



Lisbon School
of Economics
& Management

Ethics Seminars

Ethics in Science & Scientific Research

Professor: Helena Gata

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**OPEN
MINDS.
GRAB
THE FUTURE.**

Programme

Ethics in Science & Scientific Research

- 1| Concepts: ethics and morality
- 2| Ethics after II World War
- 3| Ethics in the research process
- 4| Unethical studies that led to profound reflection
- 5| The Nuremberg Code and Belmont Report
- 6| Reasons and consequences of science without ethics
- 7| Ethics in the research process using Artificial Intelligence

Concepts

What's the difference between Ethics and Morality?

Morality is based on what members of a **given culture consider right or wrong**. It consists of rules present in each society that its members must comply with, if they want to be accepted by the community, **even if they violate ethical principles assumed** by people as individuals.

Morality is what a person must do in order to comply with the norms of behavior present in society.

Ethical theories (Ethics) reflects on the **incorrectness of actions, questions if values are appropriate, whether there are conflicts and inconsistencies in current practices and beliefs**.

Ethics seeks to place moral beliefs and social practices under the cover of a unified and coherent set of guidelines and concepts.

Ethical theory consists of the philosophical reasons that support or contest the morality stipulated by society.

Ethical theories **seek the justifications for a system of beliefs and actions**, rigorously analyzing and arguing concepts and principles such as respect for autonomy, human rights, distributive justice, truth, equality of opportunity

Source: Rego, A., Cunha, M.P. et al. (2007) Gestão ética e Socialmente Responsável: Teoria e Prática. Lisboa: Editora RH, 65-127.

Example

India – Widows' Home Poverty and isolation



The widows of Vrindavan - they are often cast out by their families who don't want to pay for them

Source: BBC - <https://www.bbc.com/news/magazine-26356373>

Why did ethics become so important after II World War?

War crimes and Genocide/holocaust

Nuremberg Trial (24 political, military and economical leaders from Nazi Germany.

Toquio Trial (25 leaders from the Empire of Japan was convicted of crimes against peace, and thousands were convicted of war crimes and crimes against humanity.)

Those trials were an important milestone and are related to the creation of:

Universal Declaration of Human Rights 1948

International Courts (International Criminal Court – crimes against humanity)

Reconstruction and Democracy – reconstruction of Europe and Japan based on democratic and ethical principles (≠ totalitarian regimes)

Why did ethics become so important after II World War?

Hannah Arendt's contribution - concept “banality of evil”

For Hannah Arendt, ethics is related to judgement and individual responsibility, that is, the human capacity to differentiate between right and wrong based on reflection. It depends on our ability to think, question norms and situations, and avoid passivity and conformism, which often lead us to inhumane acts.

Hannah Arendt wrote a book about Adolf Eichmann trial's in 1960 (*Eichmann in Jerusalém*)

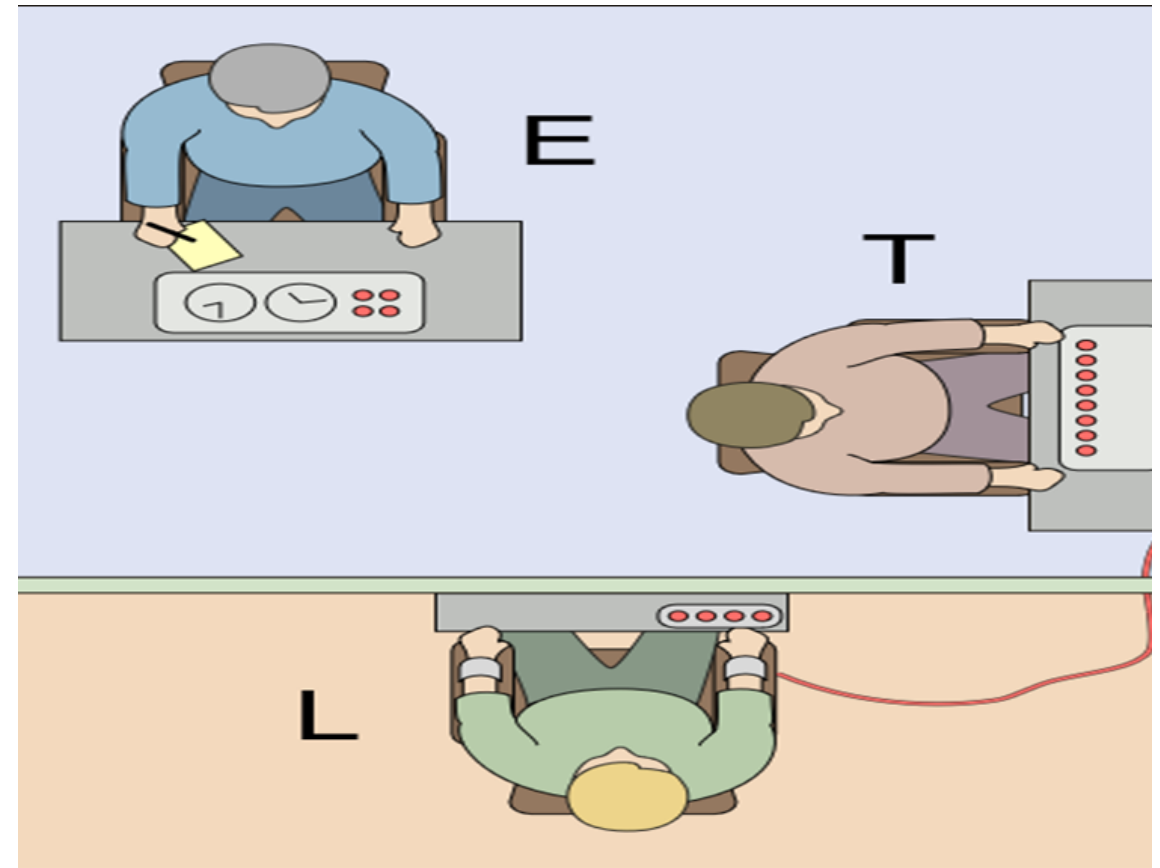
For Hannah Arendt, ethics is not a system of rules, but a practice of critical reflection and personal responsibility where individuals must be attentive to reality, the impact of their actions, and the need to judge for themselves, regardless of external pressures.

