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Editorial introduction

Machine Learning for Learning Machines

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Abstract
This special issue examines the overlap between machine learning, language, and pedagogy. It asks what role artificial intelligence plays in language teaching and language use. The issue returns to an old dream – combinatorial machines that would reveal the structure of language, produce new ideas, and create a universal means of communication. Many current systems, however, set semantics aside. This raises the question of whether language use and understanding can come from machine-learnable syntax and pragmatics alone, without meaning or reference. As generative AI becomes common, we face a world where machines train humans, write academic prose, and imitate understanding. The thirteen contributions to this issue bring together philosophers of technology, linguists, and educational theorists to examine this shift. They cover the history of educational automation, how human-AI interfaces affect thinking, empirical studies on AI literacy and coaching, and critiques of AI detection systems and the capacity of machines to truly "think". A dedicated subsection reflects on Borges's 1937 essay "Ramon Llull's Thinking Machine," using this history to examine contemporary generative models. Together, the papers show an increasingly two-way relationship between machine learning and human learning, bringing questions of agency, expertise, judgement, and evaluation to the centre of debates about what learning means when generative AI is ubiquitous. This issue brings these contributions together and speaks to both the promise and the risk of automated language.

Keywords: Generative AI; Philosophy of Technology; Language Pedagogy; Combinatorics; Epistemic Agency; Machine Learning

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Редакторская заметка

Как учат машины, способные учиться

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Аннотация
Настоящий специальный выпуск посвящен исследованию точек пересечения между машинным обучением, лингвистикой и педагогикой. В центре внимания авторов — вопрос о том, какую роль искусственный интеллект играет в преподавании и практическом использовании языка. Выпуск возвращает нас к давней мечте о комбинаторных машинах, способных раскрывать структуру языка, генерировать новые идеи и служить универсальным средством коммуникации. Однако многие современные системы оставляют семантику в стороне. Это ставит закономерный вопрос: могут ли использование и понимание языка опираться исключительно на синтаксис и прагматику, доступные для машинного обучения, в отрыве от смысла и референции? По мере повсеместного распространения генеративного ИИ мы сталкиваемся с миром, где машины обучают людей, пишут академические тексты и имитируют понимание. Тринадцать работ, вошедших в данный выпуск, объединяют исследователей в области философии техники, лингвистов и теоретиков образования для осмысления этого сдвига. Авторы рассматривают историю автоматизации образования, влияние интерфейсов “человек — ИИ” на когнитивные процессы, представляют эмпирические исследования грамотности в сфере ИИ (AI literacy) и ИИ-тьюторства, а также предлагают критический анализ систем обнаружения сгенерированного контента и самой способности машин к подлинному “мышлению”. Отдельный подраздел посвящен эссе Хорхе Луиса Борхеса 1937 года “Логическая машина Раймунда Луллия” — через призму этой истории авторы анализируют современные генеративные модели. В совокупности статьи демонстрируют все более выраженный двусторонний характер взаимосвязи между машинным и человеческим обучением. Это выводит вопросы субъектности, экспертных знаний, суждения и оценки в самый центр дискуссий о том, что представляет собой обучение в эпоху повсеместного присутствия генеративного ИИ. Настоящий выпуск обобщает эти подходы, раскрывая как потенциал, так и риски автоматизации языка.

Ключевые слова: Генеративный ИИ; Философия техники; Лингводидактика; Комбинаторика; Эпистемическая субъектность; Машинное обучение

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With artificial intelligence now common, readers and writers, students and teachers face new questions. When any text can be generated by a prompt or translated automatically, why learn languages at all? If machines can train humans to complete sentences correctly in another language, what will teaching look like? And if machine learning can identify which learning strategies work for humans, can AI then improve face- to- face teaching in the classroom? All of these questions matter because of what they imply for the multilingual life in our global village.

These questions also bring back an old dream: combinatorial and computational devices that would reveal the structure of language, produce new ideas and find a universal means of communication. Many contemporary systems set semantics aside. This, however, raises the question of whether language use and understanding can come from machine-learnable syntax and pragmatics alone, with no appeal to meaning and reference. The thirteen papers gathered in this Special Issue take up that question. Their authors are philosophers of technology and language, historians and theorists of pedagogy, (multi)linguists and language instructors, and researchers in science, technology and cultural studies, and together they examine where machine learning and human cognition meet. One ambiguity runs through the collection, and it is a useful one. The “learning machine” can be a machine that learns, as in contemporary machine learning; a machine built to support human learning, from the teaching machines of an earlier age to today’s AI tutors; or, more provocatively, the human learner, who increasingly works inside an environment shaped by algorithms. These meanings now converge. Large language models are trained on vast stores of human-produced language, and human learners meet language more and more often in outputs that such models generate, filter, translate, correct and evaluate. It is no longer accurate to say that humans teach machines, or that machines assist humans. The relationship now goes both ways. Human knowledge trains machines; machines reorganise and reproduce it; humans learn from the results and judge them; and these exchanges in turn shape later technological and pedagogical practice.

