

Some remarks about AI Trends in Higher Education and UFRGS' presentation

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May 23rd, 2024, Oslo



Outline

- Prof. Barone's short presentation
- UFRGS' short presentation
- National/ International Rankings – UFRGS
- CINTED's short presentation?
- PPGIE's short presentation?
- Artificial Intelligence Trends in Education
- Impacts of Climate Change in Porto Alegre
- Final Remarks

1 Prof. Barone's short presentation

- Full Professor at the Federal University of Rio Grande do Sul (UFRGS)
- Head of the Graduate Program of Computers in Education (PPGIE)
- Supervisor of Ph.D. and M.Sc. thesis of the Graduate Program of Computer Science(PPGC) and PPGIE
- Researcher at the Innovation Center on AI for Health- CIIA (UFMG, UFRGS, UFAM and, private companies)
- Former President and Vice-president of the UFRGS' Forum of Graduate Programs



Main Research Interests

- Ethics in Artificial Intelligence
- Machine Learning and AI
- Natural Language Processing
- Computers and Technology in Education
- Computational Neuroscience

Current Research Projects

S2C2 – System of Systems of Command and Control

Contractor: Brazilian Army

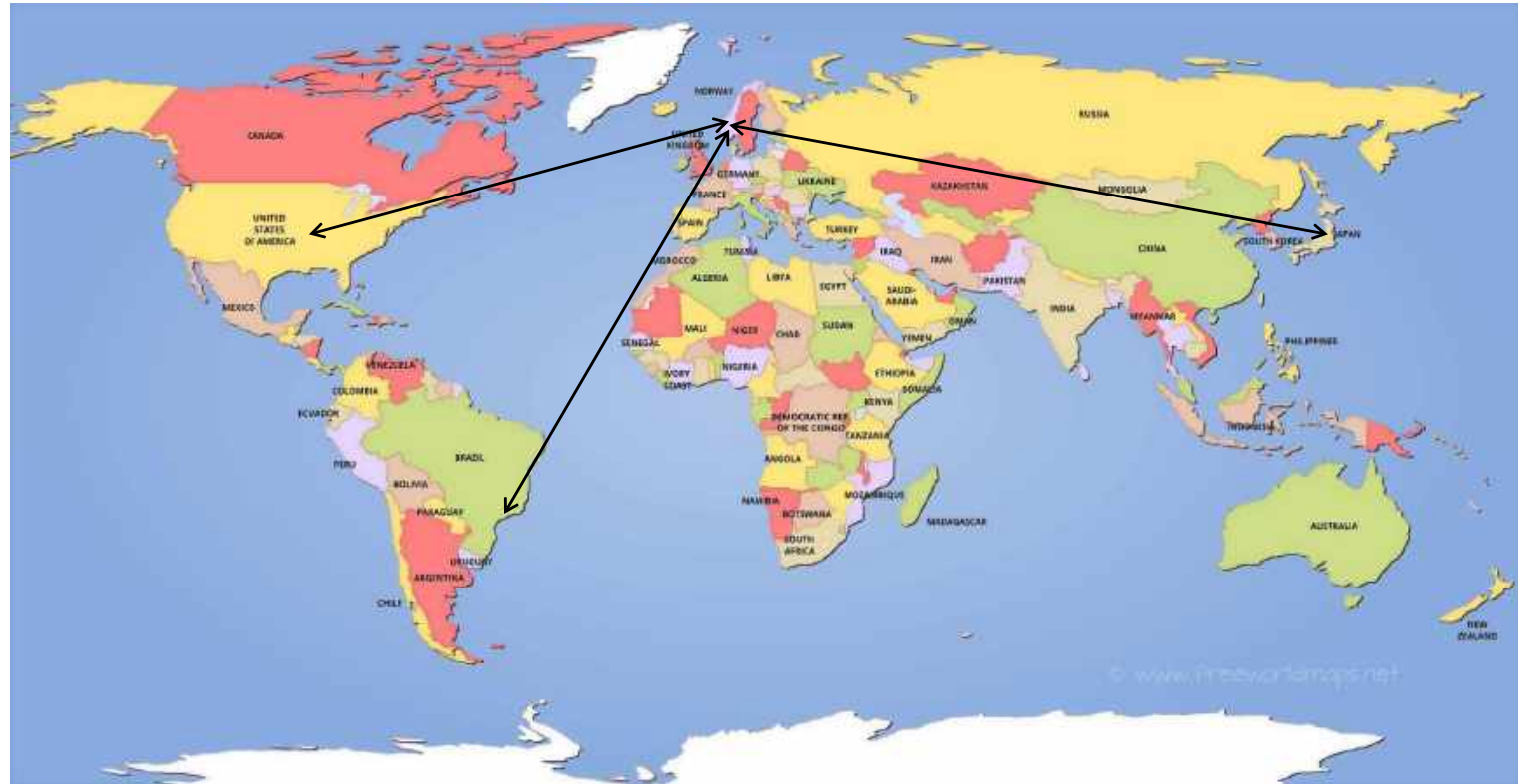
Institutions: Brazilian Army, UFRGS,IME, and UnB

