



# Historia magistra vitæ est

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**Between blue light and blue sky: the challenges of education in the digital age**  
May 10th, 2024, St. Stanislav's institution

An abstract graphic on the right side of the slide consisting of a dense network of thin, light-colored lines connecting numerous circular nodes. The nodes are colored in a gradient from red at the bottom to green at the top, with some yellow nodes in the middle. The overall shape is roughly rectangular and occupies the right half of the slide.



# Nomen est omen

- Holmes, W., Bialik, M., Fadel, C.; Artificial Intelligence in Education: Promises and Implications for Teaching and Learning. URL <https://books.google.si/books?id=tzO7wgEACAAJ>, 2019, Center for Curriculum Redesign.

The collision of three areas - data, computation and education - is set to have far-reaching consequences, raising fundamental questions about the nature of education: what is taught and how it is taught. Artificial Intelligence in Education is an important, if at times disturbing, contribution to the debate on AI and provides a detailed analysis on how it may affect the way **teachers** and **students** engage in education.

- subject to teacher's knowledge and skills

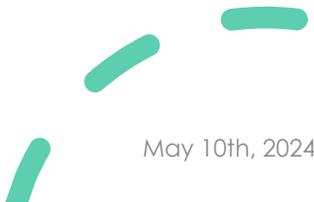


## What is behind it

- Hannes Werthner, Erich Prem, Edward A. Lee, Carlo Ghezzi: Perspectives on Digital Humanism. Springer, 2022, <https://link.springer.com/book/10.1007/978-3-030-86144-5>

The second half of the 20th century and the 21st century are a time when, for the first time in history, man-made machines do not only perform physical work but also assist humans in intellectual work. The machine is becoming a human's coworker and partner, not just a tool.

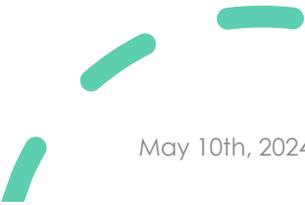
- subject to our knowledge and skills





## Looks like out of scope ...

1. Who had physics as a subject in primary school?
2. Who took physics in high school?
3. Who studied physics at college?
4. Who has never taken a physics course?
  
5. What is physics?



# James Watt

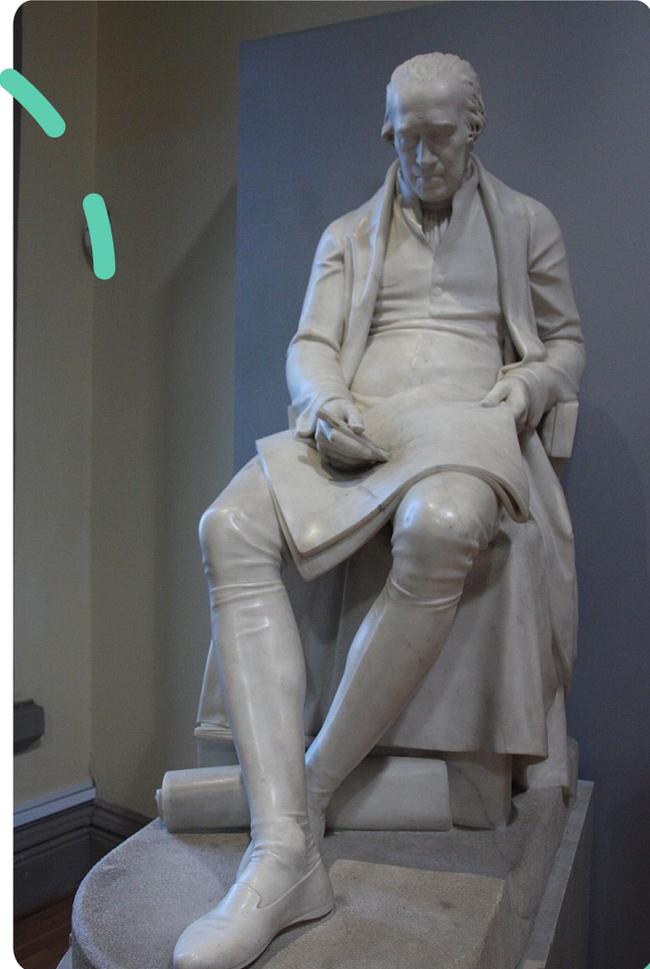
Have you heard of him?

What important did he do?

