterns and trends. This pattern recognition could allow early intervention, personalized treatment recommendations, and triage of patient through telemedicine.

However, only a clinician can provide personalized insight into decision-making because the model relies on provided prompts and prior training data. The empathy is very important in obstetrics and gynecology, which is a field uniquely involved in personal, often sensitive, issues in patient's lives. This lack of sensitivity and human interaction may also have implications ethically.

Potential for bias and liability are among the ethical concerns of using AI in medicine. According to the American Medical Association, obstetricians and gynecologists face a significantly higher risk of lawsuits compared with healthcare professionals in other specialties. Until there are established, evidenced-based standards using AI chatbots in healthcare, a cautious approach is advisable. Prompts for clinical decision support should be individualized and tailored to the patient's needs, values, risks and current practices if the prompt is specific enough. As the technology improves, there might be a risk of healthcare professionals becoming over-reliant on AI, potentially undermining critical thinking.

Artificial Intelligence is just a technology and not a substitute for clinical judgment.

Medical Literature Review and Research Writing

Despite its capabilities in research, *ChatGPT* cannot perform an authentic literature review with original references because it does not have access to current primary bibliography. Other concerns include risk of bias based on training data sets, plagiarism, a lack of transparency

regarding content generation, and citation inaccuracies. Considering these concerns, a researcher's expertise and ethical standards are still necessary.

AI can be an effective tool for designing and authoring research manuscripts. This can improve the ability to express and communicate research ideas and results, ultimately speeding up the publication process. Currently, the experience shows AI cannot fully grasp ethical considerations in scientific research (i.e., human subjects or data privacy), and without proper human oversight, there may be an inadvertent duplication of existing content without proper citation.

Medical Educator Teaching Aids, Assessment and Evaluation

AI can assist educators in creating lesson plans and activities. By incorporating the material of the subject into the prompt, it can generate specific learning objectives and tailor teaching activities. It can generate summaries of complex medical topics and design interactive activities such as simulated clinical cases for learners with varying levels of knowledge. AI can also generate flashcards, multiple-choice questions, and open-ended queries. It can reduce the burden of manual quiz design for teachers to train and test knowledge. *ChatGPT* has a promising role in medical education as an adjunct to human educators. Its ability to provide instant information, facilitate interactive learning, and support creation of educational content and assessment makes it a valuable tool.

Limitations: AI cannot understand specific learning needs or adapt to unique educational contexts without specific prompts. **It cannot replace the human element in education.** AI should not be used without clear guidelines or understanding of its limitations in educational settings. Critical thinking can be exercised only through human interaction, and a medical teaching activity should not depend solely on AI.

Impact of Artificial Intelligence (AI) on Education Sector

The advent of AI has enabled numerous innovations in different fields, and education sector is no exception. Educational chatbots, especially AI-powered chatbots such as *ChatGPT*, revolutionizing the way we learn and interact with information. Since its introduction to the public, *ChatGPT* has become a world-wide phenomenon and has generated both awe and fear with its sheer computing power.

ChatGPT is a natural language processing (NLP) system based on artificial neural networks. It was developed by Open-AI, an artificial intelligence research organization, and is based on the GPT (Generative Pre-trained Transformer) language model. This model is trained on large amounts of text data, which allows it to understand and generate natural language. It can be used in educational contexts in a variety of ways, and can be incorporated within pedagogical learning designs:

- **Research assistance** can analyze student's search queries and provide relevant results.
- **Content generation** can generate personalized content for each student, which can help students better understand concepts.

- **Text correction** can identify grammatical and spelling errors in a text and provide suggestions for correcting them.
- **Educational chatbots** can be used to provide information on a specific topic, answer questions or even provide advice and guidance on more general issues, such as how to study better.

