

Towards a European review framework for AI EdTech systems

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The need for a review framework

“We do not have tools or methods today to know when an AI model is safe and effective.”¹

Arati Prabhakar,
Director of the White House Office of Science and Technology Policy

The adoption of education technology (EdTech) in schools and learning environments has increased over the past decade.² Even the most recent Programme for International Student Assessment (PISA) results clearly highlight the potential for the use of technology within education with the Organisation for Economic Co-operation and Development stating that “it is important to ensure that all schools, regardless of their socio-economic profile, enjoy adequate and quality educational material and digital resources”.³ However, the impact of EdTech is still either being called into question or lacks unequivocal proof through clear measurement.

Since 2022, there has been a “Cambrian explosion”⁴ of artificial intelligence (AI) tools being developed for and used in education settings. Despite AI-enabled technologies designed for use in education either being introduced into existing products or being promoted into education environments, there is currently little independent evidence for either their efficacy or safety, and no specific regulations to protect the human rights and well-being of children engaging with artificial intelligence in education (AIED), or for their teachers.

It is difficult for decision makers, procurers and users of technology solutions in education to trust the claims of technology providers without evidence, and difficult for technology providers to support innovative change within education without the trust necessary to access proper testing environments and the ability to co-develop with education communities. In fact, although trust plays such a key role in the adoption and use of EdTech, “only 7% of EdTech tools have rigorous evidence and 11% of education decision-makers consider evidence when making a purchase decision”.⁵ To counteract this, approximately 50% of EdTech companies work together with research institutions, however, “only 39% of solutions have any published research”.⁶ The lack of independent and recognised testing environments and commonly accepted evidence criteria can play an important role here.

1. D. Ingvarson (2023), AI in Australian Education Snapshot: Principles, Policy, and Practice, Education Services Australia, www.esa.edu.au/resources/news-articles/article-detail/ethical-and-effective-ai-in-education-a-policy-maker-s-roadmap.
2. EdSurge, www.edsurge.com/news/2023-05-02-why-it-s-imperative-that-EdTech-providers-prove-their-products-work.
3. OECD (2023), PISA 2022 Results (Volume I): The State of Learning and Equity in Education, PISA, OECD Publishing, Paris, <https://doi.org/10.1787/53f23881-en>.
4. <https://edtechinsiders.substack.com/p/the-cambrian-explosion-of-ai-edtech>.
5. Speech of Isabelle Hau, Executive Director of Stanford Accelerator for Learning, Accelerate Edtech Impact Summit, 8 November 2023, available at <https://acceleratelearning.stanford.edu/conference/accelerate-edtech-impact-summit>.
6. 2023 EdTech Evidence Mid-Year Report, Learn Platform by Instructure, www.instructure.com/resources/research-reports/edtech-evidence-2023-mid-year-report?filled=.

According to Common Sense, almost all the EdTech applications and services it evaluated do not clearly define safeguards taken to protect child/student information, do not support encryption or lack a detailed privacy policy.⁷ An independent review framework that is internationally recognised, explores fundamental criteria of use within education and learning environments, and protects human rights and the well-being of those engaging with AIED products would be an answer to some of the biggest challenges regarding trust, transparency and evidence-based decision-making practices, as well as support AIED implementation and innovation.

Industry expresses desire for review systems

In April 2023, a large number of industry leaders and researchers advocated for a temporary halt in the advancement of AI technologies. They argued that “[p]owerful AI systems should be developed only once we are confident that their effects will be positive and their risks will be manageable”⁸ The primary reason for this pause was to create essential policies for ensuring the safety of these systems. At the same time, OpenAI continued development and has actively lobbied the EU Parliament to reduce regulatory reach, claiming that general purpose models, like generative pre-trained transformers (GPT), should not be considered “high risk”, which would subject them to more stringent legal requirements.⁹

Larger tech organisations, such as Microsoft, IBM and Google, have developed their own AI principles,¹⁰ and a number of big tech corporations have joined together with a voluntary commitment to safety, security and trust within AI.¹¹ An analysis of 22 major ethics guidelines, however, highlights a common issue: “AI ethics—or ethics in general—lacks mechanisms to reinforce its own normative claims” and principle frameworks like this “are rather weak and pose no eminent threat”¹² to any of the stakeholders, thus not bringing about the change that is necessary.

The majority of the EdTech industry is not represented by large tech corporations. In fact, just under 70% of EdTech providers within the greater European region are micro-organisations¹³ and operate under vastly different conditions. The European EdTech Map 2023¹⁴ asked respondents to address the potential role of evidence-based testing for them. Some 87% of respondents answered that evidence-based testing and certification would help the EdTech sector, for example in building trust or entering different markets.¹⁵ Further, there is a desire for unified evaluation frameworks that allow transparency and transferability across borders.