The collection begins with a historical survey that situates the present technological rupture in a wider historical and cognitive frame. Lorenzo De Stefano (2026) traces the history of educational automation from cybernetics to large language models. Generative AI, he argues, produces the kind of explanatory discourse we usually associate with human understanding, yet the priority in education should remain the cultivation of human agency and judgement. His account follows the thread from early mechanical teaching aids, Sidney Pressey’s testing machines and B. F. Skinner’s programmed instruction among them, to modern computer-assisted instruction. Immediate feedback and hyper-personalisation turn out to be recurrent promises, not new ones, and their recurrence points to something troubling: a persistent push to standardise knowledge so that it can be computed. De Stefano warns that relying uncritically on such systems may

separate the successful performance of a task from the formation of critical judgement. How people manage their dependence on machines therefore becomes more urgent.

The next two contributions connect this discussion to specific design features of current digital technologies. Anastasia Lisenkova and Olga Shipunova look at how the digital interface affects thinking, which they conceptualise as a semantic matrix and a chronotope. On this view AI systems organise the interplay of space and time, and in doing so shape both human- AI dialogue and the production of knowledge. The authors reject the assumption that the interface is a neutral conduit for transferring information. For them it is instead an active structure that shapes the whole sequence of cognitive operations, from selection and context-binding to final inference and action. They also draw on C. G. Jung's cultural archetypes to read the communicative design of these environments, arguing that the projection of "trusted agent" models subtly influences user motivation and helps shape how users orient themselves (Lisenkova & Shipunova, 2026). Sergey Sakhnevich (2026), writing from the digital humanities, proposes an AI tool for lemmatic analysis that would complement human expertise. It is meant to help identify central themes in texts of radically different styles.

David Link's (2026) paper spans the technical, the pedagogical and the philosophical, and takes up the nature of large language models. He goes back to Turing and rejects common objections to machine intelligence, from Ada Lovelace's critique of originality to Searle's Chinese Room. LLMs, he argues, do more than predict statistics: they build compressed, emergent internal representations of the world, although the nature of human and machine minds alike remains enigmatic. Scepticism about machine cognition is answered point by point. Neural networks, Link contends, generate highly novel syntactic and semantic structures on their own, which challenges the limits traditionally set on computational creativity. To the objection that AI lacks sensory grounding he replies with Turing's premise that mental capabilities can be developed through communicative exchange between teacher and student alone. Link reads "emergence" as the sudden appearance of higher-order cognitive capabilities tied to massive training data, and concludes that LLMs offer a convincing imitation of human intelligence, even if the methods of neural networks do not fully clarify what the mind is.

Link's text also points to an earlier chapter in the history of learning machines, and so, implicitly, to the Argentinian writer Jorge Luis Borges. In 1937 Borges wrote an essay that identifies the idea of the learning machine with the work of Ramon Llull, who in the 14th century developed a system for generating propositions that would open avenues for thought. The essay appeared 85 years before the release of ChatGPT and looked back 650 years to Llull's combinatorial *Ars Magna* (Figure 1). In a special subsection the contributors use this Borgesian lens to examine contemporary learning machines.

