

Construction de l'esprit scientifique par l'apprentissage des lois physiques: mauvais rôle de l'intelligence artificiel

A critical Analysis of AI's Role in Physics Education-Introduction of AI-OHERIC Model

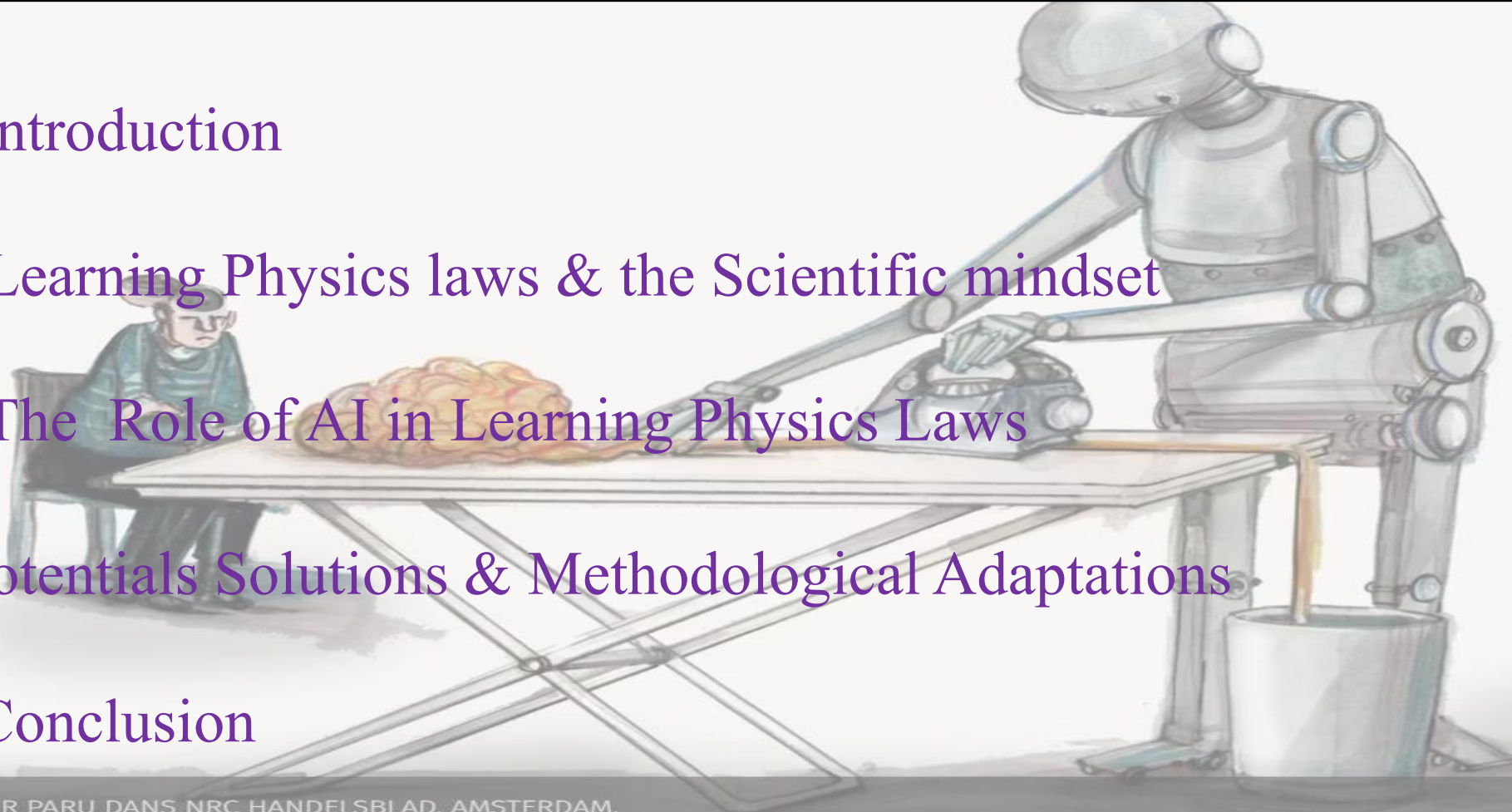
by

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June 23, 2026, Ottawa, Canada

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Learning Physics laws & the Scientific mindset

1. Scientific mindset

Galilée (1564) : - Establishing ultimate scientific truth exclusively via **Experimentation** as the bedrock of empirical proof.

C. Bernard (1865): The OHERIC or HOERIC methodology (Observation, Hypothesis, Experimentation, Results, Interpretation, Conclusion)

G. Bachelard (1934): - Breakdown of initial preconceptions (deconstruction)
- logical problematization (co-construction)
- Rectification (reconstruction)

Learning Physics laws & the Scientific mindset

2. Physics laws

Sagaut (2008): Logical construction of a stable, repeatable, and observed correlation.

Dognon (2020): Formalization of a verified regularity in nature, backed by rigorous proof.

Exemple: *Unpacking Ohm's Law requires students to navigate the whole cycle to link voltage and current natively.* $U=RI$
(Observation, Hypothesis, Experimentation, Results, Interpretation, Conclusion)

The Role of AI in Learning Physics Laws

1. AI in education

Rapid development: - Exponential Capital: 150,79Md\$ in USA (Stanford Institute HAI, 2025)
- National Directives: Canada's "AI for All" initiative (M. Carney, 2026) targeting 1M students and 3,000 physics teachers.
- Deep Software Intrusion (applications)

Stephenson & Armstrong (2026):- 95% students using AI (**73 % in 2025 by KPMG CANADA**)
- 49% of students report an improvement in their learning
- 48% considers learning with a teacher to be essential

Bussières McNicoll et al. (2026): 71 % of students view AI as a risk to academic integrity

The Role of AI in Learning Physics Laws

2. Impact of AI in physics learning

Breaking the “Construction Chain” (Observation, Hypothesis, Experimentation, Results, Interpretation, and Conclusion) by Copying and Pasting

Psyché & Davidson (2026): - Decreased brain activity
- Cognitive laziness

KPMG canada (2025) - Critical thinking loss : 48% of surveyed students state their independent critical thinking capacity worsened post-AI adoption

This interruption stops the active knowledge reconstruction process outlined by Giordan (1987).