Starting Date: September 2021

Duration: 36 months



Collaboration on Intelligent Machines project at UiO



□□ US, Brazil and Japan (2017-2025)

Project manager: Jim Torresen, Research Council of Norway grant
309869



- Short term mobility stay for meetings
- Sharing and development of curriculum and teaching material for courses
- Long term mobility stay (students)
- Intensive course/student workshop
- Workshop/conference org. activities
- New collaborations/guest lectures (partner/other countries)



The Research Council
of Norway

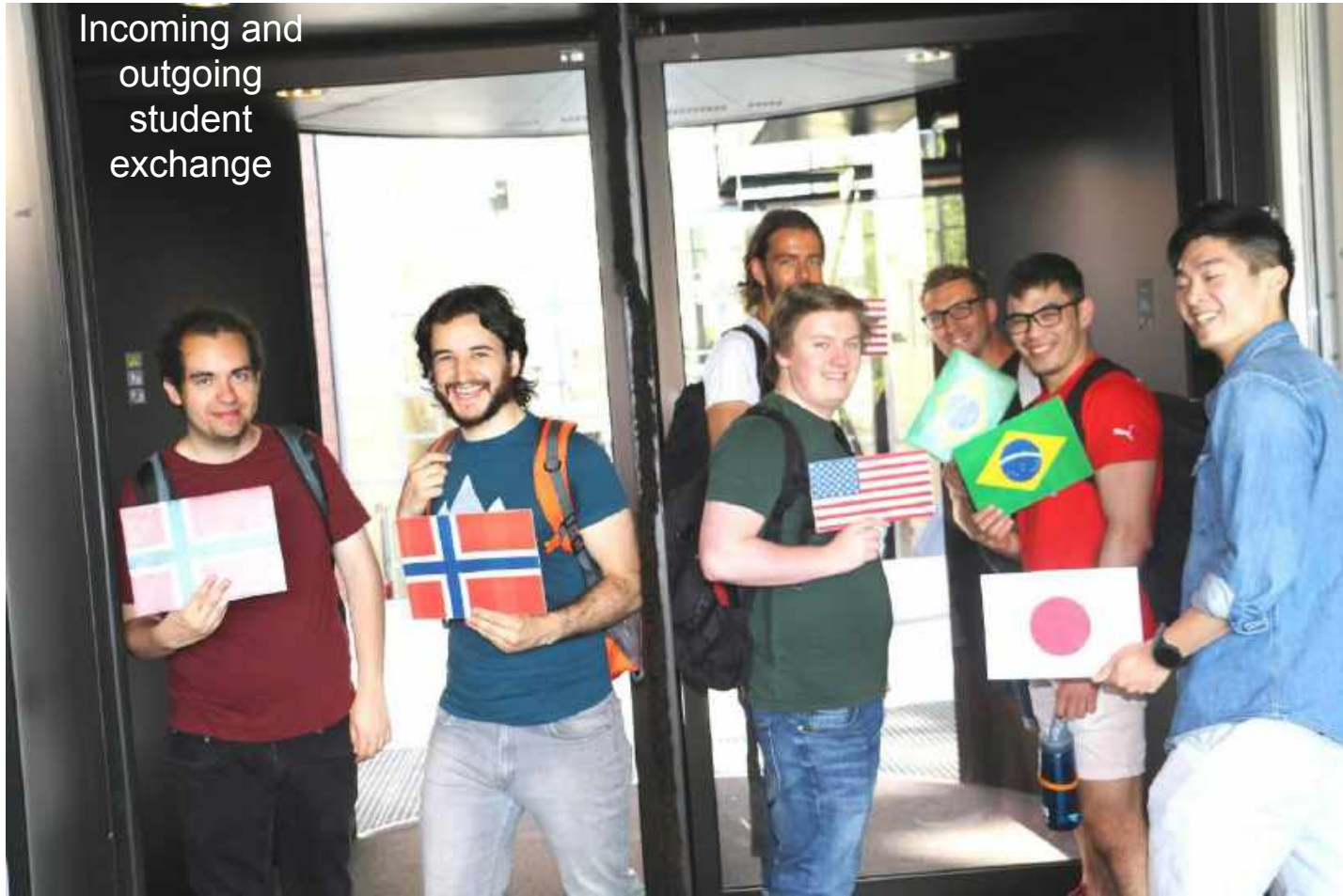
Funding: *INTPART* 2017-2024

<https://www.mn.uio.no/ifi/english/research/projects/coinmac/index.html>



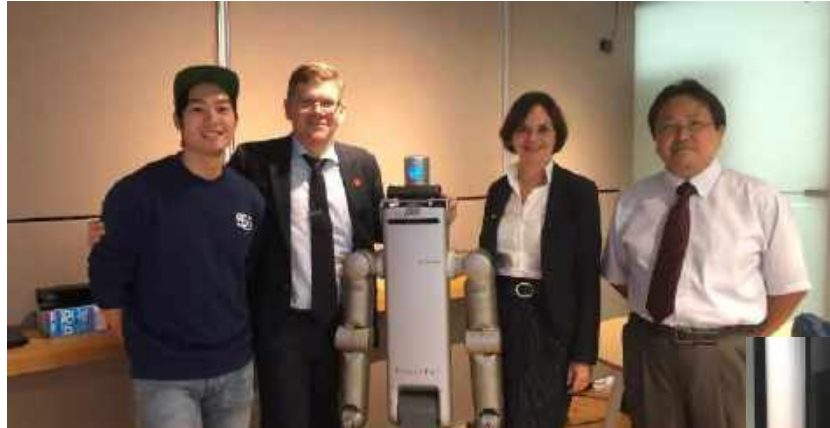
Norwegian Agency for
International Cooperation
and Quality Enhancement
in Higher Education

Incoming and
outgoing
student
exchange





International Collaboration COINMAC



Recent International Cooperation

- Zonguldak Bulent Ecevit University - Prof.Oğuz Kızılcay
- TIB/Leibniz Hannover University - Prof.Sören Auer
- L3S/Leibniz Hannover University - Prof.Wolfgang Nejdl
- University of Oslo/ Norway – since 2017 - Prof.Jim Torresen
- University of Léon,Spain-Prof.José Alberto Benítez Andrades
- University of Pisa/Italy - Prof.Francesco Marcelloni
- Former International Observer of LITHME (Languages in the Man machines Era) European COST Action- Prof.Dave Sayers (Finland) -PI



2 UFRGS' short presentation

UFRGS is located in **Porto Alegre**, capital of Rio Grande do Sul.