Source: Arendt, Hannah (2006) The Origins of Totalitarianism, Dom Quixote.

" Were Eichmann and his thousands of accomplices in the Holocaust merely following orders?"

Milgram's Experiment (1963)

The experimenter (E) orders the teacher (T), the subject of the experiment, to give what the latter believes are painful electric shocks to a learner (L), who is actually an actor and confederate. The subject is led to believe that for each wrong answer, the learner was receiving actual electric shocks, though in reality there were no such punishments. Being separated from the subject, the confederate set up a tape recorder integrated with the electro-shock generator, which played pre-recorded sounds for each shock level.



Ethics in academic context and the scientific research process

Has science always acted ethically?

Who decides what is ethical and unethical in science and academy?

Why is it important for science and academy to base their actions on ethical principles?

Ethics in academic context and the scientific research process

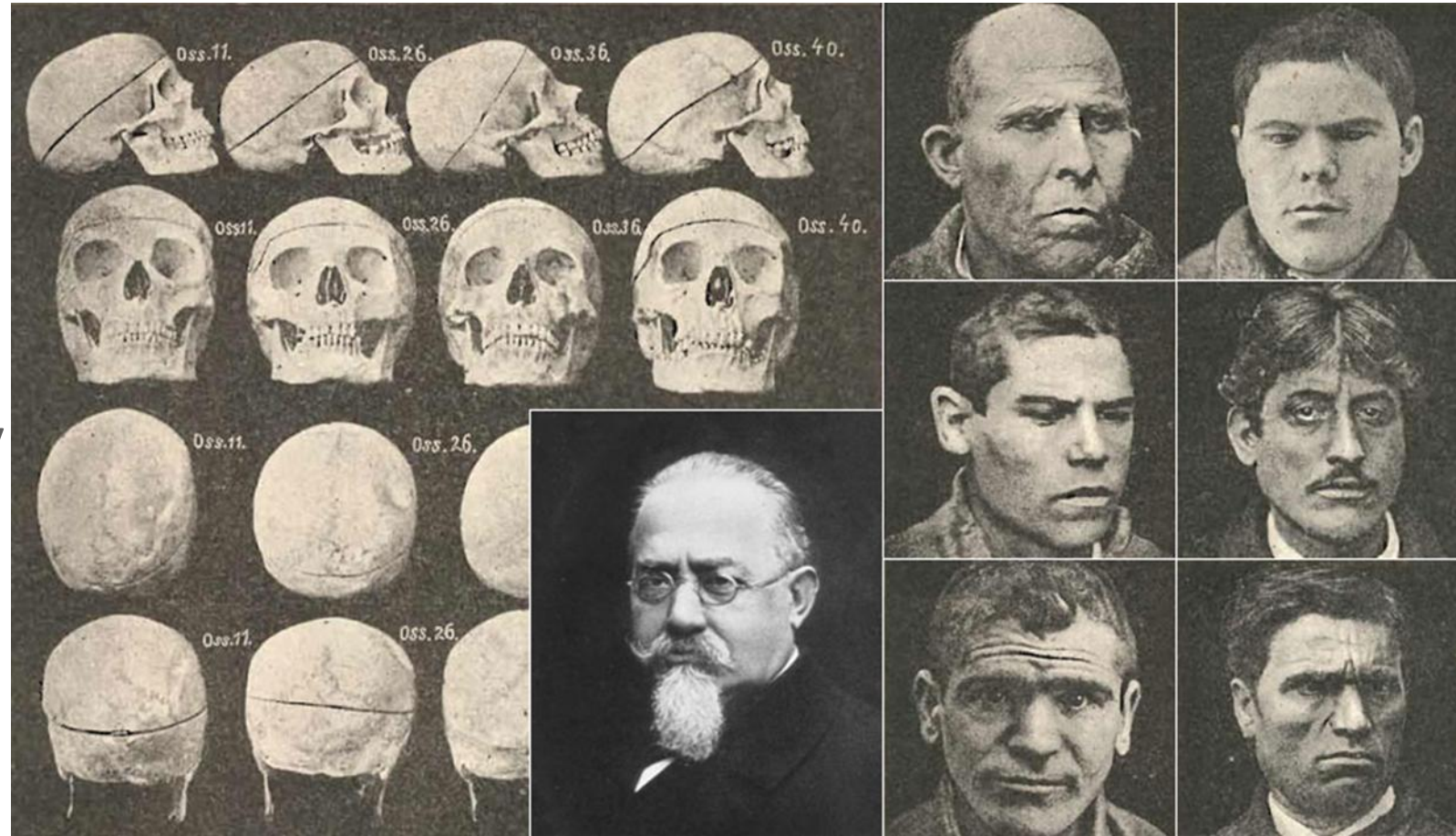


Some studies that led to profound reflections due to a lack of ethics...

1835-1909

Cesare Lombroso Studies

Lombroso believed that criminality had biological and hereditary roots.



source: <https://www.tes.com/teaching-resource/lombroso-born-criminal-theory-investigation-gcse-l2-criminology-science-citizenship-11675879>

Some studies that led to profound reflections due to a lack of ethics...

1912

The Piltdown Man Hoax

This supposed 'discovery' went unchallenged for 41 years.



The Piltdown skull combines parts of a modern human skull, the lower jaw and teeth of an orang-utan, and a poorly-painted canine tooth, also 'found' at Piltdown. The teeth were carefully filed down to simulate human wear. Tell-tale parts of the jaw, which meet the skull, were broken off. The Piltdown skull bones are human but are geologically younger than other, genuine, fossil bones from the same site. They were stained to look old.

Image: Stuart Humphreys© Australian Museum

Source: <https://australian.museum/learn/science/human-evolution/piltdown-man-skull/#gallery-thumbnail>

Some studies that led to profound reflections due to a lack of ethics...

1943-1945 Mengele's Experiences

Inhumane and pseudoscientific medical experiments carried out during the Nazi regime, mainly in the Auschwitz concentration camp

Mengele was obsessed with twins and believed that by studying them he could discover the secrets of heredity and potentially increase the birth rate of “pure” Aryans, as advocated by Nazi ideology.



