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

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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.

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

- 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.

How is data literacy covered in AI literacy frameworks?

- Students should be able to train a model and understand how biases in training data affect the accuracy and robustness of a machine learning model.
- Students should identify datasets needed to train an AI system to achieve a set goal.
- Extract information from subject-specific data for further processing using AI tools.
- Use AI-driven procedures to optimize archiving, deletion, or exchange of data.
- Explain why results contain errors due to processing them with AI techniques and questioning such results.
- Visualize data using AI algorithms such as clustering.
- Generate new information from data using AI analysis methods.
- Enrich data using AI techniques.
- Implement concrete AI learning procedures and data management systems.
- Conduct efficient data sanitation and mitigating unfairness in datasets using AI methods.
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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.