Having Uruguay and Argentina as neighbors; Rio Grande do Sul has a strategic position in MERCOSUL, a region that encompasses 60% of all Latin American economy.





- The city was founded in 1742 by immigrants from the Azores region (**Portuguese** immigrants).
- Since the 19th century, Porto Alegre has been receiving immigrants, particularly from Europe (**Germans** and **Italians**), which were of decisive importance, influencing architecture and cuisine, among other cultural aspects.
- Products of the rich agriculture and livestock such as soybeans, leather, canned food, meats, and rice are exported to several countries.
- Its population is about **1,500,000** inhabitants.



The Universidade Federal do Rio Grande do Sul (UFRGS), was founded in 1934 as a result of a gathering of independent schools and institutes that were created in the 19th and 20th centuries.





Central



Health

UFRGS comprises four
on-town campuses



Porto Alegre



Olympic



Valley

3 National/ International Rankings - UFRGS

International Rankings

UFRGS Results in International Rankings

Ranking	Sail	Edition	World Position	Latin America Position	Brazil Position	Position Federal Higher Education Institutions	Number of Institutions Evaluated in the Edition
Academic Ranking of World Universities - Shanghai	ARWU	2023	401-500th	5-8th	3-5th	1-2nd	1000
Center for Science and Technology Studies- Leiden Ranking	CWTS Leiden	2023	224th	5°	4th	1st	1411
Center for World University Rankings	CWUR	2023	467th	9th	5th	2nd	2000
Moscow International University Ranking	MosiUR	2023	901-1000th	22-28th	6-10th	4-6th	2000
National Taiwan University Ranking	NTU	2023	402-403°	5th	3rd	1st	1044
Quacquarelli Symonds University Rankings BRICS	QS BRICS	2019	59th		9th	4th	400

National Rankings

UFRGS results in the National Rankings

Ranking	Sail	Edition	Brazil Position	Position Federal Higher Education Institutions
Folha University Ranking	CALL	2023	3rd	1st



UFRGS Results in the Ranking

Edition	World Position	Latin America Position	Brazil Position	Position Federal Higher Education Institutions	Number of Institutions Evaluated in the Edition
2024	601-800th	4-7th	3-5th	1-2nd	1904
2023	601-800th	4-10th	3-4th	1-2nd	1799
2022	601 ^a -800 ^a	9-13th	3-5th	1-3rd	1662
2021	601-800th	10-18th	3-8th	1-5th	1527

4 CINTED's short presentation?

(Interdisciplinary Center for New Technologies in Education)

ufrgs.br/cinted/

Dean

Prof. Dr. Basso, Marcus Vinicius
de Azevedo



Deputy-Dean

Prof. Dr. Menezes, Crediné Silva
de



The **Interdisciplinary Center for New Technologies in Education**, was created to provide spaces for joint participation, offering institutional support for actions of interdisciplinary nature in the in-dissociability of teaching, research, and extension.

5 PPGIE's short presentation?

(Graduate Program in Computers
in Education (PPGIE))

ufrgs.br/ppgie/

Coordinator

Prof. Dr. Barone, Dante Augusto
Couto



Deputy-Coordinator

Prof.^a Dr.^a Aragón, Rosane



- The Graduate Program in Computers in Education (PPGIE) at UFRGS, Doctoral level, operates in an interdisciplinary area with the main objective of applying digital technologies in Education.
- The PPGIE's general objective is to provide in-depth studies in the area of Information Technology in Education, training, as a priority, high-level personnel to carry out research, teaching and extension activities.
- The commitment of its members and the results obtained by projects and publications guaranteed PPGIE the achievement of Concept 7 (Maximum Concept) in the CAPES assessment.