A notable issue to address when reflecting on evaluation practices in AIED is the clear disparity between the priorities of large corporation-led initiatives and the principles set forth by policy makers worldwide. The industry’s approach often prioritises immediate, practical steps rather than focusing on long-term goals or intentions. In essence, it emphasises the methods of implementation rather than the ultimate objectives. It is important to develop a system of review that can encompass both perspectives. This would mean that, while the industry welcomes and even demands some kind of regulatory framework, there is a need for this to be independently implemented, locally relevant, internationally aligned and include long-term policy goals. A review system can also lead to development guides, which support EdTech organisations in their future development.

Trust, European values and needs from a policy perspective

Only through education can we establish the necessary conditions for all European citizens to be included socially and participate equally in a democracy that is increasingly influenced by digital technology. Rethinking education in the digital age therefore matters for safeguarding European values such as equality, democracy and the rule of law.¹⁶

7. www.commonsemmedia.org/press-releases/new-privacy-analysis-of-edtech-industry-by-common-sense-finds-serious-risks-for-kids-using-educational.

8. <https://futureoflife.org/open-letter/pause-giant-ai-experiments/>.

9. <https://time.com/6288245/openai-eu-lobbying-ai-act/>.

10. See www.microsoft.com/en-us/ai/principles-and-approach and www.ai.google/responsibility/principles/.

11. www.whitehouse.gov/briefing-room/statements-releases/2023/07/21/fact-sheet-biden-harris-administration-secures-voluntary-commitments-from-leading-artificial-intelligence-companies-to-manage-the-risks-posed-by-ai/.

12. T. Hagendorff (2020), “The Ethics of AI Ethics: An Evaluation of Guidelines”, *Minds and Machines* 30, pp. 99-120, <https://doi.org/10.1007/s11023-020-09517-8>.

13. European Edtech Alliance (2023), European EdTech Map: Insight Report 2023, www.edtecheurope.org/publications.

14. www.edtecheurope.org/european-edtech-map.

15. European Edtech Alliance e.V. (2023), EdTech Map: Insight Report 2024, to be published.

16. European Parliament (2020), Rethinking education in the digital age, [www.europarl.europa.eu/thinktank/en/document/EPRS_STU\(2020\)641528](https://www.europarl.europa.eu/thinktank/en/document/EPRS_STU(2020)641528).

Initiatives, such as the Council of Europe's Guidelines to support equitable partnerships of education institutions and the private sector,¹⁷ or the Trust Framework from the Netherlands,¹⁸ define a set of key values and practical guidelines for EdTech founders, EdTech buyers and contract management. They can act as a foundation for public-private co-operation or partnerships and support the procurement processes. This is echoed in the European Commission's "Time for Action" document resulting from an industry round table, which identified that European EdTech needs to support and promote European values such as inclusion, high quality, accessibility, data security privacy and multilingualism.¹⁹

Sharing a common framework for evaluation and review of AIED can not only help to build trust between sectors, but also streamline certification practices, increase the pool of applicable innovations that can be implemented in a specific region and allow local policy work to focus on local requirements. Furthermore, a review system can act as a benchmark ensuring key issues are being certified and evaluated. For example, in a study exploring rights-based AI principles, 64% of all the gathered papers made a reference to specific human rights-related documents, but only five documents employed a human rights framework.²⁰ In developing an international review framework for AIED, European values and human rights frameworks can therefore play a vital role.

A need identified by education institutions

Globally, governments and ministries are exploring the best ways of engaging educators and administrators within education environments to learn about the use of AI in education environments and about learning and teaching with AI. A variety of skills-based initiatives are being developed both within Europe and internationally.²¹ In order to make informed decisions and profit from innovations within their education and learning settings, it is imperative that decision makers can trust the resources they are considering and be able to compare systems including risk and potential factors requiring mitigation processes. Although procurement guides are being developed at a national, municipality and even school level to help educators and administrators make informed decisions about these new technologies, education institutions are currently questioning their ability to meet the specific skill sets required to appropriately evaluate and vet these new technologies.

