

Addressing AI and Data Literacy in Teacher Education: A Review of Existing Educational Frameworks



Computing Education

Computer science explained!

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Why should AI and data literacy be part of general teacher education?

- > AI technologies are widely used in personal and professional contexts.
- > Many people encounter AI **without being aware** of it or understanding how the technology functions.
- > **Political commitments** to promote AI and data literacy in school education.
- > Increasing development of **K-12 educational frameworks** focused on AI and data literacy.
- > **Only few** educational frameworks address AI and data literacy in teacher education.
- > Existing educational frameworks **barely cover data literacy** or consider data literacy and AI literacy separately.

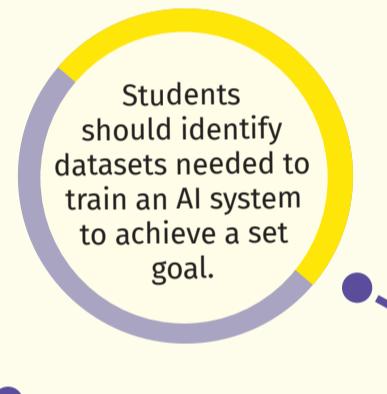
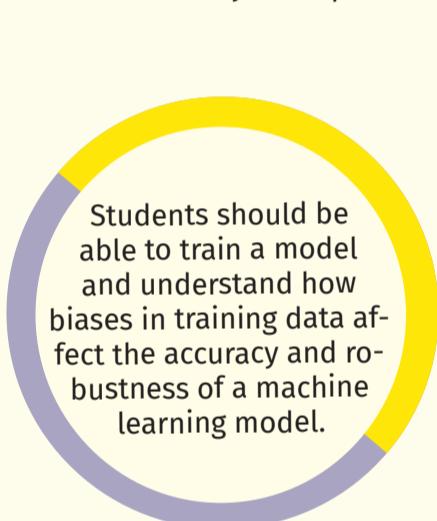
Students in all school subjects to critically evaluate AI technologies, use AI as a tool, and consciously deal with data.

- > Data literacy is closely related to the AI sub-field of machine learning and AI (especially from a machine learning perspective) cannot be adequately grasped without data literacy.

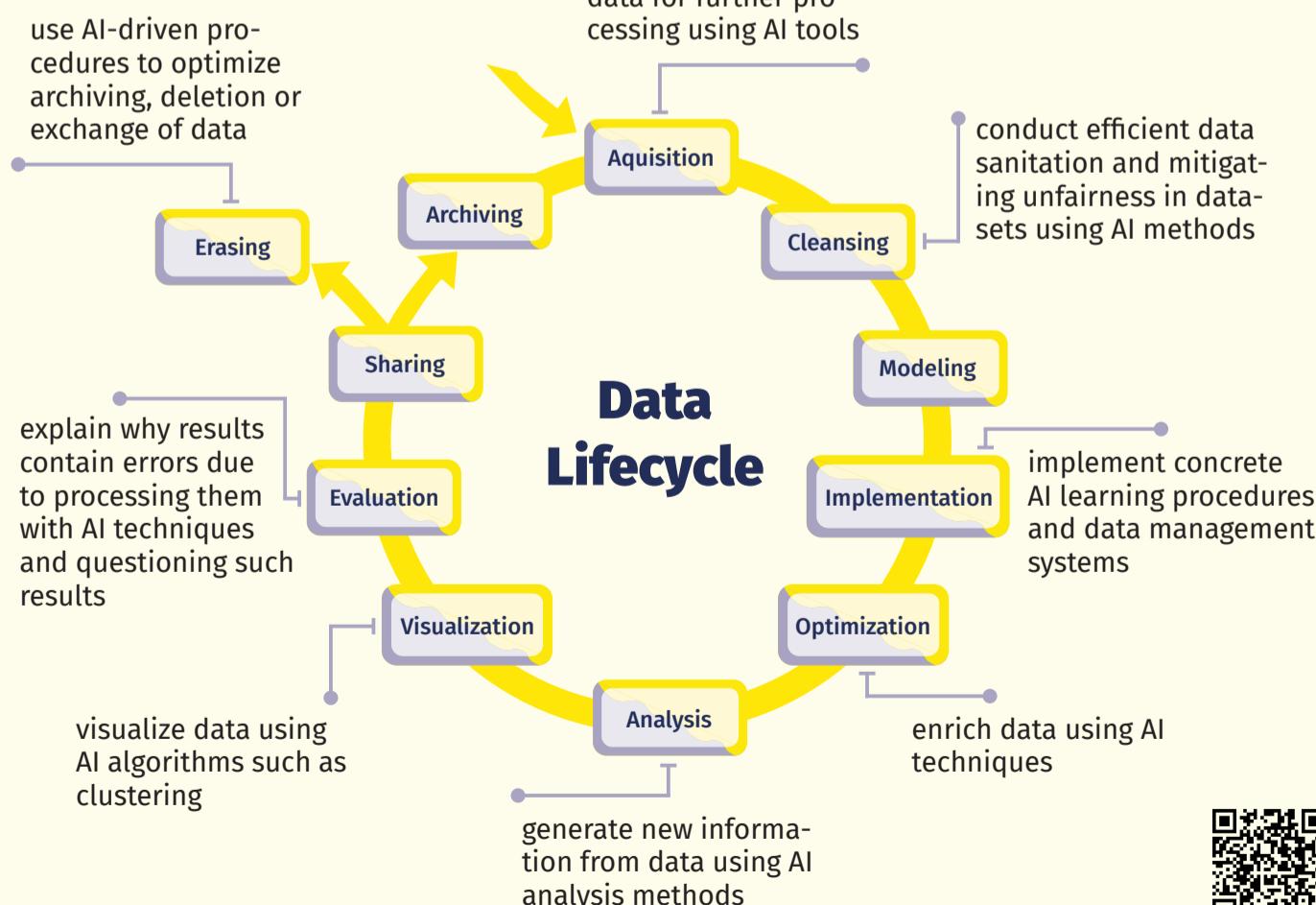
What are the core principles of AI and data literacy that all prospective teachers as well as in-service teachers need to know?

How is data literacy covered in AI literacy frameworks?

- > For each stage of the data lifecycle, we answered the following question: "**Is this stage covered by the respective AI literacy framework proposal, and if so, how it is specifically embedded?**"
- > Overall, we found that AI literacy frameworks do not comprehensively cover data literacy concepts.



AI Literacy	Data Literacy									
	Acquisition	Cleansing	Modeling	Implementation	Optimization	Analysis	Visualization	Evaluation	Sharing	Erasing
Higuera (2019)	-	-	-	-	-	-	-	-	-	-
Touretzky et al. (2019)	-	-	✓	-	-	-	-	✓	-	-
Long and Magerko (2020)	✓	-	✓	-	-	✓	-	✓	-	✓
Blakeley and Breazeal (2019)	✓	-	-	-	-	-	-	✓	-	-
Williams, Kaputsos, and Breazeal (2021)	✓	-	-	-	-	-	-	✓	-	-
Clarke (2019)	✓	-	-	-	-	✓	-	✓	-	-
Vazhayil et al. (2019)	✓	-	-	-	-	-	-	✓	-	-



How can we address AI and data literacy more holistically?

Data and data literacy can provide a **gateway** to implementing AI literacy in teacher training.

Future Work

- > **Expand** educational frameworks to foster AI and data literacy more holistically.
- > **Create** modules for teacher training in AI and data literacy.
- > **Design** interventions and evaluate them with pre- and in-service teachers for secondary and primary schools.
- > **Propose** policy recommendations for implementing AI and data literacy in teacher training.

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