Research

CINTED promotes and stimulates interdisciplinary research projects, in particular, focused on supporting activities for the implementation of alternative technologies in educative programs and projects, face-to-face or at distance, in the following topics:

- **Distance Learning;**
- **Informatics/Computers in Education;**
- **Information and Communication Technologies in Education;**
- **Other relevant themes on the same areas.**

Research Projects

- CESTA – Collection of Entities to Support the Use of Technologies in Learning
- SACCA – Automatic Audiovisual Content Cataloging System
- OBAA – Learning Objects Metadata
- AVATAR – Virtual environment for remote academic work
- NIDABA: integrated system for producing tangible and electronic educational resources in inclusive classes
- Observatory of Pedagogical Innovation with Technology.
- Others

Research Groups

- TRAPHU – Learning Trails in Ubiquitous Hiperdocuments
- NUTED – Research Group on Technology Applied on Education
- TEIAS – Research Group on Educational Technology for Inclusion and
- Learning in Society
- Virtual learning laboratories



Sustainable development education

Lines of Research and Professors

1. Computerized Environments and Distance Learning - **16 professors.**
2. Paradigms for Research on Scientific and Technological Education - **4 professors.**
3. Digital Interfaces in Education, Art, Language and Cognition - **7 professors.**

Faculties/institutes involved in its creation

Foundation Year: 1995

- Informatics
- Education
- Psychology

Number of Ph.D Students and Alumni

- Students (in 2023) – 98
- Alumni students (1996-2023) – 202

Thesis defenses - 2024

Socio-affective Model Based on Learning Analytics to Assist Teachers in Monitoring Students in a Virtual Learning Environment	Jacqueline Mayumi Akazaki
Virtual Curator: An Application to Help Reading Images	Míria Santanna dos Santos
Learning Analytics for Identification of Traces of Student Participation in Active Learning Activities	Anita Raquel da Silva
Ethoscool: Advancing Ethics in AI in Education through Artificial Moral Agents	Paulo Roberto Córdova



Is an event that aims to bring together professionals from different areas to discuss and share knowledge about education, innovation and technology.

“The education revolution with new technologies and artificial intelligence”

The objectives of **InovaEduBr** are:

- Promote practical and theoretical advancements in Educational Innovation for various professionals.
- Facilitate the meeting of innovation and education to invest in new technologies and methods.
- Support startups to grow in schools and universities, expanding the impact of technologies in education.
- Create a space for the exchange of ideas and projects in science, technology, and education, especially using Artificial Intelligence.











6 Artificial Intelligence Trends in Education

Reasons to learn AI

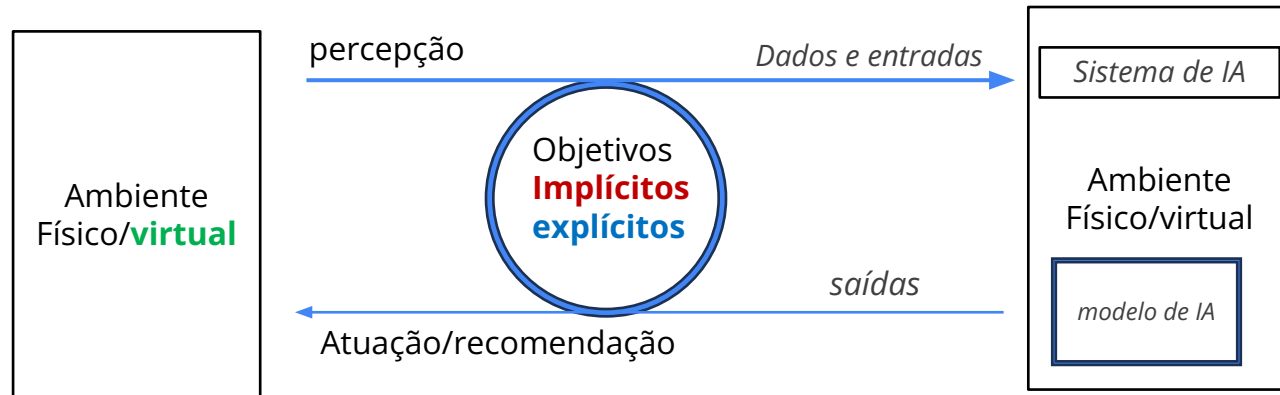
- **55%** of companies say that when adopting AI, workers need **skills** such as: knowing how to use a computer, smartphones, creativity, communication, understanding what knowledge is, machine learning, and interacting with AI applications.
- Brazil ranked **12th** in the world in AI publications in 2018. It has been declining and has fallen to **18th** position in 2023.