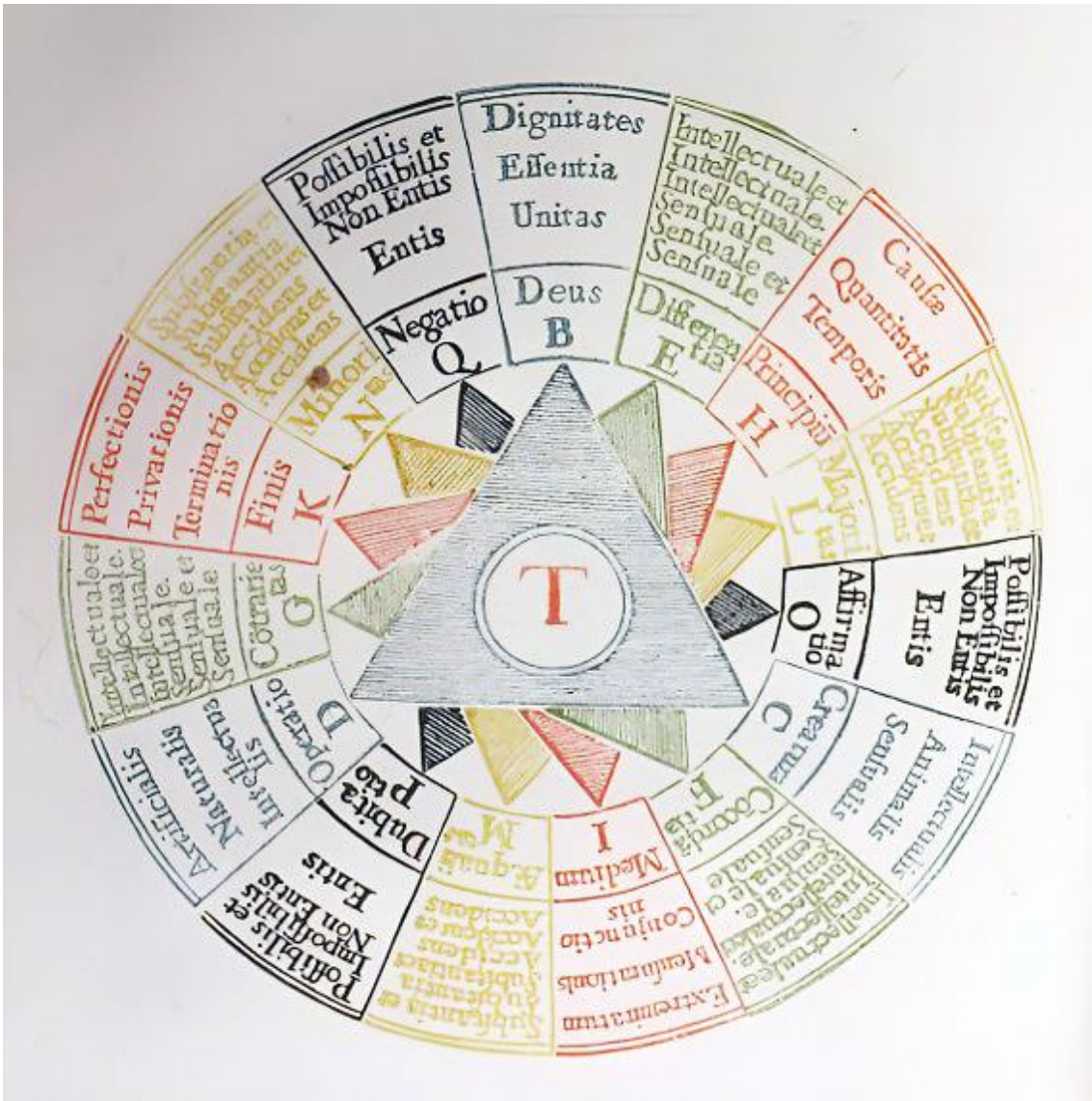

Figure 1. Ramon Llull's prototypical thinking machine subsequently led to the production of up to superimposed paper disks, which generate linguistic composites and thereby new concepts and new ways of thinking

Reiner Hähnle (2026) distinguishes the combinatorial tradition of Llull and Swift from the algorithmic tradition of the scientific age. According to him, much of today's criticism of LLMs was anticipated in Swift's satires. He points to "The Engine" in Jonathan Swift's Gulliver's Travels, and to a passage that mocks the wish to produce philosophy, poetry and laws without the "least assistance from genius or study". This echoes current worries about ChatGPT's promises to save labour. Hähnle sets out how the combinatorial approach, which applies chance to the solution of problems, differs from

the algorithmic tradition that runs from the astronomical clocks of antiquity to the computing machines of Leibniz and Babbage.

Daria Bylieva (2026) tackles the tension between determinism and chance. She argues that the poetic potential of generative AI appears only in random sampling, in the unpredictable variations that Borges might have compared to a “red tiger.” Closed combinatorial systems historically hit a dead end: because of their linear blindness they produced syntactic noise instead of truth. Transformers get past this with continuous semantic embeddings and dynamic attention mechanisms. Bylieva warns, though, that in a strictly deterministic mode, at a low temperature, LLMs only repeat linguistic clichés. Between strict alignment by reinforcement learning and stochastic creativity there is a trade-off, and she imagines a transformer that works within it by accepting calibrated uncertainty, a poetic instrument that leaves room for interpretation.

