Informatics for All Response to

"Empowering Learners for the Age of AI: An AI Literacy Framework for Primary and Secondary Education"

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1. Overview

From our perspective, this is an excellent and timely report. It should help and guide educators towards the inclusion of AI Tools in their activities and the development of AI Literacy.

Important Note on Audience: This report appears to be specifically meant to guide teachers and help them address the challenge of using AI tools in life and in school. Thus, the primary audience of the report is teachers, not policymakers or other stakeholders. This is good; we think policymakers would need a much more concise report or perhaps an executive summary.

2. Positive Aspects

Strong Foundation and Structure

The framework is particularly commendable for building upon other related reports rather than seeking to reinvent or redefine terminology, though stronger connections to digital competence frameworks would enhance its foundation. The visual style is suitable for the target audience, and the competences represent realistic ways that learners might interact with AI systems.

Clear Domains and Competences

The first 3 domains (Engaging with AI, Creating with AI and Managing AI) provide a comprehensive structure for understanding different ways learners may interact with AI tools. The competences provide a strong foundation for learners to evaluate AI's societal and ethical implications and appear durable enough to remain relevant as AI technologies evolve. The 4th domain, “designing AI” is more problematic – see below.

Educational Scenarios

The later parts of the report, particularly the educational scenarios, seem most useful from a teacher's perspective and provide practical guidance for implementation.

3. Key Areas for Improvement

There are several areas that deserve special attention.

3.1. Connection to Digital Competence and Informatics

The framework claims to build on the DigComp 2.2 framework, but it does not make sufficiently clear that AI literacy is part of the learner's digital competence. AI literacy should be understood as a current and relevant type of digital competence, not as a completely separate domain.

What needs strengthening: The framework should make explicit connections to digital competence frameworks, particularly noting that the first three domains develop students' digital competence. It's important to clarify that AI literacy is a

basic area of competence similar to digital literacy, and that understanding AI tools is comparable to learning digital literacy - using computers and their potential for daily life.

Key principle: AI literacy does not replace Informatics. To have the ability to design or work in the area of AI, you need to understand where this came from. The basis is Informatics, logic, algorithms, and algorithmic thinking, which are all connected to Informatics. You cannot really understand AI without understanding the basics of Informatics. However, this framework's aim is to teach AI literacy - how to use AI tools - not to teach AI itself.

3.2. The Fourth Domain (Designing AI) Requires Reconsideration

The fourth domain is unrealistic without students having substantial background in computer science and informatics. This domain should either be significantly scaled back or addressed in a much more limited way.

Suggested approach: If the intention is to include activities like designing simple chatbots, this should be stated clearly in the title and scope. For example, scenarios suggesting students "program a simple chatbot using conditional logic" are unrealistic without previous programming knowledge.

Recommendation: Make this domain much more minor in scope, or clearly state the substantial prerequisites needed for meaningful implementation.

3.3. Terminology and Definitions

The definitions of AI, particularly K1 (The nature of AI) and K2 (AI reflects human choices and perspectives), use disciplinary terminology without providing smooth introduction to technical concepts. This creates confusion rather than clarity for educators and students without informatics backgrounds.

Specific issues:

- The "machine-based system" terminology fails to connect AI to computers and programming
- References to "machines" may evoke dystopian imagery rather than helping readers understand AI's actual role in society
- Technical terms like "algorithm," "training," and "Large Language Models" are used without proper introduction

3.4. Computational Thinking Treatment

The skills section's treatment of computational thinking is problematic. The description given relates more to digital competence than to the type of thinking associated with computing. We recommend renaming this skill to "Planning," "Structured Interaction," or "Reflect and Prompt."

4. Recommendations for Improvement

In this section, we include specific recommendations of several kinds that would hopefully improve the report.

4.1. Terminology Recommendations

To clarify aspects of the report, we strongly suggest the inclusion of a comprehensive **Glossary** in which various terms can be defined, including:

- Large language model
- Computational thinking
- Algorithm
- Machine (clarifying that this refers to computers)
- Training (in AI context)
- Bias (in AI systems)

Additional terminology adjustments:

1. Replace "computer science" with "computer science/informatics" throughout the document to reflect global terminology preferences, particularly in Europe where "informatics" is the preferred term.
2. In the section "Young People are experimenting with AI," replace "AI literacy provides a clear understanding of how AI technologies work" with "AI literacy provides insights into how AI works" to avoid overstating the framework's scope.

4.2. Content Improvements

1. Include under K4 (AI's capabilities and limitations) the important limitation that AI systems often produce incorrect or inaccurate answers, including hallucinations.
2. Under Goal 2, add: "These topics are developed and can be studied in further courses in programmes on data science, computer science/informatics, machine learning and artificial intelligence itself."
3. In K2.5, replace "Bias inherently exists in AI systems..." with "Although highly undesirable, bias may exist..."
4. Include "ethical" under the Attitudes section.
5. In the Framework Structure section, consider omitting "fundamental" when mentioning "understanding."

4.3. Structural Suggestions

1. Consider moving the earlier descriptions of goals to an appendix to provide easier access for teachers whilst maintaining the important explanatory content.
2. Make explicit connections to digital competence frameworks throughout the document.

4.4. Recommendations for Implementation

For the framework to be successfully implemented globally, we strongly recommend:

1. **Clear Scope Definition**: Clearly communicate that this document serves as guidelines for teachers on AI literacy (using AI tools), not comprehensive technical AI education.
2. **Prerequisites for Advanced Domains**: Clearly state that technical AI education (particularly the fourth domain) requires prior knowledge in informatics, data handling, and statistics.
3. **Policy Considerations**: While not the primary audience, policymakers should understand the need to establish necessary informatics background in curricula before introducing advanced technical AI content.
4. **Phased Implementation**: Recognize that while the first three domains can be readily applied as digital competence development, the fourth domain requires substantial curriculum development and prerequisites.

5. Conclusion

The framework represents valuable work with specific and useful guidelines for teachers. With appropriate revisions addressing the connection to digital competence and informatics, clearer acknowledgement of prerequisites, and better terminology clarification, this framework could provide excellent guidance for educators new to AI literacy.

The framework's strength lies in its practical approach and comprehensive coverage of AI literacy domains. Its impact will be significantly enhanced by:

- Stronger grounding in established digital competence principles
- Clear distinction between AI literacy (using AI tools) and technical AI education
- Realistic scoping of the fourth domain
- Comprehensive glossary and terminology clarification

This framework fills an important gap in educational guidance, and with these refinements, it can serve as an invaluable resource for teachers navigating the integration of AI tools in education.