Josef Mengele

Source: <https://urologichistory.museum/the-scope-of-urology-newsletter/issue-1-spring-2020/mengeles-experiments>

Some studies that led to profound reflections due to a lack of ethics...

1939 Monster Study

22 orphaned children involved in the University of Iowa study

Two groups:

- 1) **Positive speech therapy** that included praise, self-esteem reinforcement, and encouragement
- 2) **Negative speech therapy** that included belittling, constant criticism, and scolding



Reddit

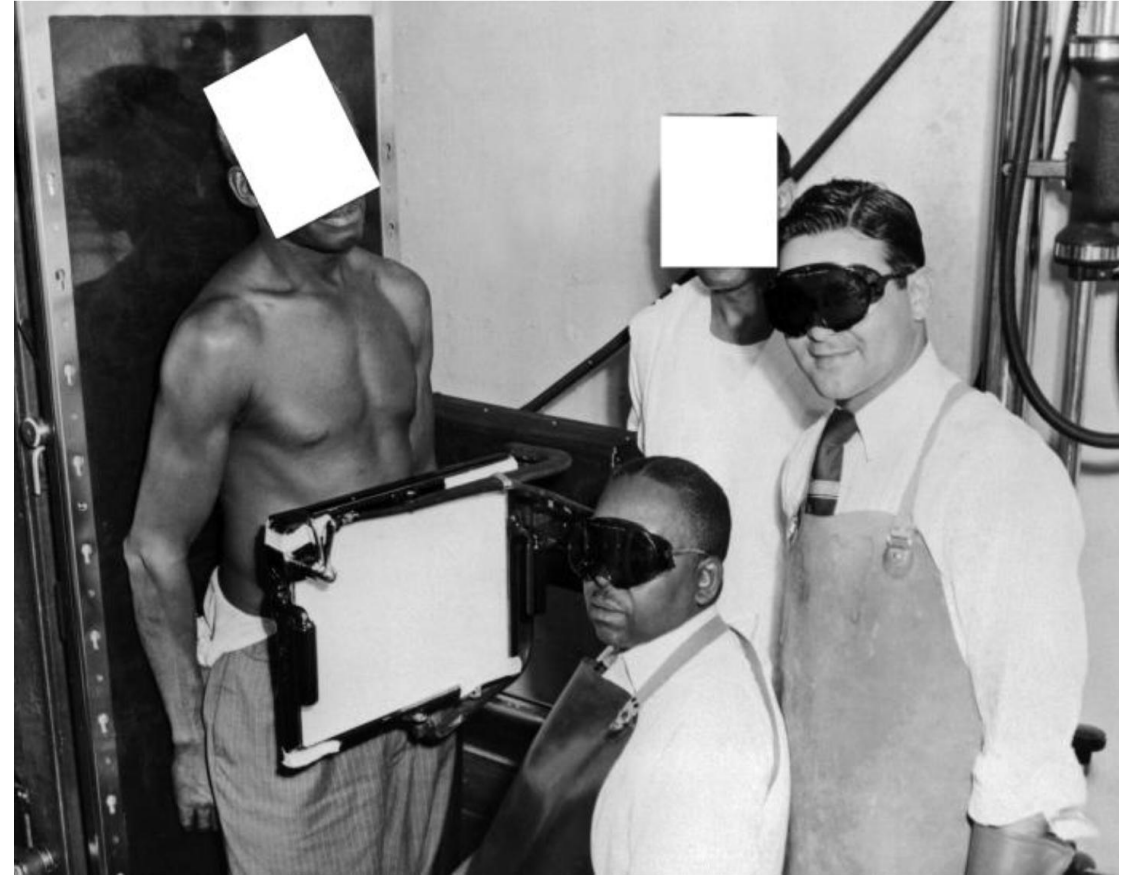
A group of orphans who participated in the Monster Study, wherein they were either praised or scolded for their speech.

Source: <https://uh.edu/ethicsinscience/Media/Monster%20Study.pdf>
<https://allthatsinteresting.com/psychology-experiments/3>

Some studies that led to profound reflections due to a lack of ethics...

1932-1972 Tuskegee Study

Black men with untreated syphilis,
when in the 1940s the
effectiveness of penicillin as a cure
for the disease was validated.



Sources: <https://phil.cdc.gov/Details.aspx?pid=7852>
Google images

And in Economic research...

Reinhart e Rogoff 2010
"Growth in a Time of Debt"

The article argued that when a country's public debt-to-GDP ratio exceeds 90%, its economic growth slows significantly.



Austerity
policies

Technical Mistakes

- Codification
- Selective exclusion of data
- Inappropriate weighting method
- Causality issues

Ethical Issues

- Lack of transparency (data not published)
- Lack of peer review
- Absence of warnings about policy implications (austerity)

Source: [Growth in a Time of Debt](#)

Nuremberg Code and Belmont Report

The Nuremberg Code (1947)

Permissible Medical Experiments

The great weight of the evidence before us to effect that certain types of medical experiments on human beings, when kept within reasonably well-defined bounds, conform to the ethics of the medical profession generally. The protagonists of the practice of human experimentation justify their views on the basis that such experiments yield results for the good of society that are unprocurable by other methods or means of study. All agree, however, that certain basic principles must be observed in order to satisfy moral, ethical and legal concepts:

1. The voluntary consent of the human subject is absolutely essential. This means that the person involved should have legal capacity to give consent; should be so situated as to be able to exercise free power of choice, without the intervention of any element of force, fraud, deceit, duress, overreaching, or other ulterior form of constraint or coercion; and should have sufficient knowledge and comprehension of the elements of the subject matter involved as to enable him to make an understanding and enlightened decision. This latter element requires that before the acceptance of an affirmative decision by the experimental subject there should be made known to him the nature, duration, and purpose of the experiment; the method and means by which it is to be conducted; all inconveniences and hazards reasonably to be expected; and the effects upon his health or person which may possibly come from his participation in the experiment.

The duty and responsibility for ascertaining the quality of the consent rests upon each individual who initiates, directs, or engages in the experiment. It is

Informed Consent
voluntary participation

THE BELMONT REPORT

Office of the Secretary

Ethical Principles and Guidelines for the Protection of Human Subjects of Research

The National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research

April 18, 1979

AGENCY: Department of Health, Education, and Welfare.