Cathrine Hasse (2026) reminds us that a machine’s failure to live up to its original ambition does not make it useless. The failures of historical devices such as Llull’s show the shape of human thought. Borges, she points out, ironically gives Llull’s invention the title of “thinking machine” only to take it away at once, comparing its capacity for thought to a magic lantern’s capacity for magic. Judging these mechanisms purely by functional success, however, misses their value for knowledge. Ekaterina Samorodova (2026), another contributor, builds on this. In her argument Llull’s “unsound” combinatorial method is a productive tool for forging poetic metaphors, and machine creativity is a matter of selection from a wide field, not of creation from nothing. The real source of creativity, she suggests, lies in the gap between a machine's grand design and its technical realisation. Dissecting Borges’s paradoxical conclusions, she shows that mechanical combinatorics fails as an instrument of religious cognition yet works very well as an engine of generative creativity, which depends on selection from many possibilities.

Cheryce von Xylander’s (2026) “Llullaby” is a personal media archaeology. It connects Llull’s “paper computer” to Weibel, to Kant and to the sensory ecosystem of modern digital gadgets. The starting point was the rediscovery of the shrink-wrapped volume Dia-Logos, edited by the late Peter Weibel, and von Xylander reflects on Weibel’s claim that Llull’s devotional disk of multi- layered rotating parts served as the multi-tab browser of the Renaissance. Her narrative links abandoned plans to commemorate Immanuel Kant as a sociotechnical constructivist with Borges’s magical realism, and thus bridges medieval theological combinatorics and the tactile digital ecosystems through which contemporary text is produced. Alla Komanova and Jacopo Vigna-Taglianti, finally, apply Llull’s combinatorics to linguistics. Their linguistic-semiotic analysis of English colour phraseology shows how the transcendent metaphysical attributes of the Absolute are refracted into the pragmatic, everyday language of the human world. Methodologically, they map English phraseological units onto a mandala-like diagram of nine attributes of the Absolute, centred on the symbol “A”. English, according to their findings, does not preserve these ideal Llullian spectra intact; it subjects them to everyday pragmatism. The authors identify the mechanisms involved, among them semantic reduction, inversion and functionalisation, by which sacral chromatic codes become a contradictory, empirical linguistic picture of the world (Komanova & Vigna- Taglianti, 2026).

The last section focuses on recent developments in generative AI. Questions of attribution are among the pressing issues in university learning environments, together with the critical skill needed to navigate the boundary between human and machine production. Aygul Shaykhulova and Andrey Medvedev discuss “the false positive paradox”: the best writing of scientists is so impersonal and conventional that it is the most likely to be mistaken for automatically generated text (Shaykhulova & Medvedev, 2026). They address the current ethical and epistemological crisis in modern academia and investigate how AI text detectors are deployed. The systems have high false-positive rates, and leaving authorship checks to algorithms undermines trust, because AI remains incapable of the transformational novelty that defines genuine human academic authorship. Their systematic review covers studies from 2022 to 2025 and scrutinises commercial tools such as Turnitin and GPTZero. It finds false-positive rates for academic texts of up to 41%, a three-to six-fold increase over standard news corpora. False-negative rates, moreover, often exceed 60% when texts are subjected to combined obfuscation techniques, so decisions based on a single detector are unreliable. Drawing on Margaret Boden’s theories of creativity and Thomas Kuhn’s philosophy of science, Shaykhulova and Medvedev propose a three-level, human-centred framework: initial screening, expert review and a formal appeals process. Its aim is to restore transparency, fairness and human judgement to academic integrity protocols.

Tereza Polednikova, Monika Ricicova, and Pavel Pilch explore AI literacy among Slavonic studies students. Their qualitative findings provocatively suggest that students judge AI outputs not by any technical understanding of the algorithms but by deep disciplinary expertise in linguistics and translation, which reaffirms how indispensable domain knowledge is (Polednikova et al., 2026). The contribution also suggests what the priorities in teaching digital competence should be. Quoc Khanh Nguyen and Minh Vinh Hien Huynh report a mixed-methods study of AI- assisted spoken language practice. According to their findings, AI coaching raises speaking self- efficacy through structural scaffolding and psychological safety, but it also has cognitive limits. Nguyen and Huynh therefore advocate a strategically designed practice that preserves independent reasoning and human interaction (Nguyen & Huynh, 2026).