Benefits and Shortcomings

Benefits

- **Accessibility:** AI can allow students to access information anytime, anywhere. Educational chatbots can be used at home, at school, or even outside the school context to provide continuing education on the go.
- **Personalized learning:** AI can generate personalized content for each student based on their needs and performance, which can help students grasp concepts at their own rhythm.
- **Improved learning efficiency:** AI can help improve learning efficiency by allowing students to ask questions and receive immediate answers. Educational chatbots can provide additional explanation to help students understand concepts more deeply.
- **Reducing instructor stress:** by answering students' frequently-asked-questions. Instructors can thereby focus on the most important tasks such as course design, personal coaching,, and assessment, while AI can answer common questions.
- **Cost Saving:** This one is controversial and may contribute to reduce the cost of education. Educational chatbots can replace some additional tutors, which can help institutions mitigate teaching costs and make education more accessible.

Shortcomings

- **As good as the data it was trained on:** Machine learning algorithms operate based on pre-defined data and algorithms has their limitations. This means that it may not always be able to provide accurate or complete responses to complex questions or situations that require human judgment and decision-making.
- **Inaccurate or completely fabricated citations:** AI so far has shown that it is not reliable when it comes to generating adequate citations and bibliographic resources. Worse, users have raised the issue that *ChatGPT* tends to generate completely fabricated citations (which nonetheless look very real). This issue has been referred to "hallucination" and might be significantly improved in the future. still, and rather disappointingly, Open AI continues to list the "hallucination" among the limitations that have yet to be solved, even with the recently released GPT-4.
- **Motivation, creativity, cheating and plagiarism concerns:** There are widespread concerns about AI that it will rob students of their motivation, creativity and critical thinking; as well as fearing that it would create a culture of widespread cheating and plagiarism. To address this key concern of cheating and plagiarism, course pedagogical designs (including assessment means) should focus on skill development, which will be crucial as they enter the world of work, post-graduation. This includes *hard skills*, such as data analysis, coding, project management, research or graphic design; but also *soft skills*, such as communication & public speaking, teamwork, empathy, leadership and emotional agility.

- **Limited personalized learning experience:** While *ChatGPT* can provide feedback and guidance on a student’s inputs and performance, it may not always be able to adapt to a student’s unique needs or preferences in the same way a human teacher can. Additionally, some students may struggle to interact with *ChatGPT*, either because they do not feel comfortable using technology or because they prefer a more traditional learning environment.
- **May lead to further student isolation:** While *ChatGPT* can provide feedback and guidance on academic performance, it may not always be able to provide the emotional support and encouragement that students need to overcome challenges or stay motivated. Additionally, AI may not be able to provide the same level of social interaction and community-building that students can experience in a traditional classroom setting.
- **Ethical and privacy concerns:** As an AI-powered chatbot, it collects and stores data on user interactions and performance, which can raise questions about who has access to this data and how it is being used. Additionally, the use of *ChatGPT* can raise concerns around ownership and control of educational content, as well as the potential for corporate interests to shape the direction and focus of educational programs.

Ultimately, the AI revolution is here to stay and will likely continue to surprise us in ways we could not even imagine. In fact, it is now opening interesting perspectives in terms of human-AI collaboration and future jobs such as “AI whisperer” or “AI prompt engineer” that, just a few years ago, would have seemed taken out of *Sci-Fi* novel. By integrating AI tools rather than trying to ban them, educational institutions will be more able to optimize their use, mitigate their shortcomings and hopefully reap the benefits of this unprecedented disruptive technological revolution.

How to Protect the Health and Safety of Patients

For AI-based health systems, to benefit people equitably around the world, multiple important gaps need to be addressed – these include robust governance, ethical consideration, and strong public trust. Systems must be developed with regulatory guardrails that secure people from harm, and avoid deepening social, economic and ethnic disparities within and between countries. Harnessing AI has always been an integral part of the global health agenda.

Global Strategy on Digital Health 2020 – 2025, built on resolutions adopted by the United Nations General Assembly, emphasizes that “digital transformation of health care will be disruptive and technologies such as the Internet of things, AI, big-data analytics, blockchain have the potential to enhance health outcomes by improving medical diagnoses, data-based treatment decisions and self-management of care.”

Specific Considerations

- Evaluate the institutional and regulatory context and infrastructure to determine whether the technology would be cost effective as “traditional” technologies and whether its introduction and use are in accordance with human rights.
- Conduct an impact assessment before deciding whether to implement or continue use of AI in the health system.