ACTION: Notice of Report for Public Comment.

SUMMARY: On July 12, 1974, the National Research Act (Pub. L. 93-348) was signed into law, thereby creating the National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research. One of the charges to the Commission was to identify the basic ethical principles that should underlie the conduct of biomedical and behavioral research involving human subjects and to develop guidelines which should be followed to assure that such research is conducted in accordance with those principles. In carrying out the above, the Commission was directed to consider: (i) the boundaries between biomedical and behavioral research and the accepted and routine practice of medicine, (ii) the role of assessment of risk-benefit criteria in the determination of the appropriateness of research involving human subjects, (iii) appropriate guidelines for the selection of human subjects for participation in such research and (iv) the nature and definition of informed consent in various research settings.

The Belmont Report attempts to summarize the basic ethical principles identified by the Commission in the course of its deliberations. It is the outgrowth of an intensive four-day period of discussions that were held in February 1976 at the Smithsonian Institution's Belmont Conference Center supplemented by the monthly deliberations of the Commission that were held over a period of nearly four years. It is a statement of basic ethical principles and guidelines that should assist in resolving the ethical problems that surround the conduct of research with human subjects. By publishing the Report in the Federal Register, and providing reprints upon request, the Secretary intends that it may be made readily available to scientists, members of Institutional Review Boards, and Federal employees. The two-volume Appendix, containing the lengthy reports of experts and specialists who assisted the Commission in fulfilling this part of its charge, is available as DHEW Publication No. (OS) 78-0013 and No. (OS) 78-0014, for sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

Sources:

<https://encyclopedia.ushmm.org/content/en/article/the-nuremberg-code>

https://media.tghn.org/medialibrary/2011/04/BMJ_No_7070_Volume_313_The_Nuremberg_Code.pdf

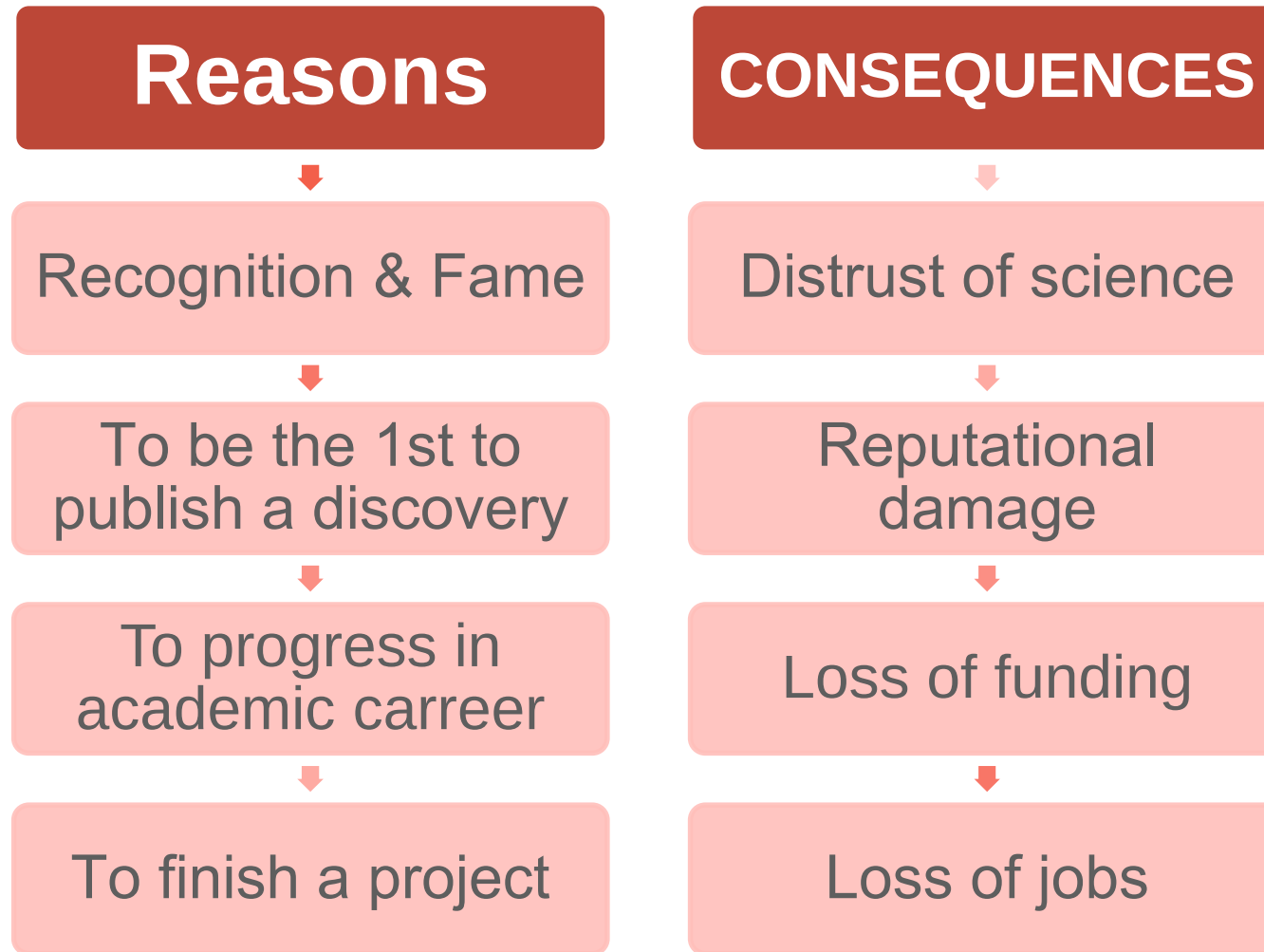
https://www.hhs.gov/ohrp/sites/default/files/the-belmont-report-508c_FINAL.pdf

Belmont Report

- 1 Respect for persons** 
 - Autonomy and informed consent
 - People with reduced autonomy are entitled to protection
- 2 Beneficence** 
 - Do no harm
 - Maximizing benefits for the research project minimizing risks to the research subjects
- 3 Justice** 
 - Ensuring reasonable, non-exploitative, and well-considered procedures are administered fairly — the fair distribution of costs and benefits to potential research participants — and equally.