Potentials Solutions & Methodological Adaptations

The AI-OHERIC Model

Adapting the process of developing scientific thinking by incorporating AI: Observation, **AI-Hypothesis**, **AI-Experimentation**, **AI-Results**, Interpretation, and Conclusion

Connect-Disconnect

Connect: Allow AI access during learning phases.
Disconnect: Remove AI completely during exam phases to gauge intrinsic understanding.

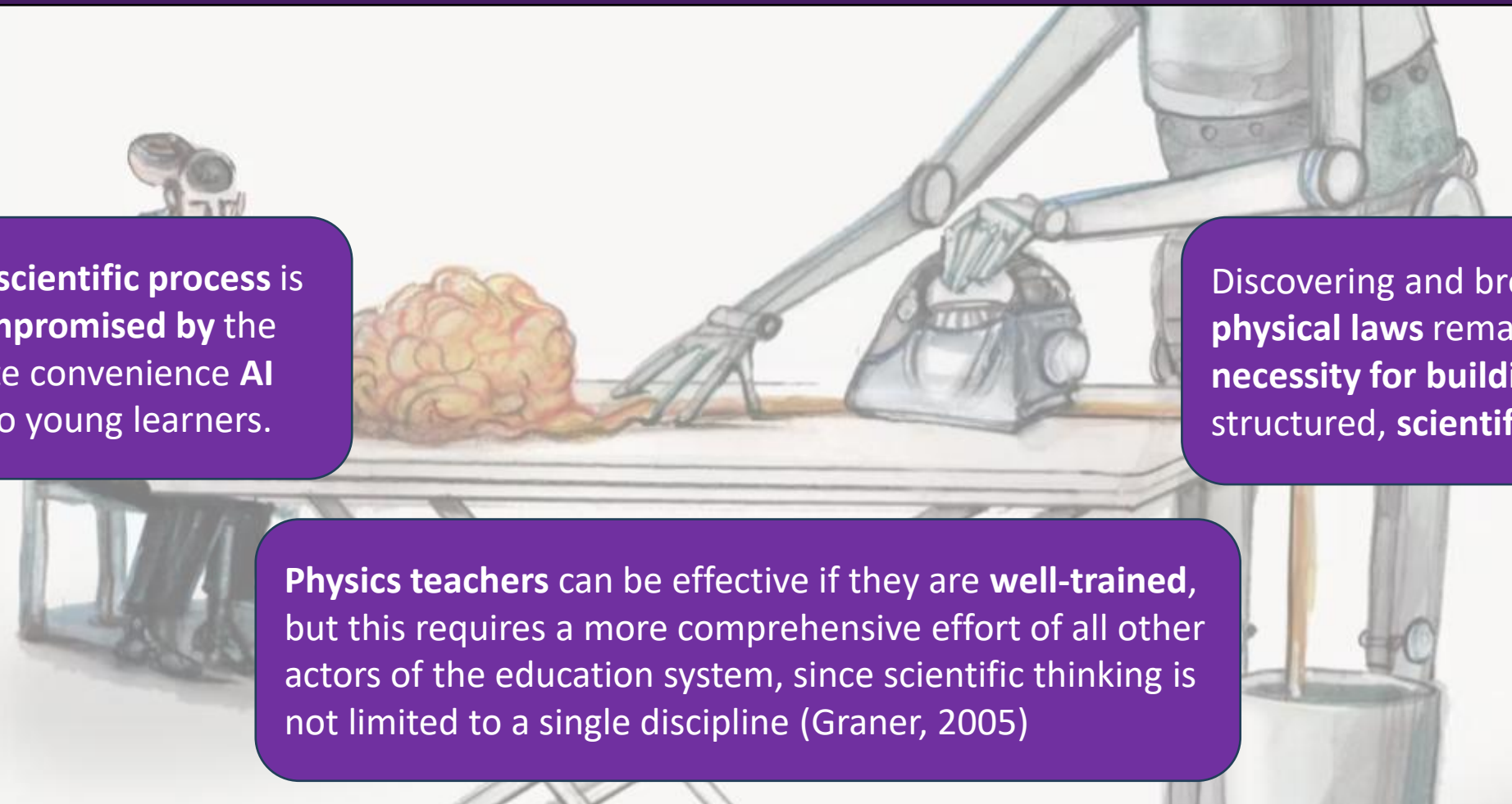
Awareness & AI Literacy

Teaching students prompt optimization, logic checking, and source cross-examination on specialized websites or books.

Process-Based Evaluation

Meirieu (2026): Re-centering student marks on the rigorous validation of the **scientific journey** rather than final output text.

Conclusions et perspectives



The native **scientific process** is being **compromised** by the immediate convenience AI delivers to young learners.

Discovering and breaking down **physical laws** remains an absolute **necessity for building** a structured, **scientific mindset**.

Physics teachers can be effective if they are **well-trained**, but this requires a more comprehensive effort of all other actors of the education system, since scientific thinking is not limited to a single discipline (Graner, 2005)

THANK FOR YOUR KIND ATTENTION