***steam engine***

Do you know or have you ever known how it works?

*wikipedia*



# Nikola Tesla

Have you heard of him?

What important did he do?

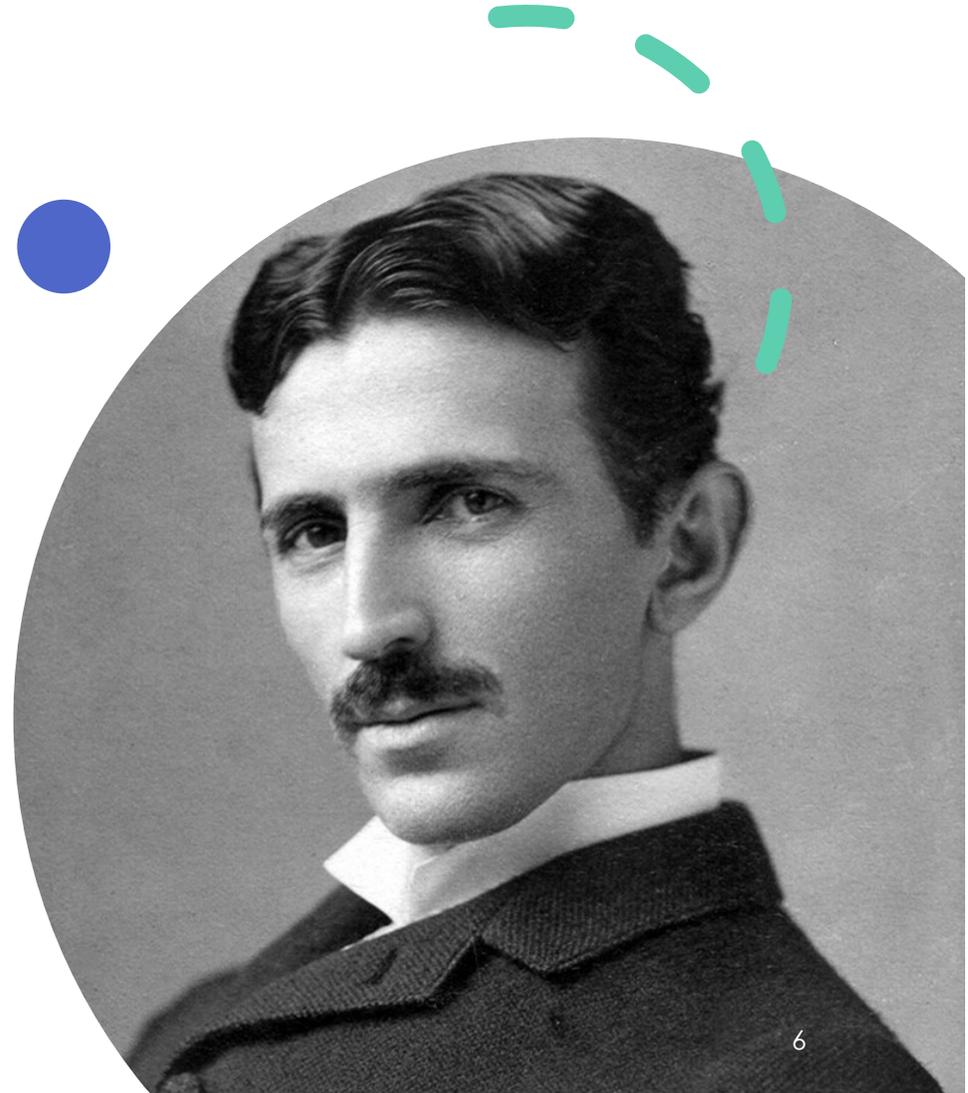
***electrical engine***

Do you know or have you ever known  
how it works?

*wikipedia*

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# John von Neumann

Have you heard of him?

What important did he do?

***computer architecture***

Do you know or have you ever known how it works?

*wikipedia*



# John McCarthy

Have you heard of him?

What important did he do?

***artificial intelligence (chess)***  
***Turing award, 1971***

Do you know or have you ever known how  
it works?



ACM

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# Vinton Cerf

Have you heard of him?  
What important did he do?

*internet*  
**Turing award, 2004**

Do you know or have you ever known how it works?

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# Martin Hellman

Have you heard of him?

What important did he do?

**certificates**  
**Turing award, 2020**

Do you know or have you ever known how it works?

