Sign Language Learning Opportunities in the Era of Artificial Intelligence – A European Perspective

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Filipe Venade de Sousa's (2025) edited volume on Sign Language in the Era of Artificial Intelligence, published (open access) by the European Union of the Deaf, explores how artificial intelligence intersects with sign languages, Deaf communities, and linguistic rights. The book combines an Ethical Framework, a Declaration of Principles, and an Exploratory Report to provide clear guidance on how AI can be developed responsibly. Its central message is clear: AI must follow a human-rights-based approach, respecting linguistic and cultural diversity while ensuring that deaf people remain active rights-holders, not passive recipients of technology.

Within this broader framework, the chapter by Christian Rathmann and Péter Zalán Romanek on *AI-Generated Sign Languages (AI-SL)* offers an in-depth look at opportunities and risks. Advances in machine learning and large language models create new possibilities for accessibility in education and public services. Yet, sign languages are still treated as "low-resource languages" in AI, which excludes them from mainstream technologies and reinforces inequalities. The authors warn of dangers such as cultural misrepresentation, data misuse, and replacing human interpreters with imperfect systems in high-stakes areas like healthcare, justice, and education.

A key concern raised throughout the book is the need to safeguard linguistic and cultural integrity. This requires informed consent, fair remuneration for data use, and strong safeguards for biometric data usage. Just as importantly, AI must be co-designed with deaf experts and communities to ensure that systems reflect the diversity of sign languages, including regional and cultural variation.

Applied to the context of the Council of Europe, these insights are especially relevant. They align with the Convention on Artificial Intelligence, Human Rights, Democracy and the Rule of Law, as well as with the UN Convention on the Rights of Persons with Disabilities (CRPD) (United Nations, 2006), the UNESCO recommendations on AI ethics (UNESCO, 2024), and the EU AI Act (European Union, 2024). All these instruments stress transparency, accountability, fairness, and respect for human dignity.

In connection with the ECML DeafSign project, this book underlines the importance of plurilinguistic and pluricultural learning, teaching, and assessment. AI-driven tools can expand learning opportunities for vulnerable learners:

- Deaf learners with immigration or refugee backgrounds, who need multilingual and multicultural integration pathways;
- Deaf children and their hearing families, who benefit from bilingual and bimodal materials that promote early communication;

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- Heritage signers, who may use AI tools to reconnect with their linguistic heritage and strengthen their plurilingual repertoires.

In sum, the book, and particularly Rathmann and Romanek's chapter, makes a strong case for co-creation-oriented, ethically grounded, and legally aligned approaches to AI in sign languages (arguments that are also centred in Way, Leeson and Shterionov's (2024) edited volume, *Sign Language Machine Translation*). It calls on European institutions and national governments to ensure that AI supports, rather than undermines, linguistic justice, cultural identity, and democratic participation for deaf people and their communities.

Unlocking educational opportunities in sign languages in Europe (2024–2027)

The rapid development of AI-generated sign language (AI-SL) is changing how we think about language learning, teaching, and assessment. For Deaf communities, these new tools open doors to opportunities but also raise important questions about language power, rights, and diversity. AI-SL must not replace human expertise but instead act as a supportive and empowering resource that strengthens sign language learning opportunities in Council of Europe member states.

The ECML's *DeafSign* project places particular emphasis on learners who are often overlooked in policy and practice: deaf learners with immigration and refugee backgrounds, deaf children and their hearing families, and heritage signers. For these learners, AI-SL could create opportunities between languages and cultures, in families at home, and between generations with access to their linguistic-cultural heritage.

At the same time, these tools must be carefully designed to avoid reinforcing inequalities. If developed without deaf leadership, AI risks treating sign languages as "low-resource languages", marginal and marginalised, thus reproducing old biases and hierarchies in digital form.

To address this, *DeafSign* recommends that AI-SL be firmly rooted in rights-based foundations, including linguistic human rights and Deaf Digital Law Development (De Sousa, 2025) must be deaf-led, with migrants, hearing families, and heritage signers fully represented. AI-SL should also be aligned with the CEFR Companion Volume (International Sign Language version), ensuring comparability in teaching, learning, and assessment across contexts. Investment in inclusive datasets is vital to represent regional and minority varieties of sign languages, and strict ethical safeguards are needed to protect biometric data, ensure informed consent, and provide fair remuneration for contributions.

Finally, policy guidelines shall be developed to help governments and institutions embed AI-SL responsibly into education and public services. This means alignment with the Convention on the Rights of Persons with Disabilities (CRPD) (United Nations, 2006), UNESCO guidelines (UNESCO, 2024), the Council of Europe's AI Convention (Council of Europe, 2024), and the EU AI Act (European Union, 2024) all of which underline the values of equality, accountability, and cultural respect.

By following these pathways, AI-SL can become more than a technical innovation. It can be a tool for empower-sharing, giving deaf learners with diverse backgrounds, deaf children and their hearing families, and heritage signers and their communities the power to shape their own linguistic-cultural contribution and recognition. It can foster plurilinguistic and pluricultural learning and teaching

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environments where mediation across languages and cultures is valued. And most importantly, it can strengthen the recognition of sign languages as languages that are valued equally across Europe.

Conclusion

AI-SL has the potential to expand learning opportunities for deaf learners with refugee and immigration backgrounds, deaf children and their families as well as heritage signers across Europe. When developed through deaf-led co-design, grounded in plurilingual and pluricultural education, and embedded in policy frameworks, it can support inclusion, family communication, and heritage language appreciation — while safeguarding the dignity and diversity of deaf sign language communities.

References

Framework Convention on Artificial Intelligence and Human Rights, Democracy and the Rule of Law, (2024). https://rm.coe.int/1680afae3c

AI Act, (2024). https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32024R1689

UNESCO. (2024). *Recommendations on the Ethics of Artificial Intelligence*. https://www.unesco.org/en/articles/recommendation-ethics-artificial-intelligence

United Nations. (2006). *Convention on the Rights of Persons with Disabilities*. New York: United Nations Retrieved from http://www.un.org/esa/socdev/enable/rights/ahc8adart.htm

Venade de Sousa, F. (2025). *Sign Language in the Era of Artificial Intelligence*. European Union of the Deaf. https://eud.eu/wp-content/uploads/2025/09/Book-Sign-Language-in-the-Era-of-Artificial-Intelligence-1.pdf

Way, A., Leeson, L., & Shterionov, D. (Eds.). (2024). *Sign Language Machine Translation*. Springer Nature.

Rathmann Christian (*et al.*) (2026), *Unlocking educational opportunities in sign languages in Europe*, Council of Europe (European Centre for Modern Languages), Graz, available at www.ecml.at/DeafSign.