- Calculate the risk-benefit ratio of adoption, investment and uptake of an AI technology, and make the information available to stakeholders so that they can provide input to any evaluation or decision.
- Manage the ethical challenges of the AI technology (e.g., equitable access, privacy) appropriately.

Artificial Intelligence (AI) and How it Contributes to Sustainable Development Goals (SDGs)

Currently AI has been utilized in all 17 SDGs; some examples are listed below;

SDG 01 (No Poverty): AI has been used to improve social security payment systems and detect tax evasion and fraud.

SDG 02 (Zero Hunger): AI and satellite imagery are used to monitor and track crop yields and detect drought. AI is used to apply fertilizer and optimize irrigation.

SDG 03 (Good Health): AI is used in health imagery & diagnosis to detect cancers. Computer vision can be used to monitor hygiene and handwashing in hospitals.

SDG 04 (Quality Education): AI can be used to personalize education, via chatbots and automated testing. Monitoring facial expressions can identify pupils who are struggling.

SDG 05 (Gender Equality): Machine learning (ML) models and facial recognition have yielded biased results and reduced accuracy for women in some applications, but algorithms can be debiased.

SDG 06 (Clean Water and Sanitation): ML models can forecast water supply and help irrigation systems function more efficiently.

SDG 07 (Affordable and Clean Energy): AI and ML can help plan network transmission and distribute power more efficiently, especially renewable energy.

SDG 08 (Decent Work and Economic Growth): AI is a massive and growing economic sector, although its labor replacement effects are unclear.

SDG 09 (Industry, Innovation and Infrastructure): AI can enhance infrastructure and infrastructure efficiency.

SDG 10 (Reduced Inequality): AI has been used to improve social security payment systems.

SDG 11 (Sustainable Cities and Communities): AI can help urban planning, transport, power consumption and energy efficiency.

SDG 12 (Responsible Consumption and Production): AI and satellite images track pollution and carbon-di-oxide CO₂ emissions and levels.

SDG 13 (Climate Action): AI and ML models have been used to improve our understanding of the climate and to predict likely future scenarios for climate change.

SDG 14 (Life Below Water): ML models have been used to estimate marine animal populations and track migrations.

SDG 15 (Life on Land): AI models can help track migrations, estimate population distributions and model genetic biodiversity.

SDG 16 (Peace, Justice and Strong Institutions): Open-source info has been used to track disinformation, assassins, tax-evasion and sanctions.

SDG 17 (Partnerships for the Goals): AI can model promising partnerships and suggest contacts and projects.

Framework for Action

The framework for action is guided by four major components:

1. **Commit.** Encourage countries and stakeholders to commit themselves to the implementation of digital health. Women's Health and Education Center (WHEC) maintains UN Member States voluntary commitment and contributions, respecting national priorities, capacities and resources.
2. **Catalyze.** Generate and sustain a conducive environment to create, scale up and maintain processes that will facilitate collaboration towards implementing universal health care. WHEC will promote collaboration among stakeholders to ensure progress by building synergies, facilitating technical collaboration, and developing digital global public goods that can be shared and used globally.
3. **Measure.** Create and adopt processes and metrics for monitoring and evaluating the effectiveness of our strategy. This component calls for the continuous assessment of whether digital health has been true to its purpose and effective in supporting countries. WHEC will measure the effectiveness of the framework from data collected globally and will report findings in our publications.
4. **Enhance and iterate.** Undertake a new cycle of actions based on what has been experienced, measured and learned. This component will respond to feedback on the progress of universal health care in adapting to emerging digital health technologies. WHEC and its partners will propose, exercise and continuously refine the implementation of AI as well as its iterative assessment and decision-making processes.

Future of Artificial Intelligence (AI)

While AI may not replace clinical decision-making, it could improve decisions made by clinicians. In settings with limited resources, AI could be used to conduct screening and evaluation if insufficient medical expertise is available, a common challenge in many resource-poor settings. Yet, whether AI can advance beyond narrow tasks depends on numerous factors

beyond the state of AI science and on the trust of providers, patients and healthcare professionals in AI-based technologies. Technological, legal, security and ethical challenges and concerns are discussed not to dissuade potential use of AI for health but to ensure that AI fulfills its great potential and promise.