Sources: https://www.hhs.gov/ohrp/sites/default/files/the-belmont-report-508c_FINAL.pdf
Wikipédia

Even so, this does not guarantee that there will be no fraud...



Plagiarism
Copying
Data fabrication
Facts V Values
Independence
Disclaimers
Exclusion and Inclusion
Definition of Rights
Trends and fads
Use of stolen data
Patents and Copyrights

Ethics & Artificial Intelligence | What is AI?

“Building machines that perform tasks normally requiring human intelligence.” Nils Nilsson, 1971

“The study of the common-sense world and how a system can find out how to achieve its goals.” J. McCarthy, 1988

“AI is an anarchy of methods.” Joel Lehmann, Jeff Clune, Sebastian Risi (2014)

The anarchic method combines and involves the three main methods:

- 1) **Logic** – programming, logical deductions, but the problem with logic is that we can program, but if the computer has to learn something new or prove something it has not considered before, it has great difficulty;
- 2) **Statistics** – data, model creation; and data has come to dominate this area of AI over a period of time;
- 3) **Biology** - later, scientists turned to the brain. They decided to develop systems similar to the functioning of the brain. For a long time, this approach did not yield results, but recently it has come to dominate the field of AI.

Ethics & Artificial Intelligence | What is AI?

Why is it important for someone who is not a computer scientist to understand the principles of machine learning?

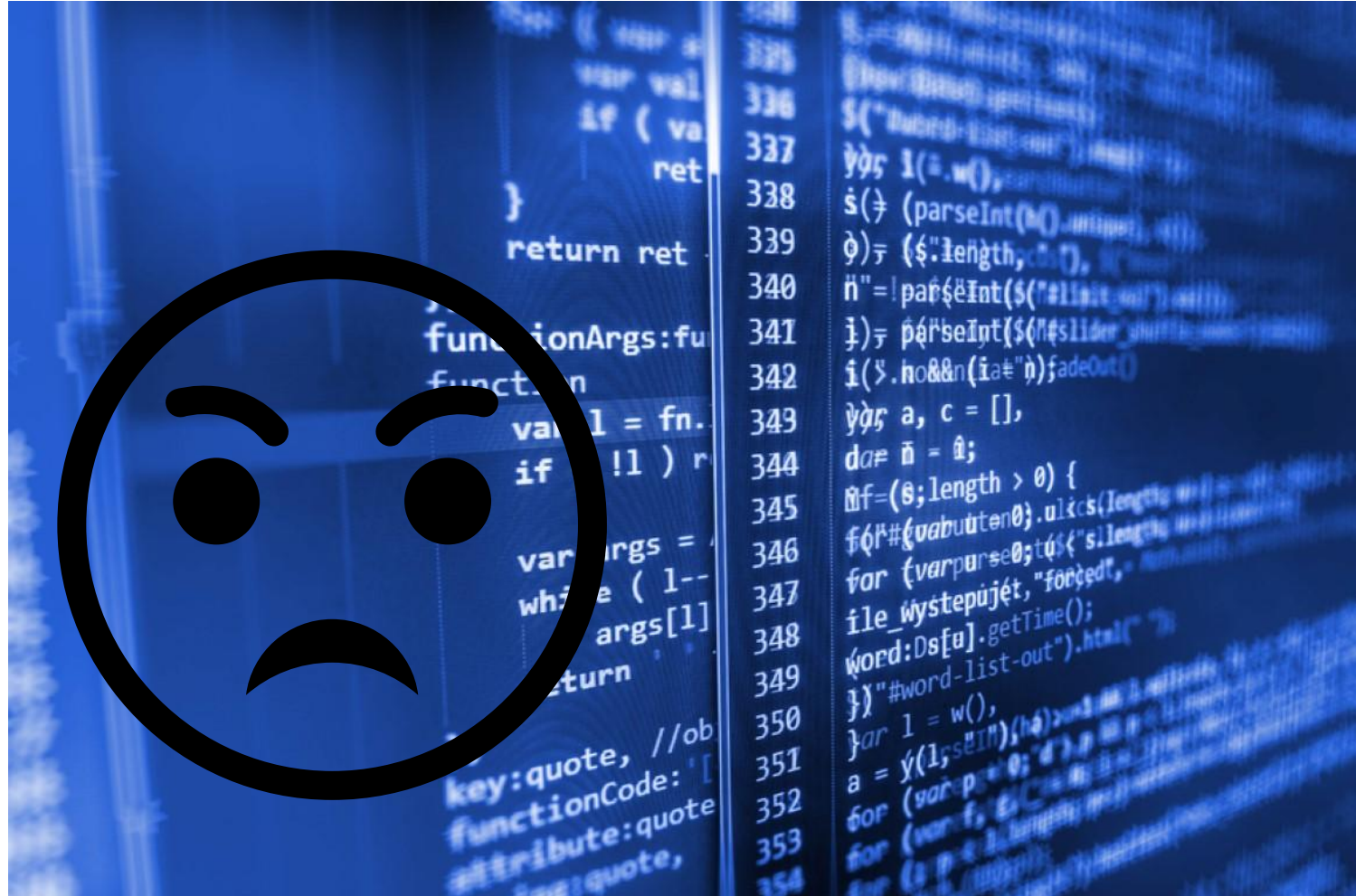
“Without concepts there can be no thought, and without analogies there can be no concepts.”