Current review frameworks and certification environments for EdTech

Public initiatives

Local and international political support for the certification of EdTech is increasing as evinced by organisations such as the Council of Europe, which has announced its intention to develop a feasibility study for an international review system for EdTech solutions,²² and the European Commission, which supports funded projects aiming to scale up European Union-based solutions through co-operation and quality assurance.²³

Several publicly funded initiatives within Europe are already exploring the best way of increasing trust and evidence in EdTech products and services by providing certification criteria and review frameworks. These include systems like EduCheck Digital,²⁴ a combined state education ministry project in Germany certifying digital education resources, Safer Technology 4 Schools (ST4S),²⁵ certifying the privacy and security of digital products in K-12 education in Australia, and the OEAD Lern-Apps-Gütesiegel,²⁶ an initiative of the Austrian Federal Ministry of Education, Science and Research (BMBWF), which certifies learning applications and furnishes them with a seal of approval intended to provide teachers, pupils and guardians with guidance when selecting apps for learning.

17. www.coe.int/en/web/digital-citizenship-education/dce-privatesector.

18. www.trustframework.eu.

19. www.edtecheurope.org/news/plwbst9o8f08bbuzjxovlwbhjn81b.

20. J. Fjeld et al. (2020), "Principled Artificial Intelligence: Mapping Consensus in Ethical and Rights-Based Approaches to Principles for AI", *Berkman Klein Center Research Publication No. 2020-1*, available at SSRN: <https://ssrn.com/abstract=3518482> or <http://dx.doi.org/10.2139/ssrn.3518482>.

21. D. T. K. Ng et al. (2023), "Teachers' AI digital competencies and twenty-first century skills in the post-pandemic world", *Education technology research and development* 71, pp. 137-161, <https://doi.org/10.1007/s11423-023-10203-6>.

22. Council of Europe (2023), www.coe.int/en/web/artificial-intelligence/work-in-progress.

23. European Commission (2023), www.eacea.ec.europa.eu/news-events/events/online-information-day-partnerships-innovation-forward-looking-projects-2023-2-february-2023-2023-02-02_en.

24. <https://educheck.schule>.

25. <https://st4s.edu.au>.

26. <https://lernapps.oead.at/de/>.

Private initiatives

Private initiatives aim to provide more targeted and agile support with regard to evidence-based quality assurance or certification. For example, the company EdTech Impact²⁷ not only provides a quality assurance framework, but also relies on crowd-sourced feedback to support the findability and searchability of trusted products. Other examples can be found in the Education Alliance Finland,²⁸ which certifies the pedagogical quality of an EdTech using a framework developed by Finnish teachers and researchers, or even Goldstar EdTech Diagnostics,²⁹ a company developed from a research project at University College London. Other, international product certification frameworks can be found in the civil sector from organisations such as the International Society for Technology in Education (ISTE) with its ISTE Seal,³⁰ seeking to showcase products that have been tested for quality and usability, and Digital Promise.³¹

While private initiatives can be comparatively fast and offer comprehensive analyses of specific areas of evidence, they can also have high costs involved with the certification itself costing thousands of euros or dollars and the maintenance of the certification, for example the right to continue carrying the certificate, costing more each year. The Norwegian organisation, International Certification of Evidence of Impact in Education (ICEIE),³² seeks to align the private certification ecosystem and provide clarity across the different unique components of certification to help decision makers understand the result comparatively and make evidence-based decisions.

Potential for an international review framework for AI

There is a demonstrated need from all segments of the EdTech ecosystem for the development of a review system providing verification to both foster evidence-based decision making and enable innovations to prove their product's claims and increase trust across multiple topics such as safety, security, privacy, data use and transparency. Additionally, with so many initiatives from the public, research and private sectors developing quality assurance mechanisms, there is a need to be aligned across fundamental criteria to ensure the results can be trusted by and made meaningful to environments not only throughout Europe, but also in the broader international ecosystem.

AI-specific environments and the educational context

Within an education context, it will be important to differentiate between the different levels of education and learning practice and consider their respective needs, purchasing processes and learning responsibilities. Additionally, it will be important to distinguish between the different types of AIED technologies, their area of implementation, their use of data and privacy requirements, for example tools used for administrative tasks, learning and tutoring systems, or assessment tools. Furthermore, it will be vital to have a better understanding of the way in which these AIED applications or models are developed and structured, to transparently show both the areas of responsibility or accountability, and the data flows and privacy issues involved. With the rapid pace of development and marketplace structures evolving, it will be important for informed decision making to differentiate between foundational models and applications built upon these models and provide transparency about these differences and the base models being used.

Although some national organisations, such as ST4S, are exploring the expansion of their criteria to include AI and education requirements,³³ there is currently no framework that outlines these specific factors for independent review in an internationally comparable and aligned fashion.