ACM





## Kaj pa o računalništvu in informatiki (RIN) ...

1. Who had subject Computing in primary school?
2. Who took Computing in high school?
3. Who took the Computing course at college?
4. Who has never had a Computing course?
  
5. What is Computing?

“... we learn about the electricity at school,  
but we do not have the subject  
fundamentals of electrical engineering ...”

Emilija Stojmenova Duh, Studio at 17h, January 11<sup>th</sup>, 2022



# What are we talking about?

## 1. Electrical Engineering

- electrical engines, lights, transformers, antennas, ...

## 2. Physics

- study of natural phenomena ...

## 1. Digital Technology

- computer, smart phone, ChatGPT, certificates, browser, ...

## 2. Informatics

- studies activities that require, has benefit, or is related with design and use of digital devices.

*ACM, Paradigms for Global Computing Education*

**Computer science is no more about computers than astronomy is about telescopes.**

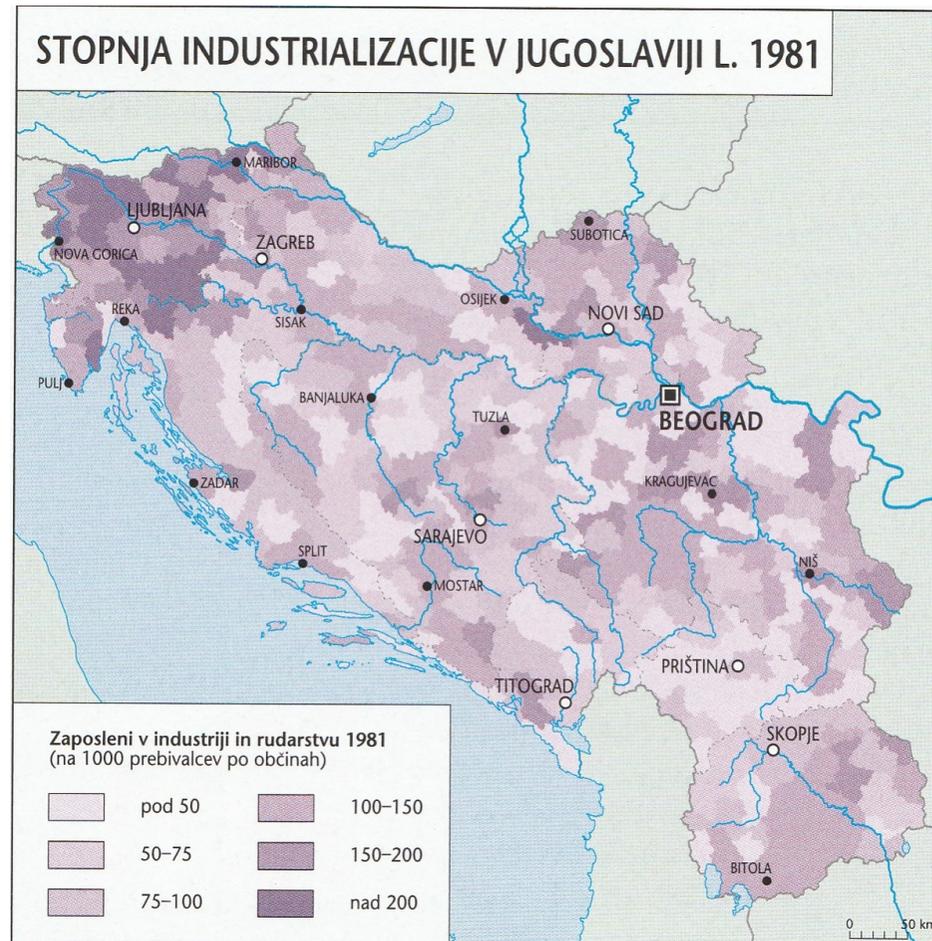
***Edsger W. Dijkstra, Turing award, 1972***

## **Slovenes in the former common state**

- **represented 1/13 of the population,**
- **created 1/5 of GDP and**
- **generated a good third of exports.**

Michael Manske, Slovenia was a strong economic engine inside Yugoslavia, 2013, <http://www.rtv slo.si/news-in-english/slovenia-was-a-strong-economic-engine-inside-yugoslavia/323573>

# Level of industrialization



***Vilma Brodnik, Krepitev kompetenc strokovnih delavcev na področju vodenja inovativnega vzgojno-izobraževalnega zavoda v obdobju od 2018 do 2022***