D. Hofstadter & E. Sander, Surfaces and Essences (2013)

Ethics & Artificial Intelligence

Algorithms tend to be described as logical and free from personal motivations and biases

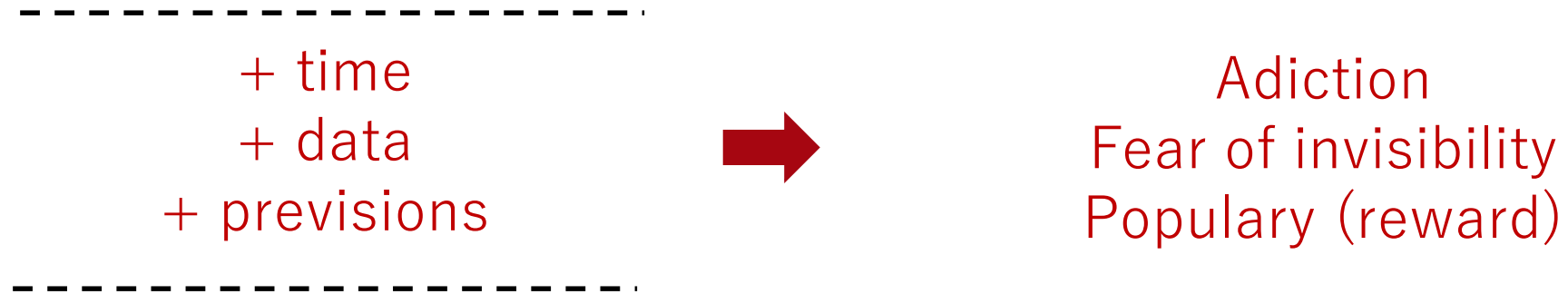
Examples:
Recruitment
Crime Prevention
Gender Bias



Source: Google Image

Ethics & Artificial Intelligence – Privacy Paradoxe

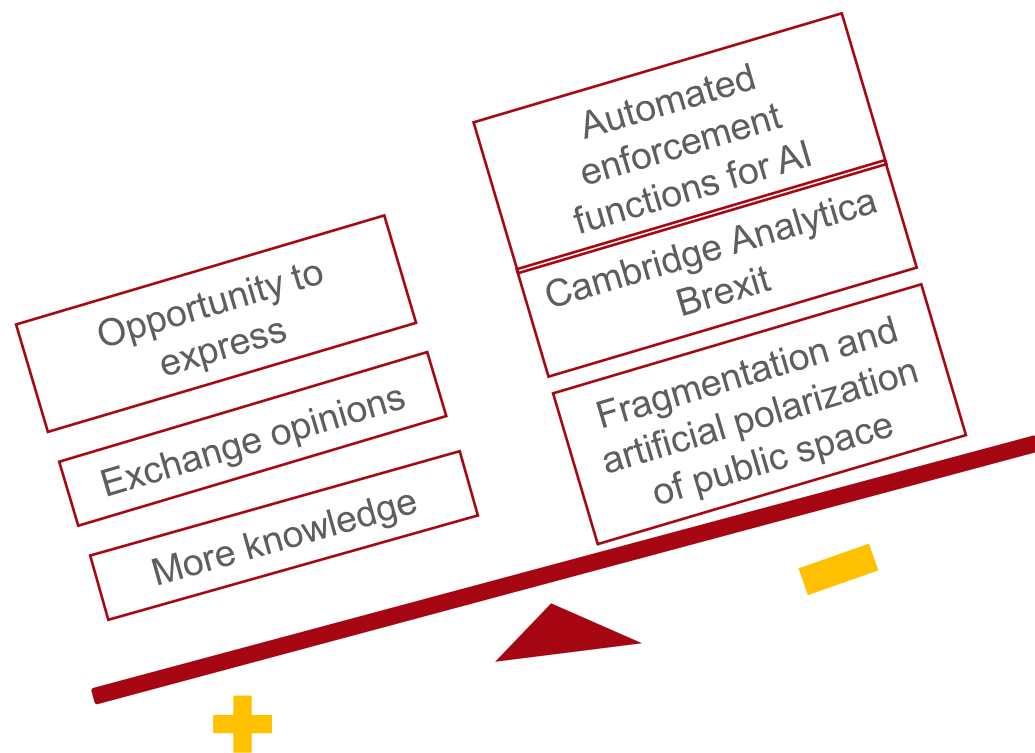
Social media platforms are designed to keep people online for as long as possible, and their business model is based on surveillance and the sale of personal data.



“Ultimately, saying that we don't care about privacy because we have nothing to hide is no different from saying we don't care about freedom of speech because we have nothing to say.”

E. Snowden

AI & Social Network | Democracy vs Autocracies



This phenomenon occurs when users are grouped into distant clusters called filter bubbles. People receive feeds associated with the cluster they have been placed in and receive more and more information that stimulates this polarization and fragmentation of societies.

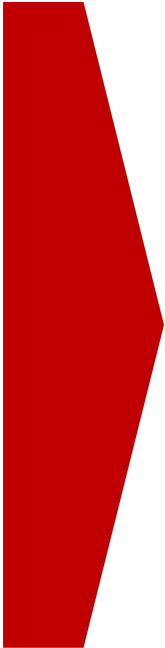
Ethics in scientific research using Artificial Intelligence

Integrity

Intellectual Honesty

Originality

Ethics

- 
- Ensure that the results obtained with AI comply with scientific principles and are not manipulated.
 - Use Generative AI as a supplementary aid, a tool for support and inspiration, but ensure personal contribution and innovation in research.
 - Take responsibility and commit to doing your work properly.
 - Recognize limitations, cite sources and avoid presenting AI results as your own work without validation.
 - Avoid misuse, respect confidentiality standards and ensure the social responsibility of research.

Using AI tools in the scientific research process

ChatGPT - <https://chat.openai.com/>

Microsoft Bing Chat (no Edge) - <https://www.bing.com/>

Google Gemini - <https://gemini.google.com/>

Chatsonic - <https://app.writesonic.com/>

Elicit - <https://elicit.org/>

SciCite - <https://scite.ai/>

SciStyle - <https://www.scistyle.com/>

Consensus- <https://consensus.app/>

Research Rabbit - <https://www.researchrabbit.ai/>

Chat PDF - <https://www.chatpdf.com/>

Claude - <https://claude.online/chat>

Perplexity - <https://www.perplexity.ai>



Generative Artificial Intelligence
Creates new content (text, images, music, videos, and code), but requires a huge amount of data.