Better technology means less hassle for patients, students, administrators, academic institutions and health workers.

Summary

The rapid diffusion of growing numbers of applications of AI large language models has generated excitement and public discourse around their potential to improve human health. However, this enthusiasm has been accompanied by concerns such as content-generative systems may be biased, produce misleading or inaccurate information, and could relinquish data privacy and ownership controls to technology firms looking to commercialize large language models and commodify data. Some have questioned whether commercial pressures have led to public releases of these technologies without adequate ascertainment of their safety and performance.

AI tools are increasingly being applied to public health priorities, and have the potential to assist with pattern recognition and classification problems in medicine – for example, early detection of disease, diagnosis and medical decision-making. The increase in sophistication of AI systems is not marked in days and weeks, as opposed to months and years. This speed outpaces the regulatory and review capacity of most agencies charged with protecting public health and providing oversight of technologies applied to health and well-being. For AI to have a beneficial impact on global health, especially in low- and middle-income countries, ethical considerations, regulations, standards and governance mechanisms must be placed at the center of the design, development and deployment of AI-based systems. The proliferation of AI for health must take place with oversight by governments and their appropriate regulatory agencies. Improved transparency and fail-safes are needed to ensure safety, consistency and quality in AI systems for health, while promoting trust.

Editor's note

To this end, Women's Health and Education Center (WHEC), has published Scientific Policy Brief and sponsored a Side Event at the UN Headquarters during the 9th Session of Science, Technology and Innovation Forum 2024 and has convened an expert group to develop additional guidance. WHEC encourages policymakers to prioritize the implementation of standards and evaluative frameworks that promote the responsible development and application of such technologies, working closely with technical experts, civil society and the private sector to identify risks, and develop mitigation strategies that preserve public health and foster trust. We should also acknowledge the sensationalism of the news cycle and social media exaggerations and examine emerging capabilities and risks dispassionately and empirically.

Companies developing health-related AI should be encouraged to act as responsible stewards of public health by prioritizing the wellbeing and safety of individuals above commercial interests, implanting recommended guidance and best practices even in poorly regulated environments. In

2024, WHEC and its partners have established a Focus Group on AI for health. This collaboration convened more than 200 stakeholders to develop a benchmarking framework to guide the design, development, regulation and deployment of these tools that bring health benefits to everyone, everywhere.

[Women's Health and Education Center \(WHEC\) - WHEC - Side Events during the Science, Technology and Innovation \(STI\) Forums \(womenshealthsection.com\)](https://www.womenshealthsection.com/)

Artificial Intelligence and Ethical Considerations in Neurotechnology

[Luthra Artificial Intelligence and Ethical Considerations in Neurotechnology.pdf \(un.org\)](https://www.un.org/development/desa/pubs/2023/04/artificial-intelligence-and-ethical-considerations-in-neurotechnology.pdf)

Sustainability requires governments and companies to address anticipated disruptions in the workplace, including training for healthcare workers to adapt to the use of AI systems, and potential job losses due to the use of automated systems. A multiagency global initiative on AI for health is warranted to improve coordination, leverage collective and individual agency capacity, and ensure that the evolution of AI steers away from a dystopian future towards one that is safe, secure, trustworthy and equitable.

Suggested Reading

1. US Patent and Trademark Office
Artificial Intelligence cannot be a legal inventor
<https://www.theverge.com/2020/4/29/21241251/artificial-intelligence-inventor-united-states-patent-trademark-office-intellectual-property>
2. European Patent Office (EPO)
Artificial Intelligence and Patentability: Statement from the EPO
<https://www.epo.org/en/about-us/social-responsibility/art/50-years-epc-exhibition/catalyst-lab-curated-ars-electronica/epo-statement>
3. World Health Organization (WHO)
Ethics and governance of artificial intelligence in health
<https://www.who.int/publications/i/item/9789240029200>
4. The UN Agency for Digital Technologies (ITU)
United Nations Activities on Artificial Intelligence (AI)
<https://www.itu.int/hub/publication/s-gen-unact-2023/>