Together, these studies suggest that the educational significance of generative AI cannot be measured by how much assistance it provides. The more important question is which kinds of intellectual work remain with the learner once such assistance is available. Fluent output is not the same as deep understanding, and frequent interaction with an AI system does not in itself constitute AI literacy. What matters educationally is the learner’s ability to question an output, to see its limitations, to compare it with disciplinary knowledge, and to decide whether to accept, revise or reject it. For language education the emerging challenge, seen this way, is to teach students how to use increasingly capable machines and, beyond that, to develop the judgement needed to learn responsibly with them.

The contributions give no single answer to whether machines understand, interpret, create or think. The issue shows that learning machines put pressure on the categories through which these capacities have traditionally been understood. The question is no longer only what machines can learn or what humans can teach them. It is what happens

to human learning, judgement, authorship and creativity once linguistic and intellectual activity is increasingly shared with computational systems. Learning machines are more than new educational or linguistic tools. They make us reconsider what learning itself involves. The essays in this Special Issue cover everything from the algorithms that structure our classrooms to the combinatorial wheels of medieval monks. They show that the effort to automate language is also an effort to understand ourselves. We invite you to explore these works, consider their answers and pose new questions.

REFERENCES

Bylieva, D. (2026). Between Determinism and Chance: From Llull's Machine to Generative AI. Models *Technology and Language,* *7*(3), 94-107. https://doi.org/10.48417/technolang.2026.02.07

De Stefano, L. (2026). Learning Machines: From the Automatic Teacher to Large Language Models. Models *Technology and Language,* *7*(3), 10-34. https://doi.org/10.48417/technolang.2026.03.02

Hähnle R. (2026). The Color of LLMs. *Technology and Language,* *7*(3), 87-93. https://doi.org/10.48417/technolang.2026.03.06

Hasse, C. (2026). The Thinking Machine and the Tiger. *Technology and Language,* *7*(3), 108-117. https://doi.org/10.48417/technolang.2026.03.08

Komanova, A., & Vigna-Taglianti, J. (2026). Chromatic Representation of Ontological Attributes: English Colour-Based Phraseological Units in the Light of Ramon Llull's *Ars Magna*. *Technology and Language,* *7*(3), 140-155. https://doi.org/10.48417/technolang.2026.03.11

Link, D. (2026). Covert Systems – On the Intelligence of Large Language Models. *Technology and Language,* *7*(3), 68-85. https://doi.org/10.48417/technolang.2026.03.05

Lisenkova, A., & Shipunova, O. (2026). Cognitive Capabilities of the Interface in Machine Learning: A Philosophical Perspective. *Technology and Language,* *7*(3), 35-47. https://doi.org/10.48417/technolang.2026.03.03

Llull, R. (1721–1742). Raimundi Lulli opera omnia (Vols. 1–8; I. Salzinger, Ed.). Ex Typographia Mayerscha per Joannem Georgium Häffner. (Original work composed c. 1300). Rare Book Collection, Martinus-Bibliothek, Mainz, Germany.

Nguyen, Q. N. & Huynh, M. V. H. (2026). AI Translation between Interpretation and Hallucination – Evidence for the Evaluative Competence of Vietnamese Students. *Technology and Language,* *7*(3), 207-232. https://doi.org/10.48417/technolang.2026.03.14

Polednikova, T., Ricicova, M. & Pilch, P. (2026). Artificial Intelligence Literacy in Slavonic Studies: Student Reflections. *Technology and Language,* *7*(3), 184-206. https://doi.org/10.48417/technolang.2026.03.13

Sakhnevich, S. (2026). Towards a Hermeneutic AI: A Lemmatic Approach to Nietzsche and Robbins. *Technology and Language,* *7*(3), 48-67. https://doi.org/10.48417/technolang.2026.03.04

Samorodova, E. (2026). Ramon Llull's Thinking Machine: Between Uselessness and Poetry. *Technology and Language,* *7*(3), 118-124. https://doi.org/10.48417/technolang.2026.03.09

Shaykhulova, A., & Medvedev, A. (2026). The False Positive Paradox: AI Detection Systems and the Erosion of Human Academic Authorship. *Technology and Language, 7*(3), 157-183. https://doi.org/10.48417/technolang.2026.03.12

von Xylander C. (2026). Llullaby. *Technology and Language,* *7*(3), 125-139. https://doi.org/10.48417/technolang.2026.03.10

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