Privacy
Security
Bias
Mistakes
False information/Fack News

Areas of AI use in the scientific research process:

- **Research and mapping:** [Litmaps](#), [Scispace](#), Elicit, Consensus, Connected Papers, OpenAlex, [Scopus AI](#), Google Gemini, [Dimensions AI](#), [Web of Science](#)
- **Reading and summarising documents:** NotebookLM, [Scispace](#), ChatPDF
- **Drafting:** [JenniAI](#), [Yomu](#), ChatGPT, [Claude](#), Copilot
- **Questioning/feedback:** [Thesify](#), [Paperpal](#), [writeful](#)



Privacy | Security | Bias | Mistakes | False Informations/ Fack News

Using AI tools in the scientific research process

Privacy

- Collection and use of personal data without consent
- Risk of surveillance and loss of control over information

Security

- Vulnerabilities exploitable by cyberattacks
- Possible malicious use of AI

Bias

- Algorithms can reproduce or amplify social biases
- Unfair decisions in areas such as recruitment, justice, or credit

Mistakes

- Incorrect results due to flaws in the model or data
- Serious consequences in critical contexts (health, transport, finance)

Fack News

- Generation and dissemination of fake news
- Difficulty in distinguishing real information from fabricated information

[Links: Predatory Journals, Retraction Watch – Tracking retractions as a window into the scientific process](#) , ADBC
Index [Scopus Fake Journal List](#)

How to refer the use of AI and ensure ethical uses

In response to the use of AI, several scientific journal publishers have established policies and rules. Authors are asked to disclose/declare whether they have used AI and/or AI-assisted technologies before submitting articles. (Sage, Elsevier, Wiley, Cambridge University Press, Taylor & Francis, IEEE, Springer-Nature).

AI is not an author, because authorship implies responsibilities

Disclosure on the use of AI in research manuscripts: How are researchers doing it?

25 Nov 2024



By Aaron Tay, Head, Data Services

How to refer the use of AI and ensure ethical uses

1. ChatGPT or AI tools should not be listed as an author or co-author

For example, Elsevier states that

“ "Authors should not list AI and AI-assisted technologies as an author or co-author, nor cite AI as an author. Authorship implies responsibilities and tasks that can only be attributed to and performed by humans. Each (co-) author is accountable for ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved and authorship requires the ability to approve the final version of the work and agree to its submission."

"The author used Grammarly to enhance the writing quality during the revision process. Additionally, the author utilized other AI tools, such as SCISPACE and Elicit, to search for relevant literature while revising the manuscript. After using these tools, the author reviewed, edited, and took full responsibility for publishing the content." (citation)

Citing Elicit and Using Elicit's Content in Your Own Work

Edited 7 months ago

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We do NOT recommend copying/pasting Elicit summaries verbatim into your work. To minimize hallucinations, Elicit summaries stay as faithful to the source text as possible, so some summary text may be quoted as published. Elicit summaries are intended to enhance and support your understanding of your topic. They are not intended to be used as your own text.

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Elicit Warning Message

When using AI platforms in scientific research, our actions must be guided by integrity, intellectual honesty, and originality, ensuring that technology supports rather than compromises the values of genuine scholarship.

Source: Disclosure on the use of AI in research manuscripts: How are researchers doing it? | Singapore Management University (SMU)

How to refer the use of AI and ensure ethical uses

First, we start off with some simple common and standard uses of Generative AI to help with rewriting and paraphrasing.

1

"During the preparation of this work the authors used Copilot (Microsoft) to reword and rephrase text. After using this tool/service, the authors reviewed and edited the content as needed and take full responsibility for the content of the publication" (citation)

"During the preparation of this work, the authors used Chat Generative Pre-Trained Transformer (ChatGPT; OpenAI, San Francisco, CA, USA) to enhance readability and language, aiding in formulating and structuring content. After using this tool, the authors reviewed and edited the content as needed and take full responsibility for the content of the publication." (citation)

Next, we move on to disclosure of use of "AI search" tools.

2

"The author used Grammarly to enhance the writing quality during the revision process. Additionally, the author utilized other AI tools, such as SCISPACE and Elicit, to search for relevant literature while revising the manuscript. After using these tools, the author reviewed, edited, and took full responsibility for publishing the content." (citation)

+ Refer prompts that you used

Source: Disclosure on the use of AI in research manuscripts: How are researchers doing it? | Singapore Management University (SMU)

How to refer the use of AI and ensure ethical uses

PROMPTS

Instructions, questions, or phrases given to a platform or system with the aim of triggering a specific response or action.

“What factors should be taken into account when designing prompts to generate reliable scientific content or analyses via language models?”

Chat GPT Answer's:

How to refer the use of AI and ensure ethical uses

Things to Consider When Making Prompts Correctly in Scientific Research

Here are key criteria and strategies to ensure prompts are well-designed in scientific contexts:

Consideration	Why It Matters	How to Implement / Questions to Ask
Clarity & Specificity	Vague prompts produce vague or incorrect outputs; scientific research demands precision.	Specify what data type, what format, what level of detail. E.g., "Provide a statistical summary of dataset X, including mean, variance, and confidence interval at 95%."
Context Provision	Models need sufficient context to understand domain, scope, assumptions.	Include background info, definitions of terms, and boundaries. For instance: "In the field of molecular biology, with standard definitions of gene regulation ..."
Assumptions & Constraints	Unstated assumptions often lead to misinterpretation or biased results; constraints help shape feasible, valid outputs.	State assumptions (e.g. about data distribution), constraints (e.g. "assume normal distribution", or "only peer-reviewed literature").
Reproducibility	Others should be able to replicate your prompt + context and get similar outputs.	Record full prompt, model version, parameters (temperature, etc.), data sources; avoid randomness unless necessary.
Bias & Validity	Prompts may unintentionally introduce bias or misrepresent facts; need to ensure validity of generated content.	Use neutral phrasing; check if prompt leads to overfitting or stereotypes; if necessary, include counterfactual or alternative scenarios.

How to refer the use of AI and ensure ethical uses

Things to Consider When Making Prompts Correctly in Scientific Research

Here are key criteria and strategies to ensure prompts are well-designed in scientific contexts:

Consideration	Why It Matters	How to Implement / Questions to Ask
Evaluation Criteria	Without clear criteria, it's hard to assess whether output meets scientific standards.	Define what "good" means: accuracy, completeness, precision, reproducibility, etc. Consider how you'll test or validate the output.
Ethical & Safety Considerations	Science may touch on sensitive areas; misuse or harmful outputs should be avoided.	Consider data privacy, ethical norms, dual use issues. Include disclaimers, request safe-usage framing.
Iterative Refinement	First prompt may not yield optimal results; refining improves relevance and accuracy.	Use pilot runs; compare outputs; adjust prompt wording, context; maybe break tasks into smaller parts.
Transparency & Documentation	For scientific credibility, everyone needs to see what was done.	Document prompt history, changes, why those changes were made; version control.
Model Limitations	Language models have limits in knowledge, logic, up-to-dating, bias etc.	Be aware of cutoff dates, hallucination risk; include request for references or fact-checking when needed.
Statistical / Methodological Rigor	For tasks involving analysis, statistics etc., the prompt should align with rigorous methodology.	Specify sampling method, statistical tests, significance thresholds; define metrics.