Harvard business review, [OECD Employment Outlook 2023: Artificial Intelligence and the Labour Market](#), Scopus e Web of Science, <https://www.scimagojr.com/countryrank.php> (SJR).

What is AI Today?

"An AI system is a machine-based that, for explicit or implicit purposes, infers, from the input it receives, how to generate predictions, content, recommendations, or decisions that may influence physical or virtual environments"

- Different AI systems vary in their levels of autonomy and adaptability after their deployment.*



Cognitive Line – knowledge and reasoning and learning in an explicit way (XAI).

Machine Learning – learning with a lot of data, implicitly, difficult to explain.

Generative Line – predicts and/or generates the next step.

- Goal-oriented AI suggests a shift towards proactive, goal-driven AI systems that are able to plan and execute educational strategies tailored to individual learners' needs.
- This age-old approach transforms AI from a supporting player into an active participant in the learning process, dynamically adapting to meet different educational goals.

Challenges of AI in Higher Education

- According to Educativa Chegg, based on responses from 15 countries, including Brazil, 40% of university students interviewed use AI in their schoolwork.
- According to a survey by Semesp, 74.9% of elementary school teachers are in favor of the use of AI in the classroom.
- The current learning scenarios may not allow the achievement of the skills necessary for society 4.0, since they were designed to respond to an educational model, to the reality and needs of the society of the last century.

<https://stem.numerade.com/>

<https://www.semesp.org.br/seja-socio/>

Challenges of AI in Higher Education

- What are the learning spaces and strategies that allow the student to appropriate the skills required by the society of the moment (and of the future)?
- It is necessary to reorient the objectives of learning processes, creating and strengthening skills that adapt to the new technological and social reality, investing in the training of people who can promote an alternative model of development that leads the country to the common good.

Challenges of AI in Higher Education

How can education for the 21st century reinforce the development of the competencies and skills needed for the moment?

- develop critical thinking skills,
- personalized learning,
- strengthen conscious decision-making,
- creative adaptability for self-reinvention and self-employment,
- develop empathy,
- sense of responsibility,
- aptitude in building relationships and collaboration,
- ability to operate the complexities of human-AI interaction,
- inter and transdisciplinarity.

Use of AI in University Education

- As this trend continues, humans will increasingly tend to share opinions and decisions with AI, which in turn will influence other AI outcomes and development.
- Generative AI's next frontier will be the shift from chatbots to agents, with agents demonstrating proactive behavior in contrast to reactive bots.
- LLMs provide data to feed into other systems, such as training robots to perform tasks and obey speech and text commands instead of being programmed to do so (Nvidia, RFM-1).

Use of AI in University Education

- The main focus should be on educating people about the conscious and ethical use of AI.
- If used appropriately, these technologies have the potential to level the playing field and increase the level of knowledge.
- Finding a way to work with AI effectively and benevolently in all aspects of our lives.