Scope and possible criteria for an international AI review framework

Widespread AIED use requires specific review frameworks that go beyond the need for existing quality assurance criteria for general EdTech use. An international alignment across stakeholder requirements could not only increase trust and empower evidence-based decisions, but also ensure safe practice when developing and using AIED tools. Certain elements of existing review practice, such as educational or curriculum alignment, user experience and performance, could be covered by complementary and existing review frameworks.

27. <https://edtechimpact.com>.

28. <https://educationalliancefinland.com>.

29. <https://www.goldstared.com/>.

30. <https://iste.org/iste-seal>.

31. <https://digitalpromise.org/>.

32. <https://eduevidence.org>.

33. Australian Framework for Generative Artificial Intelligence (AI) in Schools (2023), www.education.gov.au/schooling/resources/australian-framework-generative-artificial-intelligence-ai-schools.

Tools should also be verified, however, according to performance metrics like accuracy, efficiency and scalability, assessing whether the AI operates reliably under typical educational loads. Evidence-based approaches should explore claims of enhancing student engagement and knowledge retention. Equally important are legal and regulatory compliance of these newer applications of AI technologies, and data privacy, security, bias and fairness. AI tools should not only adhere to existing data privacy laws, for example the General Data Protection Regulation, but also ensure secure handling of student data and robust protection against breaches. Furthermore, there should be a focus on mitigating algorithmic bias and promoting equity and cultural inclusivity. Safe integration with existing educational technologies is key, requiring compatibility and interoperability. The impact of these tools on educational outcomes, teacher support and student feedback should be measurable and evaluated. Finally, ethical considerations and transparent AI processes are essential. A framework built around criteria like these could balance innovation with responsibility, ensuring AI tools in education are beneficial, secure and equitable.

Impact assessments should span both short- and long-term impacts to regularly assess the immediate and long-term effects of AI integration on educational outcomes, student well-being and human rights. It will be important to define stakeholder engagement in this process to establish a broad range of insights, which could involve teachers, parents, students and educational experts.

Summary

To address the challenges of trust, transparency and evidence-based decision making in AIED, an internationally recognised, independent review framework is essential. This framework would safeguard human rights and well-being in educational settings, guiding the certification, implementation and evaluation of AIED products. Such a system, embraced by all education sector stakeholders, would foster trust, streamline certification processes and enhance the adoption of innovative AI solutions tailored to regional needs. While various private and public initiatives are exploring certification frameworks, a dedicated, international AIED review system could align these efforts, setting a global benchmark for evaluating critical issues in AIED.

Evidence standards and research initiatives

Few national frameworks for evidence standards exist and these vary by country, with some nations like the USA and UK establishing clearing houses to monitor evidence-based educational resources. The USA's Every Student Succeeds Act's (ESSA) standards of evidence,³⁴ for example, provide detailed guidance for selecting and using evidence-based tools and interventions, categorised into four levels ranging from promising to strong evidence. This framework advises educators to engage in ongoing monitoring and evaluation of these interventions. Research-based initiatives include certification practices such as those of the EdTech Index in Germany³⁵ or Western Norway University of Applied Sciences (WiKIT) from Norway³⁶ and explore the efficacy of EdTech and developing research design principles to address key issues of quality in EdTech. These do not, however, expressly look at the effects of AI or currently cover the specific use of AI in education.

Co-ordinated frameworks and structured dialogue

The lack of co-ordination among these initiatives presents a major challenge. This is particularly true for EdTech providers operating in various markets and for educators who must sift through and assess different products and assess the relevance of different certifications. Currently, there is an absence of structured dialogue that would allow for knowledge exchange and substantial interaction with stakeholders. Such dialogue is crucial to ensure that action taken effectively addresses concerns, fosters trust and promotes decisions based on evidence. Establishing shared frameworks of understanding is essential to enable the efficient use and development of EdTech in educational environments.

34. <https://ies.ed.gov/ncee/wwc/essa>.

35. T. Brüggemann and C. Wiepcke (2023), Der EdTech-Index (ETX) – Beurteilungskriterien digitaler Bildungsmaßnahmen am Beispiel der Beruflichen Orientierung, Karlsruher Beiträge zur Ökonomischen Bildung Beitrag Nr. 3, Institut für Ökonomie und ihre Didaktik, Pädagogische Hochschule Karlsruhe, www.ph-karlsruhe.de/hochschule/fakultaet-fuer-natur-und-sozialwissenschaften/institut-fuer-oekonomie-und-ihre-didaktik.

36. Western Norway University of Applied Sciences, www.wikit.no.