# Literacy



**Vilma Brodnik, Krepitev kompetenc strokovnih delavcev na področju vodenja inovativnega vzgojno-izobraževalnega zavoda v obdobju od 2018 do 2022**

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Europe 1789



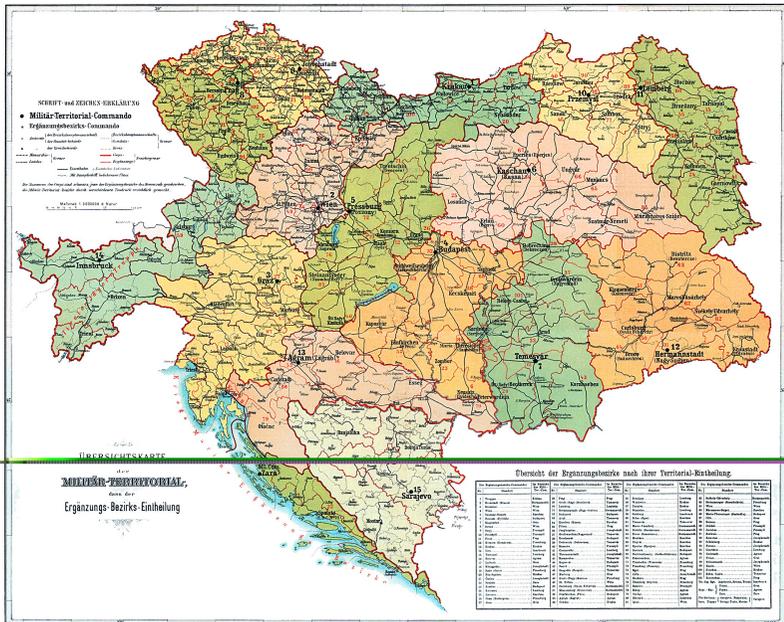
WikiMedia

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Education reform in Austria, 1774 (Allgemeine Schulordnung für die deutschen Normal-, Haupt- und Trivialschulen in sämtlichen Kaiserl. Königl. Erbländern)



Maria Theresa  
(1717-1780)



WikiMedia



# Reform

- *Article 3*: all schools follow a uniform method or skill of teaching and implement a uniform set of subjects
- *Article 5*: lists and divides the subjects
  1. religious education;
  2. reading, writing and arithmetic;
  3. preparation for a profession or further education;
    - German syntax, the basics of Latin, history, geography, natural science, geometry and architecture.
  4. education of future teachers.

Simon Malmenvall: Za »srečo narodov«, Slovenski čas, 26. 3. 2024.

## 2. reading, writing and arithmetic

- The 3 **R**'s Get a **C**-for **C**ompute  
New York Times, May 2nd, 1982
- Computational thinking  
Seymour Papert in 1980 and  
again in 1996  
Jeannette Wing in 2006





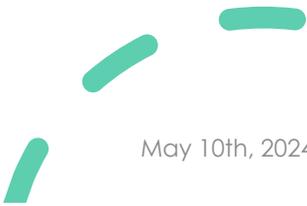
## 2. preparation for a profession or further education

- one of subjects from natural science
- physics of 21st century
- necessary for any profession to be succesful, Nobel prizes in 2022:
  - *Physics*: Alain Aspect, John F. Clauser and Anton Zeilinger "for experiments with entangled photons, establishing the violation of Bell inequalities and **pioneering quantum information science**"
  - *Chemistry*: Carolyn Bertozzi, Morten Meldal and Barry Sharpless "for the **development of click chemistry** and bioorthogonal chemistry"
  - *Peace*: Ales Bialiatski, Memorial, Centre for Civil Liberties "... They have made an outstanding effort to **document war crimes, human right abuses and the abuse of power ...**" (<https://ccl.org.ua/en/tools/map-of-enforced-disappearances-in-ukraine/>)



## What is at stake?

- creator or consumer of digital technology
- understanding or just following
- which side of a digital divide do we want to be
  
- wellbeing of our children:
  - ICILS 2013, creative solving of problems using digital technology (grade 8): Polish children 4 % successful, Slovenian children 0,4 %.



Hvala za pozornost / Thank for your attention!

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***It is easier to move a cemetery  
than to change a curriculum.***

Woodrow Wilson

[https://www.azquotes.com/quote/  
1359810](https://www.azquotes.com/quote/1359810)

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