Use of AI in University Education

In Teaching:

- From search engines, chatbots and virtual tutors to personalized assessment systems and data analysis tools.
- Promote inclusion and equity by providing personalized support for students with special needs, helping access to education for all.
- **LMS**: many all with user limits - generate learner template
- **MOOC** Cyberlearning - Center for Integrative Research in Computer and Learning Sciences (CIRCLS).

https://www.nsf.gov/awardsearch/showAward?AWD_ID=2021159

Use of AI in University Education

In the Search:

Advanced Search & Referral Management:

- Find scholarly articles based on keywords, authors of interest - Google Scholar
- Organize articles, explore citations, and visualize collaboration networks between authors and institutions - Research Rabbit,
- Save, organize, and share articles, PDFs, and annotations with research colleagues - Mendeley

Text Analysis and Information Extraction:

- Discover research trends, visualize collaborative networks, and identify emerging topics in articles – CiteSpace, Perplexity.AI (reputable sources)
- Analyze large volumes of text, identify linguistic patterns, and explore relationships between words and concepts, Voyant Tools
- Extract relevant information from textual documents, names of people, places and dates - Lexico.io

Use of AI in University Education

Data Analysis and Visualization:

- Create and run code, text, and visualizations to analyze scientific data - Jupyter Notebook
- Perform complex statistical analysis, create graphs, and generate reports - RStudio
- Explore and visualize data interactively by creating custom dashboards - Tableau

Text Generation and Creation of content and images:

- ChatGPT, Gemini, Dall-E, Midjourney, sdxl ⚡ lightning, Leonardo AI, FreepikCanva Magic Media, Bing Create, Adobe, Firefly
- Paraphrases and summarizes texts, enhancing the clarity and originality of writing – QuillBot, Elicit
- Check Grammar, Spelling, and Writing Style - Grammarly

Use of AI in University Education

In project and school administration:

- Project Management and Collaboration:
- Organize research tasks, set deadlines, collaborate, and track project progress - Asana
- Create centralized workspace for notes, ideas, tasks, and research projects, accessible from anywhere - Notion
- Team communication, file sharing, and project monitoring – Slack
- **Optimizing educational management**, from creating schedules and tracking student performance to resource management and strategic decision-making.

Challenges and Considerations

We live in a world surrounded by AI
The world is learning to live with AI
Ethics in the use and development of AI
Based on UNESCO recommendations



- Proportionality and do no harm;
- Safety and security;
- Justice and non-discrimination;
- Sustainability;
- Right to privacy and data protection;
- Human oversight and determination;
- Transparency and explainability;
- Responsibility and accountability;
- Awareness and literacy;
- Adaptive governance and multi-stakeholder collaboration.

7 Impacts of Climate Change in Porto Alegre





Caramel horse

Before vs After





Muçum City, 250km to Porto Alegre



Bridge from Lajeado to Estrela City



Porto Alegre Airport



Photo from **Germano Preichardt.**
Not generated by AI

Porto Alegre City



Photo from **Germano Preichardt.**
Not generated by AI

Porto Alegre City

Civil Defense of Rio Grande do Sul, May 16th, 2024

- The state records **104 missing** and **806 injured**.
- There are **538,1 thousand** people away from home.
- **77,2 are in shelters** and **164,583 are homeless** (people staying with family or friends).
- **142,000 customers** without water supply in **10 cities**.
- **124.488 thousand** customers are without power.
- **Dead Toll 151** confirmed.

Veja o mapa das cidades afetadas no Rio Grande do Sul

Das 497 cidades do RS, 425 foram afetadas

● Sim ● Não

🔍 Pesquise aqui o município



RS has 425 of its 497 municipalities with some report of problems related to the storm, with 1.476 million people affected.



Katrina hurricane/ USA, 2005	Flooded Rio Grande do Sul/ BRA, 2024
<ul style="list-style-type: none"><li>● Katrina flooded 2,400km²	<ul style="list-style-type: none"><li>● In the State of Rio Grande do Sul, 3,800km² so far, May 12, 2024.
<ul style="list-style-type: none"><li>● Katrina displaced 400,000 people	<ul style="list-style-type: none"><li>● In Rio Grande do Sul, so far, May 12, 2024, 618 thousand people.
<ul style="list-style-type: none"><li>● The damage caused by Katrina was \$125 billion.	<ul style="list-style-type: none"><li>● In Rio Grande do Sul, so far, it is incalculable.

8 Final Remarks

Questions?

Takk!



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