How to refer the use of AI and ensure ethical uses

Stanford AI Index Report 2025, produced by the Stanford Institute for Human-Centred Artificial Intelligence highlight the influence and scientific expansion of AI.

The report presents an annual global series of AI publications, covering 2010 - 2023, and shows that output rose from around 102.000 publications in 2013 to over 242.000 in 2023, almost triple.

The proportion of AI publications out of total computer science research rose from 21,6% to 41,8% over the same period.

Number of AI-related publications in natural sciences, 2010–25

Source: AI Index, 2026 | Chart: 2026 AI Index report

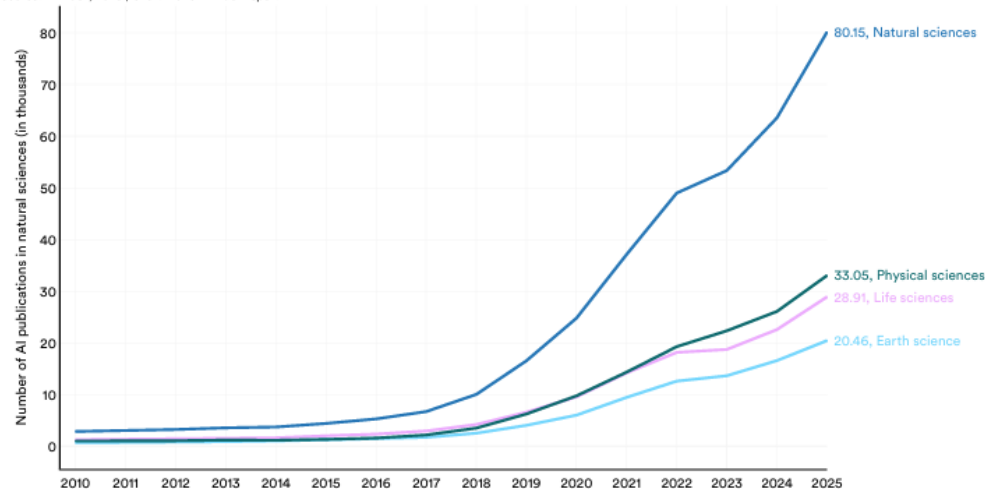
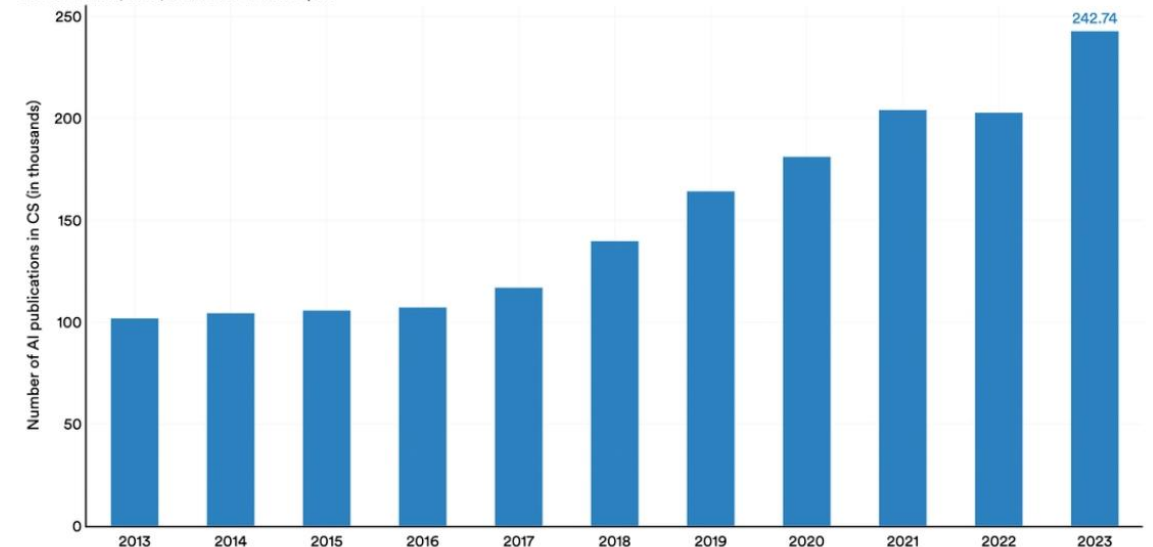


Figure 5.1.1²

Source: Stanford Institute for Human-Centered Artificial Intelligence. (2025: 235)
[ai_index_report_2026_chapter_5_science.pdf](#)

Number of AI publications in CS worldwide, 2013–23

Source: AI Index, 2025 | Chart: 2025 AI Index report



Source: Stanford Institute for Human-Centered Artificial Intelligence. (2025)
[Research and Development | The 2025 AI Index Report | Stanford HAI](#)

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https://media.tghn.org/medialibrary/2011/04/BMJ_No_7070_Volume_313_The_Nuremberg_Code.pdf
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https://www.hhs.gov/ohrp/sites/default/files/the-belmont-report-508c_FINAL.pdf
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<https://www.scientificamerican.com/article/will-democracy-survive-big-data-and-artificial-intelligence/>
[Disclosure on the use of AI in research manuscripts: How are researchers doing it? | Singapore Management University \(SMU\)](#)
Wikipédia and Google images

Prompts and AI Platforms: ChatGPT: “What factors should be taken into account when designing prompts to generate reliable scientific content or analyses via language models?”; “Give me examples related with AI risks such as privacy, security, bias, mistakes and fake news”

Copilot: “What were the main errors made by Carmen Reinhart and Kenneth Rogoff in their article ‘Growth in a Time of Debt’? And what ethical issues did this raise?”

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www.iseg.ulisboa.pt

